UNIT - III RABBIT FUNCTIONAL ANATOMY-I

RABBIT EXTERNAL CHARACTERS:

- European grey rabbit is **Oryctolagus cuniculus**.
- Warren is an interconnected intricate net of tunnel like burrows
- Rabbit is crepuscular active during dawn & dusk
- Young rabbit is Bunny.
- Male rabbit is Buck
- Female rabbit is Doe.
- Speed of rabbit 32-40 km/hr.
- Life span of rabbit is 13 years.
- Rabbit is a herbivore which feeds on roots, soft stems, leaves, fruits, vegetables, tubers etc.
- They also feed on their own faeces, hence they are called coprophagous particularly autocoprophagous also called caecophagous.
- Peak mating period is January to June.
- One male lives with many females hence are polygamous.
- Rabbit matures at the age of six months. They breed four times in a year.
- Each time rabbit gives birth to **5-8 young ones.**
- Gestation period of rabbit is **31 days**.
- Rabbits produce thumping sound as warning signal to other members by thumping the ground with hind limbs and lifting of tail.
- Rabbits are homeothermic. The body temperature is **35.5**°C
- Body is covered by fur which is greyish dorsally & laterally and light grey ventrally. The tail has white fur ventrally.
- Body is divisible into head, neck, trunk and tail.
- Head is pear shaped.
- Mouth is bounded by movable **muscular lips**.
- Upper lip has a cleft and hence it is called hare lip.
- Incisors are visible through the cleft.
- Nostrils are surrounded by moist skin called **Rhinarium.**
- Long stiff tactile hairs present on either side of upper lip are called **vibrissae or whiskers**.
- Each eye has movable upper and lower eye lids bearing eye lashes.
- Third eye lid is present in the **anterior corner of** each eye called nictitating membrane

- Visual field of each eye is 360 degrees.
- Basal part of each pinna surrounds the external ear opening or external auditory meatus.
- Pinnae can be moved independently to collect sound waves from all directions.
- Neck does not contain coelom. The neck is short and permits the animal to move its head in all directions to a limited extent.
- Thorax and abdomen are internally seperated by **diaphragm.**
- On ventral side of abdomen there are **four to five pairs of nipples or teats.** In female ducts of mammary glands open into the nipples.
- Hairless depression on each side of anus is called **perineal pouch.**
- Secretions of perineal glands produce characteristic odour.
- In male, urinogenital aperture is present at the tip of penis.
- Scrotal sacs which contains testis are present on either side of the penis.
- In female rabbit urinogenital aperture is slit like and known as **vulva**. It is located below the **anus**.
- Small rod like clitoris is present at the tip of **vulva**.
- Clitoris is homologous **to the penis of male**.
- Each fore limb is divisible into proximal upper arm (brachium), Middle fore-arm (antibrachium) and distal hand (manus).
- The manus has five fingers with curved claws.
- Each hind limb is divisible into proximal thigh (femur), middle shank (crus) and distal foot (Pes)
- Each pes has **four toes ending with claws**.
- The first toe (hallux) which is equal to **the thumb** of fore limb (pollex) is absent.
- Hind limbs are mainly used for **leaping**.
- In case of danger the tail is raised showing white patch of fur present on the lower side of tail.

RABBIT DIGESTIVE SYSTEM <u>ALIMENTARY CANAL:</u>

- Alimentary canal of rabbit is very long and coiled due to its <u>herbivorous</u> habit.
- **Region of ingestion** mouth, buccal cavity and pharynx.
- **Region of digestion** mainly stomach and small intestine.

- Region of absorption small intestine and large • intestine.
- Region of egestion - rectum and anus.
- Transverse slit - like mouth is bounded by mov able and muscular upper and lower lips.
- The cavity present among lips, cheeks and gums of teeth is called vestibule
- The roof of the buccal cavity is called palate •
- The dorsal nasal passage and ventral oral food • passage is separated by palate
- The palate is distinguished into anterior hard pal • ate and posterior soft palate
- Antirior hard palate is formed by - Premaxilla and Maxillary processes.
- Posterior hard palate is formed by -Palatine bones.
- The ectodermal lined transverse ridges present on • the lower surface of the hard palate are called 'palatine rugae'
- Soft plate is formed by connective tissue
- The narrow posterior soft palate which hangs down into the pharynx is called Uvula
- A pair of openings of naso-palatine ducts open in the anterior part of hard palate
- Jacobson's organ opens into naso-palatine duct.
- Jocobson is organ is probably useful to recognise different kinds of food.

TOOTH

- Dentition in rabbit is thecodont, heterodont, and diphyodont
- The crown of incisors is sharp and chisel - like
- The crown of canines is conical and pointed
- The premolars and molars are together known as grinding teeth
- Type of teeth absent in the dentition of adultcanines
- Teeth found in milk teeth of rabbit

- incisors and premolars

- ٠ The gap found on the jaw between incisors and premolar is diastema
- The dental formula of rabbit is *i*2,*c*:0,*p*:3,*m*:3
 - $\overline{i1, c: 0, p: 2, m: 3}$
- The total no of teeth in rabbit = 28

- Typical dental formula of eutherian = $\frac{3143}{3143} = 44$ •
- Parts of typical mammalian tooth : crown (visible part). Neck (enclosed by gum) Root (buried in jaw socket)
- Bulk of tooth is formed by **dentine**

- Dentine is bone-like and contains canaliculi but Hav ersian canals are absent
- The central pulp cavity of tooth is lined by layer of odontoblasts
- Tooth contains a cavity called pulp cavity
- Pulp cavity has openinig at the base of the root
- The dentine of crown is covered by shiny white Enamel
- Enamel is the hardest part of the body
- The dentine of root is covered by Cement:
- The socket is lined by periodontal membrane formed by dense fibrous connetive tissue.

TONGUE

- Muscular, flat, movable, tongue is present on the floor of the buccal cavity
- Papillae of the tongue contain taste buds
- Papillae situated along the margin of tongue - Fungi form
- Papillae situated on the upper surface of tongue -Filiform
- Papillae situated at the base of tongue - circumvallate
- Papillae situated at the sides of the base of tongue - Foliate
- Tongue is formed mainly by intrinsic muscles.
- Tongue is attached to other structures by extrinsic • muscles.
- Reposition of tongue - Extrinsic muscles
- Shape of tongue is altered by - intrinsic muscles.
- Tonsils are of three kinds.
- Tonsils on either side of throat-palatine tonsils.
- Pharyngeal tonsil is present in nasopharynx.
- Lingual tonsils present at the back of tongue.
- Unpaired tonsil is pharyngeal tonsil or adenoid.
- Paired tonsils are palatine and lingual tonsils.
- Total no. of tonsils - 5.

PHARYNX

- Divisions of Pharynx : A dorsal Nasopharynx, a ventral Oropharynx and posterior Laryngopharynx
- Nasopharynx is situated above soft palate.
- 1 pair of internal nostrils and 1 pair of Eustachian apertures are present in Nasopharynx
- Oropharynx is located below the **soft palate**.
- Nasopharynx and oropharynx are connected to laryngopharynx.
- Laryngopharynx opens into larynx throughglottis

- Glottis is guarded by epiglottis
- Laryngopharynx also opens into oesophagus through <u>gullet</u>
- Gullet is gaurded by upper oesothageal sphincter.

OESOPHAGUS

- It is a long, narrow muscular tube which passes through the neck, thoracic cavity and opens into stomach in the abdominal cavity.
- The inner surface of the oesophagus contains **Mucous glands & longitudinal folds.**
- Anterior 3rd of oesophagus is formed by striated muscles.
- Posterior 3rd of oesophagus is formed by unstriated muscles.

STOMACH

- Stomach lies on the left side of the <u>anterior</u> part of <u>abdominal cavity</u>
- Stomach has smaller inner concave surface and a large outer convex surface called lesser and greater curvatures respectively.
- Parts of stomach: Cardiac, Fundic and Pyloric regions.
- Oesophagus opens into cardiac stomach through <u>Cardia</u>
- Cardia is guarded by <u>lower oesophageal sphinc-ter.</u>
- Pyloric stomach opens into duodenum through pylorus
- Pylorus is guarded by pyloric sphincter
- Cardiac sphincter prevents regurgitation
- Phyloric sphincter regulates the flow of <u>chyme</u> into duodenum
- Biggest part of the stomach is <u>Fundic region</u>
- 4 Layers of the stomach wall are : Outer serous layer, muscular layer, submucosa and <u>inner mucosa</u>
- <u>Serous layer</u> is formed by <u>squamous epithelium</u> and <u>connective tissue</u>
- <u>Muscle layer</u> is composed of outer <u>longitudinal</u> muscles, inner <u>circular muscles</u> and below to these oblique muscles.
- The muscles of stomach (gut) are of <u>unstriated</u> type.
- <u>Submucosa</u> lies below the muscle region, and is formed of <u>connective tissue</u>
- Blood capillaries, lymph capillaries, nerves and bases of gastric glands are found in <u>submucosa</u>
- Mucosa is the <u>inner most</u> layer of stomach
- Mucosa contains outer <u>muscularis mucosa</u>, inner <u>simple columnar epithelium.</u>

- The inner longitudinal folds of stomach are called <u>rugae.</u>
- Rugae allow the expansion of the stomach.

SMALL INTESTINE

- Length of small intestine -2.5m.
- Parts of small intestine anterior <u>duodenum</u> and posterior <u>Ileum</u>
- Duodenum is <u>U-shaped anterior part</u> of small intestine
- Bile duct opens into the beginning of <u>proximal limb</u> of duodenum
- Pancreatic duct opens into beginning of <u>distal limb</u> of duodenum
- The terminal bulb like region of Ileum <u>sacculus</u> rotundas
- Caecum and large intestine arise from <u>sacculus</u> rotundas
- The wall of small intestine also contains four layers.
- Brunner's glands are found in <u>submucosa</u> of <u>duodenum</u>
- Function of Brunner's gland : <u>Mucous secretion</u>
- The finger like projections of mucosa of Ileum are called <u>Villi</u>
- Villus contains an <u>arteriole</u>, <u>venule</u> and lymph <u>cap-</u> <u>illary</u>
- The lymph capillary of villus is called <u>'Lacteal'</u>
- Function of intestinal villi is to increase the area of absorption
- Pocket like depressions among villi <u>crypts of</u> <u>Lieberkuhn</u> (intestinal glands)

LARGE INTESTINE

- Villi are absent in <u>large intestine</u>
- Length of caecum 25 to 40 cm.
- Caecum contains <u>spiral valve</u>
- Caecum ends with thick walled blind tube called <u>appendix (13cm long)</u>
- Symbiotic bacteria are found in <u>caecum</u>
- Cellulose digestion in caecum occurs by <u>symbi-</u> <u>otic bacteria</u>
- <u>Ileo-caecal valve</u> present in <u>sacculus rotundus</u> of <u>Ileum</u>
- Ileo-caecal valve directs the food into the <u>caecum</u>
- Length of colon 45 cm
- The middorsal longitudinal muscular bands of colon - <u>taenia</u>
- The series of pouches of the inner part of colon <u>Haustra</u>
- Length of rectum : 75 cm

- Rectum exhibits beaded appearance due to the presence of - Faecal pellets
- Water reabsorption occurs through large intestine
- The terminal part of the large intestine is anal canal, it opens out through anus.
- Anus lies at the base of the tail and is guarded by internal anal sphincter of smooth muscles and an external anal sphincter of striated muscles.

DIGESTIVE GLANDS

- External digestive glands are Salivary glands, Liver, • Pancreas
- Internal digestive glands are Gastric glands & In testinal glands

SALIVARY GLANDS

- No. of Salivary glands in Rabbit - 4 pairs
- Salivary glands are of Compound tubular type
- Salivary glands which lie at the bases of pinnaeparotid glands
- Duct of parotid gland- Stenson's duct •
- Stenson's duct opens into the buccal cavity behind - Upper incisors
- Glands situated on the inner side of angles of lower • jaws - Submaxillary glands
- Duct of Submaxillary gland-Whorten's duct
- Whorten's duct opens into the buccal cavity near the - lower incisors
- Glands situated below the tongue - Sublingual glands
- The duct of sublingual gland (duct of rivinus) opens into the buccal cavity below the free part of -Tongue
- Glands situated below the orbits Infra orbital • glands
- The ducts of infra orbital glands open into the buccal cavity near - Upper molars
- No. of salivary glands in man 3 pairs
- Salivary glands not found in man Infra orbital glands
- Saliva is secreted by - Mucous and serous cells
- The pH of saliva is 6.9 (Slightly acidic)
- Saliva contains water, mineral salts, mucin and an enzyme Ptyalin or Salivary amylase.

GASTRIC GLANDS

- Gastric glands are present in the wall of stomach
- Gastric glands are of-Simple branched tubular type
- The bases of gastric glands lie in- Sub mucosa
- Based on location, gastric glands are of 3 types
- Cardiac glands, Fundic glands, and pyloric glands
- Both cardiac and fundic glands are formed of mu-

cus cells and secrete - mucus

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- Types of cells are found in fundic glands: a) Oxyntic cells or parietal cells - secrete -HCl and Castle's intrinsic factor.
 - b) Neck cells secrete mucus
 - c) Zymogen cells or chief cells secrete pepsino gen and prorennin
 - d) G cells secrete hormone gastrin
- Gastric juice contains-HCl, Mucin, Pepsinogen, Prorennin, and castle's intrinsic factor.
- P^H of gastric juice - 1.5-2.0 (Strongly acidic)

INTESTINAL GLANDS

- These are present in the lining of - Small Intestine - Types of intestinal glands are a) Brunner's glands b) Crypts of Lieberkuhn
- Brunner's glands are present in - Sub mucosa of duodenum
- Function of Brunner's glands - Secretion of Mucus
- Pocket like structues in the mucosa of Ileum -Crypts of Lieberkuhn
- Crypts of Lieberkuhn open into small pits among -Villi
- Secretions of Brunner's glands and thatof crypts of Lieberkuhn constitute - Succus entericus or Intestinal Juice
- P^H of Intestinal Juice - 7.6 (Slightly alkaline)
- Succus entericus contains:
- Mucin, Enterokinase, Peptidases, (dipeptidase, tripeptidase, amino peptidase)
- Lipase, Disaccharidases (Maltase, Sucrase, Lactase), phosphotasese and nucleosidases LIVER
 - Largest gland in the body Liver
- • No of lobes in the liver - 5 (right:2; left:3)
- Right lobes of liver - Right central, Right Caudate lobes, Left Lobes of liver, Left central, Left lateral & Spigelian lobe
- Gall bladder lies between -Right and Left lobes
- Duct arises from gall bladder -Cystic duct
- All bile ducts of each side unite to form the hepatic duct.
- Right and left hepatic ducts unite to form the common hepatic duct.
- Cystic duct and common hepatic duct unite to form • - common Bile duct
- Common bile duct opens into the proximal part of - duodenum
- The opening of bile duct is guarded by-**Sphincter** of oddi

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- Each hepatic lobe contains rows of hepatic cells called - Hepatic cords
- Among the liver lobules are present-Glisson's Capsules
- Each lobule contains an intra lobular central vein
- Glisson's Capsule contains hepatic artary, hepatic portal vein, bile duct, lymph vessels etc
- Phagocytic cells present among the liver cells-Kupffer cells
- Secretion of liver Bile Juice •
- pH of Bile Juice 7.6 (Slightly alkaline) •
- Enzymes are absent in • _ **Bile Juice**
- Bile Juice is a greenish fluid contains bile salts and bile pigments.
- Bile pigments are biliverdin and bilerubin
- Function of bile Juice : Emulsification of fats •
- Bile canaliculi are present between the hepatocytes
- Sequence of ducts in liver: bile canaliculi \rightarrow bile duct \rightarrow hepatic ducts \rightarrow common hepatic duct \rightarrow cystic duct \rightarrow common bile duct.

FUNCTIONS OF LIVER

- Promotes Glycogenesis (glucose \rightarrow glycogen) Promotes glycogenolysis (glycogen \rightarrow glucose)
- Conversion of amino acids, lactate or glycerol into • glucose (gluconeogenesis)
- It produces blood coagulating proteins like factor • I, II, V, VII, IX, X and XI.
- Converts ammonia to urea
- Haemopoietic organ in <u>embryonic stage liver</u> •
- Synthesises vitamin A and stores vitamin D •
- Detoxifying organ.
- Synthesis of cholesterol and production of triglycerides.
- Stores glycogen, vitamin B_{10} , Iron and Copper.
- Erythroclastic organ in adults. •

PANCREAS

- Second Largest gland Pancreas •
- Irregular, thin, flat and pinkish gland situated in the loop of duodenum
- It is partly exocrine and partly endocrine (Mixed • gland) in function.
- Acini of exocrine part secrete -Pancreatic juice
- P^H of pancreatic juice is 8.0 (Slightly alkaline) •
- Enzymes present in pancreatic juice -
- Trypsinogen
- Chymotrypsinogen •
- **Carboxypeptidase-(Exopeptidase)**
- Nuclease, Amylase, Lipase

Lipase of pancreatic juice is also called steapsin.

PROCESS OF DIGESTION

- Food of rabbits contain
 - -Carbohydrates
 - Proteins
 - Fats
 - Vitamins
 - Minerals
 - Water

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- Nutrients which require digestion :
 - Proteins
 - Carbohydrates
 - Fats
- Body builders are-Proteins-Energy producers are carbohydrates and fats:
- Metabolic regulators are-Vitamins and Minerals
- The process of break down of large complex molecules of food into simple diffusable molecules is called - Digestion
- End products of protein digestion aminoacids •
- End products of fat digestion - Fatty acids & Glycerol
- End products of carbohydrate digestion Glucose, Fructose and Galactose

Types of digestion

- Mechanical, Chemical and Microbial
- Mechanical digestion involves Chewing of food in buccal cavity and churning of food in stomach
- Chemical digestion involves the biochemi cal reactions in gut with the help of enzymes
- Microbial digestion involves the digestion of • cellulose by symbiotic bacteria in the caecum

DIGESTION IN BUCCAL CAVITY:

- Food is cut into pieces by Incisors •
- Food is masticated by - Premolars and Molars
- The ball-like moistened food formed in the buccal cavity is called -Bolus
- Carbohydrates are partially digested in the buccal cavity by salivary amylase - Ptyalin
- Ptyalin or α amylase converts starch into dextrins and to maltose in the prescence of -Chloride ions
- Lysozyme of saliva dissolves bacterial cellwall.
- Lingual lipase breaks triglyceride into fattyacids and monoglycerides.

DIGESTION IN STOMACH

- The Churning movements of stomach cause -Mechanical digestion.
- In the stomach the food is mixed with gastric juice
- Gastric juice contains :

HCl, Mucin, Pepsinogen, Prorennin, Lipase and Castles intrinsic factor

- Stomach has 35 million gastric glands in man.
- Killing of Bacteria and other microbes of the food
- Conversion of inactive pepsinogen into active pepsin
- Conversion of Prorennin into active rennin
- Prorennin is present in the gastric juice of Infants
- Pepsin and rennin digest the proteins in <u>acidic medium</u>
- Rennin converts casein into Paracasien and proteoses.
- Action of pepsin :Conversion of <u>proteins</u> into <u>pep-</u> tones, <u>proteoses</u>
- Pepsin performs autocatalylsis
- Action of castle's intrisic factor Absorption of vitamin B₁₂
- The inner lining of stomach is protected from the action of Hcl by <u>Mucin</u>
- The partially digested acidic fluid like food in the stomach is called -<u>Chyme</u>
- Carbohydrates are not digested in the <u>Stomach</u>
- Only small change triglycerides are digested in the Stomach by gastric lipase.

DIGESTION IN THE INTESTINE

- In the intestine the acidic chyme is mixed with <u>bilejuice</u>, <u>pancreatic juice</u>, and <u>intestinal juice</u> (succus entericus)
- The acidic chyme is changed to alkaline chyme by the <u>bile juice</u>
- Enzymes of pancreatic juice : Trypsinogen, Chymotrypsinogen, Carboxypeptidase, nuclease, lipase
- Enzymes of intestinal juice : <u>Enterokinase</u>, (activator) <u>Peptidases (</u>Tripeptidase , Dipeptidase,Aminopeptidase)Lipase Disaccharidases (Maltase, sucrase,lactase), phosphotases and nucleosidases.

PROTEIN DIGESTION

- The inactive trypsinogen is converted into active trypsin by <u>Enterokinase</u>
- Trypsin performs <u>auto catalysis</u>
- Chymotrypsinogen is converted into active chymotrypsin by <u>Trypsin</u>
- Trypsin and chymotrypsin convert the peptones and proteoses into <u>Polypeptides</u>
- Carboxy peptidases and Aminopeptidases break the peptides into <u>tripeptides</u>, <u>dipeptides</u>,and <u>Aminoacids</u>

Carboxypeptidase

• Polypeptides $\xrightarrow[Amin opeptidase]{Amin opeptidase}$ Tripeptides, Dipeptides

, Amino acids

- Tripeptidase converts the Tripeptides into Dipeptides and Amino acid
- Tripeptide $\xrightarrow{Tripeptidae}$ Dipeptide + Amino acid
- Dipeptide $\xrightarrow{Dipeptidas}$ Amino acids
- The end products of protein digestion - Amino acids

DIGESTION OF FATS:

- Bile salts help in the <u>emulsification of fats</u>
- Lipases of Pancreatic and intestinal Juices digest the emulsified fats into fatty acids+ glycerol
- Fats $\stackrel{Bile}{\rightarrow}$ emulsified fats
- Emulsified fats \xrightarrow{Lipase} Fatty acids, Glycerol
- End products of fat digestion : Fatty acids and Glycerol.
- Preparatory phase-digestion of fats in intestine and some extent in the stomach.
- Transport phase transport of fattyacids and glycerol across membrane of intestinal villi into epithelial cells.
- Transportation phase convertion of fatty acids and glycerol into fats and release into lacteals.

DIGESTION OF CARBOHYDRATES

- Pancreatic amylase digest the carbohydrates into disaccharides (Maltose, Sucrose, Lactose)
- Disaccharidase of intestinal juice convert the disaccharides into Monosaccharides (glucose fructose, galactose)
- Carbohydrates $\xrightarrow{amylase}$ Maltose, Sucrose, Lactose
- Maltose $\xrightarrow{Maltase}$ glucose, glucose
- Sucrose $\xrightarrow{Sucrase (invertase)}$ Glucose, fructose
- Lactose $\xrightarrow{Lactase}$ glucose, galactose
- End product of Carbohydrate digestion -Monosaccharides (Glucose, Fructose, Galactose)
 DIGESTION OF NUCLEIC ACIDS
- RNAase DNAase are present in pancreatic juice.
- Phosphotases and necleosidases are present in intestinal juice.
- Phosphotases hydrolyse the ester bonds to release phosphate from nucleotide.
- Nucleosidases hydrolyse glycosidic bond to digest nucleosides into pentose sugars and nitrogen bases.

- Symbiotic bacteria in caecum secrete-cellulase
- Cellulose digestion occurs in Caecum
- Diffusion of digested food into the blood is known as Absorption
- Function of intestinal villi to increase the area of absorption
- Villus contains an arteriole, a venule and a lymph capillary
- The lymph capillary of intestinal villus is called -Lacteal
- Glucose and galactose are absorbed into epithelial cells by secondary active transport with Na and absorb into blood by facilitated diffusion.
- Fructose is absorbed into the cell and into the blood by facilitated diffusion.
- Amino acids are absorbed into the cell by secondary active transport with Na or by primary active transport and into the blood by diffusion.
- Short chain fatty acids are absorbed into the cell and into the blood by diffusion.
- In the absorption of long chain fatty acids and glycerol micelles and chylomicrons are formed.
- Water reabsorption occurs in <u>Large Intestine</u>
- Rabbit feeds on its own faeces (Autocoprophagus).
 The faeces contains simplified <u>sugars</u> and vitamins
- The process of elimination of undigested food is called egestion

VITAMINS

- The term 'vitamin' was proposed by <u>Funk</u>
- Vitamins are accessory food factors which are essential for growth and healthy maintenance of the body.
- Fat soluble Vitamins are A, D, E, K
- The absorption of Fat soluble vitamins is promoted by <u>Bile Juice</u>
- Fat soluble vitamins are transported to all parts of the body by <u>lymph.</u>

VITAMIN-A

- Chemical name is <u>Retinol</u>
- Common name is <u>Antixerophthalmic vitamin</u>
- Sources of Vitamin A: Fish liver oil, Milk, egg yolk
- Plants contain β carotene (Provitamin A)

 β -carotene is converted into Vitamin A in - <u>liver</u> and <u>intestine</u>.

- β carotene is rich in Carrots, green leafy vegetables
- Function of Vitamin -A Health and Vigour of Epithelial tissues and Vision.

- Visual purple (rhodopsin) is resynthesized from Vitamin A in <u>Retina</u> of eye
- Deficiency of Vitamin A causes -:Nyctalopia (night blindness)
- Xerophthalmia (dryness of conjunctiva).
- Keratomalacia (dry cornea).

VITAMIN - D

- Chemical name <u>Calciferol</u>
- Common name <u>Antiricketic vitamin</u> or <u>Sunshine vitamin</u>
- Sources of Vitamin -D: Fish liver oils, milk, egg.
- <u>Mammalian skin</u> synthesises Vitamin-D in the
- presence of light (U.V.rays).
- Vitamin -D is essential for <u>calcium metabolism</u>.-Deficiency of Vitamin-D causes : rickets in children : <u>Osteomalacia</u> in adults
- Rickets characterised by <u>bow legs</u>, <u>Knock-knees</u>, <u>pigeon breast</u>.
- Osteomalacia characterised by <u>soft</u> and <u>fragile</u> bones.
- Over dose of Vitamin D causes: nausea, headache, kidney damage, ossification of soft tissues.

VITAMIN - E

- Chemical name Tocopherol
- Common name Anti-sterility vitamin
- Sources Wheat germ oil, nuts, wheat and maize
- Vitamin- E acts as an 'antioxidant'
- Maintains health and integrity of muscles
- Proper functioning of gonads
- Deficiency of Vitamin E causes -Sterility in males
 - abortion in females
 - muscular dystrophy

VITAMIN-K

- Chemical name <u>Napthoquinone</u>
- Common name <u>antihaemorrhagic</u> vitamin
- Sources leafy vegetables, egg, liver, tomato
- Vitamin K is also synthesized by intestinal microbes
- Deficiency leads to delay in blood coagulation.

VITAMIN-B₁

 Chemical Name: Thiamine Common Name : Anti beri beri factor. <u>Functions</u>: act as co factor for few enzymes involved in carbohydrate and amino acid metabolism.

Involved in growth and proper functioning of

nervous system.

Deficiency of vitamin cause Beri-beri

Symptoms of beri beri - partial paralysis of smooth muscles of gastro intestinal tract and skeletal muscle paralysis.

• Polyneuritis (degeneration of myelin sheath, loss of appetite, stunted growth)

VITAMIN - B₂

- Chemical name <u>Riboflavin</u>
- Component of Co-enzymes, FMN and FAD
- Deficiency causes- <u>cheilosis</u>, <u>glossitis</u> and <u>seboric</u> <u>dermatitis</u>.
- Cheilosis is characterised by dryness of lips cracks at the corners of mouth.
- Glossitis is characterised by <u>inflammation of</u> <u>tongue</u>.
- Seboric dermatites scaly and greasy skin on nose and ears.

VITAMIN B₆

- Chemical name <u>Pyridoxin</u>
- involved in the production of <u>antibodies</u>
- Intestinal microbes synthesize the <u>Vitamin B₆</u>
- Deficiency in children causes <u>Convulsion</u>
- Also causes hypocromic microcytic anaemia.

VITAMIN B₁₂

- Chemical name: <u>Cyanocobalamin</u>
- Coenzyme for maturation of RBC, formation of methionine
- Deficiency causes pernicious anaemia, degenerative changes in spinal cord.

NIACIN or NICOTINIC ACID

• Common name: Anti pellagra vitamin and is part of co-enzymes like NAD, NADP Deficiency causes - pellagra, pellagra is characterised by Diarrhoea, dermatitis and dementia (disturbances in nervous system)

FOLACIN

- Chemical name Folic acid
- Formation of RBC and WBC synthesis of Adenine, Guanine and Thymine.
- Deficiency causes macrocytic anaemia, delayed replication of DNA, Leucopenia

PANTOTHENIC ACID

- Constituent of Coenzyme A
- Intestinal microbes synthesize this vitamin
- Deficiency causes <u>Poor growth, early aging,</u> premature greying of hair

BIOTIN

- Acts as coenzyme for <u>carboxylase</u>
- Mineral present in this vitamin is <u>sulphur</u>
- Deficiency is caused due to consumption of <u>raw</u> eggs
- Raw egg white contains the protien avidin
- Intestinal microbes synthesises it.

VITAMIN - C

- Chemical name Ascorbic acid
- Common name Antiscorbutic vitamin
- Sources- Citrus fruits (lime, orange) tomatoes, leafy vegetables
- Maintains matrix of <u>cartilage bone</u> and <u>dentine</u>.
- Maintains integrity of endothelium
- Helps to dissolve <u>cholesterol</u> in blood
- Provides <u>resistance</u>
- Helps in wound repair
- Enhances absorption of iron
- Deficiency causes <u>'Scurvy'</u> Scurvy is characterised by
 - skin eruptions
 - swollen and bleeding gums of teeth
 - haemorrhage
 - poor healing of wounds

MINERALS

- Minerals form 4% of the body weight
- Minerals are classified into Macronutrients and Micronutrients.

MACRONUTRIENTS:

1)Calcium:

Source : Milk, egg yolk, cabbage, cauliflower -Functions: major component of bones and teethplays important role in <u>blood coagulation</u>.

- Muscle contraction
- Nerve irritability

Deficiency causes: rickets in children & Osteomalacia in adults.

2) Phosphorus:

Source: Milk, cereals, egg, fish, meat Functions: Major component of bones and teeth : ATP and coenzymes contain phosphorus Deficiency causes - <u>rickets</u> and osteoporosis

3) Sodium:

Source: Table salt, oysters,, wheat germ, oils, carrots. Functions: Maintenance of osmotic balance Muscle contraction nerve impulse propogation emulsification of fats Deficiency causes: Muscle cramps, head ache, nausea etc.

4) Potassium:

Source: chicken, beef, pork, potato, banana **Functions**: component of intracellular and e x t r a cellular fluids of cardiac muscles, acid base balance and nerve impulse propagation.

Deficiency causes: muscle weakness, tachycardia, paralysis (hypokalemia)

Hypokalemia - low level of serum potassium Hyper kalemia - high level of serum potassium (dehydration renal failure cardiac failure)

5) Magnesium:

Sources: Cocoa, nuts, Soya beans **Functions:** Combine with Ca, P in the complex salts of bone involved in <u>protein</u> and <u>lipid</u> metabolism

Deficiency causes : Hyper excitability of nervous system, muscle tremors, convulsions bloring :

6) Chlorine :

Sources: Table salt

Functions: Water balance and osmotic pressure regulation

maintain acid base equil librium in blood (chloride shift)

Deficiency causes : Vomiting, Hypochloremic alkalosis

7) Sulphur:

Sources: Wheat germs, cheese, cabbage **Function:** formation of insulin, protien bio s y n - thesis

Deficiency causes - stunted growth

MICRONUTRIENTS

1) **Iron**:

Sources: Liver, heart, kidney, egg, fish, leafy vegetables

Functions: Component of Haemoglobin, cytochromes

Deficiency causes: <u>Anaemia</u>

2) Copper:

Sources: Nuts, shell fishes, liver, kidney Functions: synthesis of haemoglobin Proper activity of certain enzymes

Deficiency causes: Anaemia loss of weight

3) Iodine:

Sources: Sea foods, iodised salts Functions: Synthesis of thyroid hormones Deficiency causes: Thyroid Hypertrophy (simple Goitre)

 4) Manganese: Sources: Nuts, grains, vegetables, fruits
 Functions: Bone formation, reproduction
 Deficiency causes: Sterility

5) Cobalt

Sources: Liver, Kidney **Functions:** Formation of R.B.C <u>deficiency</u> leads to <u>Anaemia</u>, loss of <u>weight, weakness</u> Excess cobalt leads to - Poly cythemia

6) Zinc

Sources: Meat, liver, eggs, Functions: Growth, reproduction, tissue repair, healing, proper vision Deficiency causes: Hypogonadism Dwarfism

NUTRITIONAL REQUIREMENTS IN RELEATION TO BALANCED DIET

- The study of food stuffs and nutrition is called dietetics.
- Carbohydrates are formed by C. H and O in 1 : 2 : 1 ratio.
- These are polyhydroxy aldehydic or ketonic organic compounds.
- The general formula of carbohydrates is $C_n(H_2O)n$
- On the average, an adult person needs 500g carbohydrates per day.
- One gram of carbohydretes yield : 4.0 k.cal energy.
- Proteins are formed by C, H, O and N.
- Nitrogen is the peculair element of protiens.
- Proteins are polymers of amino acids.
- An average person needs about 70-100g of proteins per day.
- One gram of proteins yield 4.0 k.cal energy.
- Fats are formed by C, H and O.
- Number of oxygen atoms is less than carbon atoms in fats.
- The ratio of carbon and oxgen in carbohydrates is same i.e., 1 : 1.
- On the average an adult man needs about 50gm fats per day.
- One gram of fats yield 9.0 k.cal energy.
- water in the human body is 65 %
- A man needs 5-6 glasses of water per day.
- An imbalance of the total caloric intake or imbalance in the intake of specific nutrients, which can either inadequate or excessive, is refereed to as **Malnutrition.**
- Deficiency of calories and specific nutrients is referred to as **Undernutrition**
- Deficiency of protiens in a normal caloric intake is called **Kwashiorkor**

- Prtotein - calorie under nutrition leads to a disorder called Marasmus.
- Excess intake of food is **Overnutrition**
- Excess intake of saturated fats is hypercholestrolemia.
- Hypercholesterolemia leads to cardiac disorders.
- Excess intake of calories may produce overweight and obesity.

RABBIT EXTERNAL CHARACTERS: LEVEL-I

1.	Rabbit belongs to the order		
	1) Primata	2) Lagomorpha	
	3) Rodentia	4)Sirenia	
2.	The intricate network of bu	urrows where rabbits live	
	is called		
	1)Barren	2) Warren	
	3) Rumen	4) Foramen	
3.	The body temperature of	rabbit is	
	1) $35.5^{\circ}F$	2) $37.5^{\circ}F$	
	3) $37.5^{\circ}C$	4) $35.5^{\circ}C$	
4.	Long, stiff, tactile hairs the	at are present at the mar-	
	gin of upperlip of rabbit	-	
	1) Vibrissae	2)Antennae	
	3) Antennules	4) Chelicerae	
5.	The structure of female rab	bit which is homologous	
	to penis of male rabbit is		

4) Clitoris 3) Perineum The proximal part of forelimb of rabbit is 6. 1) Manus 2) Antebrachium 3) Brachium 4) Shank/Crus Structure absent in rabbit in the following is 7.

2) Whisker

1) Vulva

1) Hallux 2) Pollex 3) Third eyelid 4) Tail

LEVEL - II

In female rabbit, the structure homologous to penis 8. of male is present in the 1) Anterior wall of urethra 2) Anterior wall of uterus 3) Posterior wall of uterus 4) Anterior wall of vestibule

RABBIT DIGESTIVE SYSTEM ALIMENTARY CANAL: LEVEL - I

- 9. Small cavity present between lips, cheeks and gums of teeth in rabbit is called 2) Vestibule 1) Perineum 3) Buccal cavity 4)Nasal chamber
- 10. In rabbit, the roof of buccal cavity is formed by 1) Anterior hard palate & posterior soft palate 2) Anterior soft palate & posterior hard palate 3) Upper hard palate & lower soft palate 4) Upper soft palate & lower hard palate 11. In rabbit, the buccal cavity and nasal chamber are separated by 1)Uvula 2) Epiglottis 3) Jacobson's organ 4) Palate 12. In rabbit, transverse ridges on the lower surface of hard palate are called 1)Villi 2) Papillae 3) Palatine rugae 4) Gyri 13. In rabbit, Jacobson's organ opens into buccal cavity by 1)Inguinal canal 2) Bidders canal 3) Stensons duct 4) Naso-Palatine duct 14. The dental formula of Rabbit is 1) $\frac{1,0,3,3}{2,0,2,3} \times 2$ $2)\frac{2,0,3,3}{1,0,2,3} \times 2$ 3) $\frac{2,0,2,3}{1,0,3,3} \times 2$ 4) $\frac{2,1,2,3}{2,1,2,3} \times 2$ 15. In rabbit the set of permanent teeth does not possess 1) Cutting teeth 2) Grinding teeth 3) Cutting teeth & Tearing teeth 4) Tearing teeth 16. Persistant teeth in rabbit are 1) Incisors 2) Canines 3) Premolars 4) Molars 17. The papillae arranged in semicircle at the base of rabbit's tongue are 1) Fungiform 2) Filiform 3) Foliate 4) Circumvallate 18. Eustachian tubes of Rabbit open into 1) Nasopharynx 2) Oropharynx 4) Buccal cavity 3) Laryngopharynx 19. Pharyngeal tonsil of Rabbit is located in 1) Nasopharynx 2) Oropharynx 3) Laryngopharynx 4) Buccal cavity 20. The freely hanging, posterior extension of soft palate into pharynx is called 1) Penis 2) Uvula 3) Clitoris 4) Epiglottis 21. Uvula is a part of 1) Stomach 2) Soft palate 3) Hard palate 4) Large Intestine 22. During swallowing, entry of food into larynx is prevented by 1) Uvula 2) Glottis 3) Epiglottis 4) Tonsils 23. In rabbit diastema is present on 1) Both sides of upper jaw only 2) Both sides of lower jaw only 3) One side of both jaws

 - 4) Both sides of both jaws

24.	The total number of mole	ar teeth in the dentition of	37.	In Rabbit, sacc
	Rabbit is	0) 0		1) Anterior end
	1)6	2) 3		2) Posterior end
25	3) 12 Di tra 6 11 11 1	4) 10		4) Posterior end
25.	Diastema found in the de	entition of Rabbit	38	In the alimentar
	is due to the absence of		50.	in the anniental
	1) Premolars	2) Molars		1) Ileum
	3) Canines	4) Incisors		3)Caecum
26.	In rabbit, teeth absent in	milk set are	39	In rabbit cellul
	1) Incisors, Canines	2)Canines, Premolars	57.	1) Caecum
	3) Molars, Canines	4) Molars, Premolars		3) Colon
27.	Palate in Rabbit is found		40.	In rabbit, poster
	1) On the roof of the buc	cal cavity		1) Caecum
	2) Floor of the buccal car	vaity		3) Sacculus rotu
	3) Inbetween nasophasyr	nx and larynx	41.	The small, rour
	4) Inbetween molars and	premolars		rabbit are called
28.	Dentition of Rabbit is			3) Haustra
	1) Heterodont, Thecodor	nt, Diphyodont	42	In rabbit, verm
	2) Heterodont, Thecodor	nt, Monophyodont		1) Intestine
	3) Homodont, Acrodont,	, Polyphyodont		3) Stomach
	4) Homodont, Acrodont,	, Thecodont		Johnach
29.	Glottis is the opening bet	ween	40	
	1) Nasopharynx & Oeso	phagus	43.	
	2) Oropharynx & Oesop	hagus		A) Haustra
	3) Laryngopharynx & La	rynx		B) Uvula
	4) Laryngopharynx & Oe	esophagus		C) Sacculus rotu
30.	Grinding teeth in Rabbit	are		D) Jacobsons or
	1) Incisors only	2) Premolrs, Molars		•
	3) Canines, Premolars	4) Molars only		1) IV
31.	Teeth of Rabbit which ex	hibit continuous growth		2) IV
	1) Incisors	2) Canines		3) I
	3) Premolars	4) Molars		4) I
32.	In rabbit, teeth with wide	opening of the pulp cavity	44.	Assertion (A) : I
	are			Incisor and Prem
	1) Canines	2) Premolars		1) A is correct of
	3) Incisors	4) Molars		1) A is contect a
33.	Hardest substance in the	body of rabbit is		$(2) \land \land$
	1)Cartilage	2)Enamel		tion to A
	3) Bone	4) Dentine		$(4) \Delta$ is wrong a
34.	Enamel covering region	of tooth in rabbit is	15	In rabbit teeth x
	1) Root	2) Neck	чĴ.	
	3) Crown	4) Jaw		1) Having coni
35.	In rabbit, cardia is found	in between		2) Having wide
	1) Liver & Duodenum			2) Having wide
	2) Colon & Rectum			the base of the 2 N ₁ ± 1 ± 1
	3) Oesophagus & Stoma	ich		5) inot having g
	4) Stomach & Duodenur	n		tooth
36.	Region of the alimentary	canal guarded by sphine-		4) Absent in lo
20.	ters at both the ends in Ra	abbit in the following is	46.	In rabbit, the pi
	1) Ileum	2) Colon		ratio in
	3) Caecum	4) Stomach		1) Upper jaw
				3) Both the jaw

7.	In Rabbit,	sacci	alus roti	undus li	ies at	
	1) Anterior end of lleum					
	2) Posterior end of Ileum					
	3) Antenior end of Duodenum					
	4) Posterior end of Caecum					
8.	In the alin	nentar	y canal c	ofRabbi	t, spiral valve lies	
	'n					
	1)Ileum			2) Co	olon	
	3) Caecur	n		4) Sa	cculus rotundus	
9.	In rabbit,	cellulo	ose diges	stion tak	es place is	
	1) Caecur	n		2) Ile	eum	
	3) Colon			4) Di	ıodenum	
0.	In rabbit, p	posteri	ior dilati	on of ile	um forms	
	1) Caecur	n	1	2) Co	olon	
1	3) Saccult	is rotu	indus	4)1le	co-caecal valve	
1.	The small	, roun	aea stru	ctures o	a large intestine in	
	1) Sacculi	caned	L	2) Ta	mblosoles	
	3) Haustra	3		$\frac{2}{4}$ Vi	lli	
2	In rabbit	vermi	iform aı	nendiy	r is a part of	
	1) Intestin	e		2) L i	ver	
	$\frac{1}{2}$ Stomac	.c .h		$\frac{2}{1}$ D		
	5) Stollad	/11 T		4) K		
		L	LEVE			
3.	Match the	follow	ing and	choose	the correct answer	
	Column-I			Colu	mn-ll	
	A) Haustra	1		i) Pai	ate	
	C) Sacculi	is rotu	Indus	ii) Na	isopalatine uuct	
	D) Jacobs	onsor	naus	iv) Co	blon	
	_)•		9	v) ilei	um	
		Α	в	Ć	D	
	1)	IV	Ι	V	II	
	2)	IV	l	V		
	3)		IV		V	
4	4) Accortion	 (A).1.	IV a rabbit d	lll iactomo	V	
+.	Assertion	(A) : II I Drom	nappilu Jar	lastema	is present between	
	Reason (F	R) · Ca	nines ar	e absent	t in rabbit	
	1) A is con	rect a	nd R is y	vrong		
	2) A & R a	re corr	ect and	'R' expla	ains A	
	3) A & R a	re corr	ect but F	R is not t	he correct explana	
	tion to A	1				
	4) A is wr	ono ar	nd R is w	ronσ		
5	In rabbit 1	eeth v	visible th	rough th	ne cleft of upperlip	
<i>J</i> .	ore			iougiiu	ie eien of uppernp	
	1) Uning		nal maint	ad and a		
			ai,point		•, ,	
	2) Having	wide	opening	orpuip	cavity at	
	the base of	of the	root			
	3) Not ha	ving g	gums aro	und the	neck region of	
	tooth					
	4) Absent	t in lov	ver jaw.			
6.	In rabbit,	the pr	emolars	and the	molars are in 1:1	
	ratio in	-				

1) Upper jaw	2) Lower jaw
3) Both the jaws	4) Neither of the jaws

47.	The following parts are concerned to the teeth of	53.	Which of the following is incorrect regarding
	rabbit		the teeth of rabbit
	A. Dentine B. Lining of odontoblasts		1)The total number of teeth on the upper jaw
	C. Periodontal membrane		is equal to the total number of milk teeth in
	D. Pulp cavity E.Cement		rabbit.
	Arrange them in correct sequence from		2)The total number of teeth on the lower jaw
	central cavity towards the socket		equal to the total number of molars.
	1) D-B-A-C-E 2) D-A-B-E-C		3)The total number of premolars of the lower
	3) D-B-A-E-C 4) D-A-B-C-E		jaw is equal to the total number of molars of
48.	Assertion (A): Alimentary canal of rabbit is		upper jaw.
	very long and coiled		4)The total number of incisors of the upper
	Reason (R): Rabbit is a herbivore		jaw is equal to the total number of premolars
	1) Both (A) and (R) are true and (R) is the		on the lower jaw.
	correct explanation of (A)	54.	In adult rabbit, the number of premolars on it
	2) Both (A) and (R are true but (R) is not		lower jaw is equal to the number of
	the correct explanation of(A)		1) Molars on lower jaw
	3) (A) is true (R) is false		2) Incisors on lower jaw
	4) (A) is false (R) is true		3) Incisors on upper jaw
49.	Lower oesophageal sphincter in rabbit		4) Premolars on upper jaw
	prevents the regurgitation of food from the	55.	During ingestion in rabbit food reaches the
	1) Cardiac stomach to pyloric stomach		oesophagus through which of the following
	2) Cardiac stomach to fundic stomach		route?
	3) Cardiac stomach to oesophagus		1)Mouth \rightarrow buccalcavity \rightarrow oropharynx \rightarrow
	4) Pyloric stomach to cardiac stomach		$laryngopharynx \rightarrow gullet \rightarrow oesophagus$
50.	Match the Following		2)Mouth \rightarrow buccalcavity \rightarrow oropharynx \rightarrow
	Process Organs concerned		$laryngopharynx \rightarrow glottis \rightarrow oesophagus$
	A) Egestion I) Mouth, Buccal cavity &		3)Mouth \rightarrow buccalcavity \rightarrow laryngopharynx –
	Pharynx		oropharynx \rightarrow gullet \rightarrow oesophagus
	B) Digestion II) Rectum & Anus		4)Mouth \rightarrow buccalcavity \rightarrow
	C) Absorption III) Stomach & Small Intestine		$laryngopharynx \rightarrow oropharynx \rightarrow glottis \rightarrow oesophage$
	D) Ingestion IV) Small intestine & large	56.	Which of the following regions of the alimen
	Intestine		tary canal of rabbit does not secrete a diges
	1)A- II, B-III, C IV, D I		tive enzyme?
	2)A-II, B-IV, C-III, D-I		1)Oesophagus 2)Stomach
	3)A-I, B-III, C-IV, D-II		3)Duodenum 4)Mouth
	4)A-II, B-I, C-IV, D-III	57.	Assertion: Regurgitation into oesophagus of
51.	The following are statements about the palate of		rabbit is prevented.
	rabbit		Reason: In rabbit the cardia present between
	 i) It separates buccal cavity and pharynx. 		oesophagus and cardiac stomach is guarded b
	ii) It is with anterior hard palate and		lower oesophageal sphincter.
	posterior soft palate.		1)Both A & R are true, R is the correct expla
	The correct combination is		nation to A
	1)All are true $2)Only i & ii are true$		2)Both A & R are true, R is not the correct
	3) Only iii & ii are true 4) Only i & iii are true		2) Only A is true D is false
52	Read the following statements about the		A)Dath A & D are false
52.	dentition of rabbit	58	4)Boun A & K are faise Boon should part of alimentary could in rabbi
	I. Number of teeth on upper jaw is 16.	50.	lies on the
	II. Number of teeth on each dentary is 6.		1) I eft side in anterior part of abdominal cavit
	III. Number of cutting teeth is 6.		2) I eft side in posterior part of abdominal cavit
	IV. Number of grinding teeth is 22.		3) Right side in anterior part of abdominal cav
	Which of the above are true		4) Right side in posterior part of abdominal
	1) I,II,IV 2) II,III,IV 3)I, III, IV 4)All		covity

1)The total number of t is equal to the total num rabbit.	eeth on the upper jaw ber of milk teeth in					
2)The total number of t	eeth on the lower jaw is					
equal to the total number	er of molars.					
3)The total number of r	premolars of the lower					
jaw is equal to the total	number of molars of					
upper jaw.						
4)The total number of i	ncisors of the upper					
jaw is equal to the total	number of premolars					
on the lower jaw.						
In adult rabbit, the num	ber of premolars on its					
lower jaw is equal to th	e number of					
1) Molars on lower jaw	I					
2) Incisors on lower jay	W					
3) Incisors on upper jay	W					
4) Premolars on upper	jaw					
During ingestion in rab	bit food reaches the					
oesophagus through which of the following						
route?	C					
1)Mouth \rightarrow buccalcavity	$y \rightarrow \text{oropharynx} \rightarrow$					
$laryngopharynx \rightarrow gulle$	$t \rightarrow oesophagus$					
2)Mouth \rightarrow buccalcavity	$y \rightarrow \text{oropharynx} \rightarrow$					
$laryngopharynx \rightarrow glotti$	$laryngopharynx \rightarrow glottis \rightarrow oesophagus$					
3)Mouth \rightarrow buccalcavity \rightarrow laryngopharynx \rightarrow						
oropharynx \rightarrow gullet \rightarrow	oesophagus					
4)Mouth \rightarrow buccalcavit	$y \rightarrow$					
$laryngopharynx \rightarrow oropharyn$	$x \rightarrow \text{glottis} \rightarrow \text{oesophagus}$					
Which of the following:	regions of the alimen					
tary canal of rabbit doe	tary canal of rabbit does not secrete a diges					
tive enzyme?	tive enzyme?					
1)Oesophagus	2)Stomach					
3)Duodenum	4)Mouth					
Assertion: Regurgitation	n into oesophagus of					
rabbit is prevented.						
Reason: In rabbit the ca	rdia present between					
oesophagus and cardiac	stomach is guarded by					
lower oesophageal sphincter.						

e in anterior part of abdominal cavity e in posterior part of abdominal cavity de in anterior part of abdominal cavity de in posterior part of abdominal cavity

59.	 Correct statement about rabbit in the following 1) Pyloric sphincter regulates the flow of food in to the duodenum. 2)Lower oesophayeal sphincter prevents backward flow of food into duodenum. 3)Pylorus is present between pyloric stomach 	65.	The parts of alimentary spiral constrictions and so respectively are 1) Rectum and Ileum 3)Colon and Caecum	canal of rabbit with eries of constrictions 2)Rectum and Colon 4)Caecum and Colon
	and fundic stomach.4) Cardia is present between cardiac stomach and fundic stomach.		DIGESTIVE LEVE	<u>GLANDS</u> L - I
60.	Arrange the following parts in the stomach wall of rabbit in sequence from outer to inner A. Circular muscle fibres B. Serosa C. Muscularis mucosa D. Oblique muscle fibres	67	 Gastric gland in rabbit ar 1)Simple branched tubular 2) Compound tubular gla 3)Simple alveolar glands 4) Compound alveolar glands 	e ar glands inds ands
	E. Columnar epithelium F. Longitudinal muscle fibres G. Submucosa 1)B-E-A-D-G-C-E 2)B-A-E-D-G-C-E	68.	1) Oxyntic cells 3) Parietal cells The largest part of Rabbi	2) Zymogen cells 4) Kupffer cells t's stomach is
61.	3)B-F-A-G-D-C-E 4)B-F-A-D-C-G-E The following are statements about the caecum of Rabbit	69.	1) Cardiac stomach 3) Pyloric stomach The gland cells of stoma	2) Fundic stomach 4) Ileum ch that secrete HCl are
	 i) Caecum ends with vermiform appendix. ii) Caecum contains symbiotic bacteria. iii) Caecum is the region of cellulose digestion. The correct combination is 1)All are true 2)i & ii are true 3)iii & ii are true 	70.	 Zymogen cells Chief cells Oxyntic / Parietal cells Mucus cells Gastric glands formed of Fundic and cardiac of 	s `only mucous cells are ands
62.	Anus in rabbit is guarded by 1) Internal anal sphincter of striated muscles and external anal sphincter of smooth muscles 2) Internal anal sphincter of smooth muscles and external anal sphincter of striated muscles 3) Both internal and external anal sphincters of striated muscles 4) Both internal and external anal sphincters of smooth muscles	71.	 2) Brunners glands 3) Fundic glands 3) Fundic glands 4) Cardiac and pyloric gl Salivary glands of rabbit 1. Compound tubular glands 2. Simple tubular glands 3. Simple branched tubul 4. Compound branched t Succus entericus is sec 	ands are nds ar glands ubular glands reted by
63.	Wrong statement in the following about the alimentary canal of rabbit is 1)Layer absent in the wall of small intestine but present in stomach is oblique muscle layer. 2)Submucosa of duodenum contains Brunner's glands whereas mucosa of ileum contains crypts of Lieberkuhn. 3)Finger like elevation in the mucosa of large intestine are called villi.	73.	 Zymogen cells & Oxyn Brunner's glands & C Liver & pancreas Gastric glands & salive The salivary glands that absent in man are Parotid glands Sub lingual glands Sub maxillary glands Infra ortibal glands 	ntic cells rypts of Leiber kuhn ary glands are present in Rabbit but
64	 4)Villi increase the area of absorption. F unctions of large intestine are 1)Absorption of digested food 2)Absorption of water from undigested matter 	74. 75.	In rabbit, salivary glands 1) Parotid glands 3) Infra orbital glands Whorten's duct arises fi	with stenson's ducts are 2) Sub maxillary glands 4) Sub lingual glands rom
	3)Elimination of feaces 4)2 and 3	76.	1) Sub lingual gland 3) Infra orbital gland The enzyme present in the 1) α amylase 3) Enterokinase	 2) Sub maxillary gland 4) Parotid gland e saliva of rabbit is 2) Trypsin 4) Lipase

77.	. Number of right and left liver lobes of rabbit are		
	spectively		
	1) 3,2	2) 2,3	
	3) 2,4	4) 4,2	
78.	In Rabbit, sphincter of O	ddi guards the opening of	
	1) Oesophagus into cardi	iac stomach	
	2) Pyloric stomach into d	uodenum	
	3) Bile duct into duoden	um	
	4) Ileum into caecum		
79.	Which of the following is n	ot an enzvme?	
	1) Trypsin	2) Amvlase	
	3) Lipase	4) Gastrin	
80.	The largest digestive gland	dis	
	1) Bone marrow	2) Liver	
	3) Spleen	4) Kidney	
81.	Kupffer cells are found in	, ,	
	1) Gall bladder	2) Pancreas	
	3) Liver	4) Stomach	
82	Ammonia is converted in	to urea in	
02.	1) Pancreas	2) Kidneys	
	3) Liver	1) Spleen	
83	Formation of glucose in	liver from non-carbohy	
65.	drates is called	liver nonn non-carbony-	
	1) Characteristic		
	1) Glycogenesis	2) Gluconeogenesis	
0.4	3) Lipogenesis	4) Cori & Cori cycle	
84.	Blood coagulation factor	formed by liver with the	
	help of Vitamin K is		
	1) Heparin	2) Cephalin	
	3) Thromboplastin	4) Prothrombin	
85.	In rabbit, Brunner's Gla	inds are found in	
	1)Submucosa of Ileum		
	2)Submucosa of Duoden	um	
	3) Submucosa of Stomac	ch .	
	4) Mucosa of Caecum		
86.	Which of the following is	not a function of liver	
	1)Production of Urea		
	2)Synthesis of Prothromb	pin	
	3) Synthesis of Vitamin A	<u> </u>	
	4) Production of Glucago	n	
87	Digestive enzymes are ab	osent in the secretion of	
	1) Intestinal glands	2) Gastric glands	
	3) Pancreas	4) Liver	
88.	Cells which secrete pepsir	noden are	
	1) Oxynctic cells	2) Zvmogen cells	
	3) Argentiffin cells	4) Kupffer cells	
89.	Castle's intrinsic factor	is secreted by	
	1) Mast cells	2) G cells	
	3) Zymogen cells	4) Oxyntic cells	
90.	Brunner's glands are fou	nd in	
	1) Stomach	2) lleum	
	3) Duodenum	4) Oesophagus	
91.	The nature of gastric Juice	eis	
	1) Highly acidic	2) Slighty alkaline	
	3) Highly alkaline	3) Slightly acidic	
92.	Sinusoids are positioned	between	
	1) Heptic lobules	2) Hepatic cords	
	/ 1	/ 1	

93. Statement-I(S-I):Liver performs gluconeogenesis Statement(S-II) : Liver converts glycogen into glucose whenever glucose is necessary
1) Both (S-I) and (S-II) are true and(S-II) is the correct explanation of (S-I)
2) Both (S-I) and (S-II) are true but (S-II) is not the correct explanation of(S-I)
3) (S-I) is true (S-II) is false
4) (S-I) is false (S-II) is true

LEVEL - II

94. Match the following and find the correct answer Gland Duct A) Liver i) Wharton's duct B) Parotid Gland ii) Small duct C) Submaxillary gland iii) Stenson's duct D) Sub-Lingual Gland iv)Bile duct С D Α В IV I. Ш 1) 2) III IV L II 3) Ш IV L II 4) Ш IV L

95. Match the following and find out the correct combination

01111111011						
Column	-I		Colui	nn-II		
A)Cysti	c duct		I) Pa	rotid gland		
B) Wha	rton's du	ıct	II) Ga	all Bladder		
C) Stenson's duct			III) S	III) Spigelian Lobe		
D) Hepa	atic duct	;	IV) P	ancreas		
. –			V)Su	ıbmaxillary glar	ıd	
	А	В	С	D		
1)	Π	V	Ι	III		
2)	Π	Ι	V	III		
3)	V	Π	Ι	IV		
4)	III	Π	V	Ι		
/						

^{96.} Match the following and find out the correct combination

	<u>Cells</u>			<u>Secr</u>	<u>etion</u>	
	A) Zymogen Cells			I) Mucus		
	B) Goblet Cells			II) Pep	osinogen	
	C) Parie	tal Cells		III) HC		
	D) Oxyn	ntic Cells	;	IV)Ca	stle's intr	insic factor
		Α	в	С	D	
	1)	III	I	IV	I	
	2)	I	IV	I	III	
	3)	III	IV	I	I	
	4)	I	I	IV	III	
97.	The follo	owing are	e statem	ents abo	ut pancre	eas
	i) It is ex	ocrine 8	k endocr	ine glanc	ł.	
	ii) endoo	crine par	t contair	ns acinar	cells.	
	iii) it ope	ens into d	distal lim	b of duo	denum.	
	The corr	rect com	bination	is		
	1) All are	e true		2) On	ly i & ii a	re true
	3) Only	ii, iii are	true	4) On	ly iii & i a	are true

3) Hepatic ducts

4) Hepatic capillaries

98	Bile is produced	in	
	1) Gall bladder	2) Pano	creas
	3) Liver	4)Splee	en
aa	Amylolytic enzy	mes are produced	from
00.	1) Saliyary alan	ds and liver	nom
	2) Costria aland	and non-arrow	
	2) Gastric giand		
	3)Salivary gian	ds and pancreas	
400	4) Gastric gland	s and liver	
100.	Following are the	e statementsabout	liver
	I) It is the detoxit	thrombokinase	
	III) It converts an	monia to urea	
	IV) It synthesises	fibrinogen from vi	tamin K
	Which of the abo	ve are correct	
	1) I,IV only	2) II,III,I	V only
	3) I,IV only	4) I,II,III ,	IV
101.	Assertion (A) :	Flow of bile into d	uodenum is con-
	trolled by Sphinc	ter of oddi.	into duodonum io
	Reason (R): Op	ening of blie duct i octer of Oddi	into auodenum is
	1) A is correct a	nd R is wrong	
	$2) \land \& B $ are corr	ect and 'P' explain	
	3) A & R are corr	ect but R is not the	e correct explana
	tion to A		
	4) A is wrong ar	nd R is wrong	
102	Study the follow	ving and choose th	e correct answer
102.	Salivary glands	Character	Open at
	D Infra- orbital	Situated below	Molars of the
	1) IIIIa- Oronar	the eve orbit	upper jaw
	II) Paratid	Open through	Incisors of the
	ii) i alolid	Wharton's dust	
	III) Sub maxilla	whomen s duct	upper jaw
	m) Sub maxina	ry Open inrough	
		Stenson's duct	the lower Jaw
	IV) Sub lingual	Situated below	Below the free
		the tongue	part of the
			tongue
	1) I and II 2) II	and III 3) III and	14) IV and I
103.	Acidic digestive	juices in rabbit are	3
	1) Saliva and ga	stric juice	
	2) Gastric juice	and intestinal juice	
	3) Bile juice and	pancreatic juice	
	4)Pancreatic juid	e and intestinal ju	ice
104.	Which of the fol	lowing is true abo	ut gastric glands
	present in the sto	omach wall of rab	bit?
	1)Simple tubula	r glands present ir	n the sub mucosa
	2)Compound tu	bular glands prese	ent in the sub-
	mucosa		
	3)Simple branch	ned tubular glands	lie upto the
	muscularis muco	osa.	_
	4)Simple tubula	r glands present in	rugae lie upto
	submucosa	- 1	C 1
105.	Following are th	e statements abou	t intestinal
	glands in rabbit.		
	I.Brunners gla	nds are present in	submucosa of

duodenum II. Crypts of Leiberkuhn are situated in mucosa ofileum III. Secretion of both the above glands together constitute success entericus, which is acidic Which of the above are true? 1) All are true 2) I and II are true 3) II and III are true 4) I and III are true 106. Glucose is the end product in liver by 1) Gluconeogenesis and glycogenesis 2) Glycogenesis and lipogenesis 3) Lipogenesis and glycogenolysis 4) Glycogenolysis and gluconeogenesis 107. Read the following statements about liver I. Hepatic lobules are separated by Glissons capsules. II. Radial rows of hepatic cells are called hepatic cords. III. Blood filled sinusoids are present between hepatic cords. IV. Endothelial cells called **kuffer cells** surrounds the sinusoids. V. Glissons capsules are complete connective tissue capsules Which of the above are incorrect 1) Only IV, V 2) Only III 3) Only V 4) Only II 108. Read the following statements about rabbit I.Largest gland is liver whereas second largest gland is pancreas. II. Cystic duct arises from gall bladder whereas hepatic ducts arise from liver. III. Gall bladder is a green sac whereas bile juice is colourless fluid. IV. Bile juice is without digestive enzymes whereas bile pigments help in emulsification of fats. Which of the above statements are correct 1) All except III 2) All except IV 3) Only II 4) Only I, II 109. Conversion of amino acids and lactate into glucose is called 1)Glucogenesis 2)Glycogenolysis 3)Glycogenesis 4)Gluconeogenesis

PROCESS OF DIGESTION LEVEL - I

110. The secretions of which of the following cells help in the absorption of cyanocobalamin in the intes tine of rabbit?

1) Parietal cells	2) G cells
3) Cheif cells	4) Mucus cells

111	Function of pensin is			
111.	1) Breaking of proteins into proteoses and pep			
	tones at pH-7			
	2)Breaking of proteins into amino acids at pH-7			
	3) Breaking of proteins into amino acids at pH2			
	4) Breaking of proteins into proteoses and pep			
	tones at pH-2			
112.	Prorennin is secreted by the glands of			
	1) Small Intestine 2) Kidney			
112	3) Liver 4) Stomach			
113.	In rabbit, cnyme passes into the			
	2) Duodenum through pylorus			
	3) Oesophagus through cardia			
	4) Oesophagus through pylorus			
114.	Proteolytic enzymes act in acidic medium are			
	1)Chymotrypsin, Rennin 2)Pepsin, Rennin			
	3)Pepsinogen, Irypsinogen			
115.	Which of the following is incorrectly matched			
	1)Pepsin-Stomach			
	2)Ptyalin - Buccal Cavity			
	3) Kennin - Liver (1) Trynsin - Intestine			
116.	The enzyme nuclease is present in			
	1)Saliva 2)Gastric juic			
	3)Pancreatic juice 4) Bile Juice			
117.	The enzymes disaccharidases are found in			
	1)Pancreatic Juice 2) Saliva 3) Costric Juice 4) Succus enterious			
118	Proteolytic enzyme acts in alkaline medium is			
110.	1) Pensin 2) Trypsin			
	3) Lipase 4) Enterokinase			
119.	Milk protein is			
	1) Lactogen 2) Myosin			
	3) Casein 4) Pepsin			
120.	The end products of carbohydrate digestion are			
	1) Galactose, maltose, fructose			
	2) Maltose, fructose, lactose			
	3) Glycogen, glucose, galactose			
	4) Glucose, fructose, galactose			
121.	Which of the following is different from other three-			
	1)Glucagon 2) Secretin			
	3) Gastrin 4) Ptyalin			
122.	Polysaccharides are changed into disaccharides			
	by-			
	1) Amylase 2) Protease			
	3) Lipase 4) Insulin			
123	Food substances which are not digested in the			
	stomach of rabbit are			
	1) Proteins 2) Fats			
104	3) Carbohydrates 4) Vitamins			
124.	Enterokinase is-			
	1) An enzyme mat converts trypsinogen into			
	иуръш			

2) A hormone which stimulates intestine

3) A hormone inhibiting HCl

4) Inactive state of hormone

125. Disaccharide which gives two molecules of glucose is
1) Sucrose
2) Fructose
3) Maltose
4) Galactose

LEVEL - II

100			- 11		
126.	Find out the inco	orrect ma	atch		
	a)Stomach-Pepsinogen b)Intestine-Prorennin				
	c)Pancreas-chymotrysinogen				
	d)Buccal Cavity-Ptyalin				
	1) a,d	2) b on	ly		
	3) a,b	4) b,c			
127.	In rabbit casein	is conve	rted into paracasein by		
	1) Pepsin 2) Chy	motryps	in		
	3) Rennin4) Try	psin			
128.	Match the followi	ing and c	hoose the correct answer		
	<u>Enzyme</u>	<u>Activa</u>	tor		
	A) Trypsinogen		I) HCI		
	B) Pepsinogen		II) Trypsin		
	C) Chmyotrypsin	ogen	III) Zn		
	Α	В	С		
	1) IV	I	I		
	2) III	I.	II		
	3) IV	I	I		
	4) IV	III	I		
129.	Read the following	ng statem	nents		
	i) Casein conver	ts Rennir	n into paracaesin in acidic		
	medium.				
	ii) Pepsin conver	ts proteir	ns into peptones in		
	acidic medium.				
	iii) Trypsin converts proteoses and peptones into				
	peptides in alkali	ne mediı	um.		
	iv) Carboxypeptidase digests the peptides into amino				
i	acids in acidic me	dium.			
	Which of the abo	ve are tru	le		
	1) I, II, III	2) II, III			
	3) III, IV	4) I, II			
130.	Amino acids are	e the only	y end products by the ac-		
	tion of which of th	e followi	ing enzyme on the protein		
	constituents?				
	1) Aminopentid	060	2) Carboxymentidase		
	2) Tuin anti 1 an	asc	4) Dimential		
	3) Tripeptidase		4) Dipeptidase		
131.	Which of the fol	lowingd	lisaccharides give rise to		
	two different mor	nosaccha	rides on digestion?		
	1) Maltose and	sucrose	2) Sucrose and lactose		
	3) Lactose and g	glucose	4) Maltose only		
132	Which of the fol	lowing e	nzvme differ in its		
102.	origin?				
	1) A minopontida		2) Tripentidase		
	2) Carb	daga	4) Dimential		
	5) Carboxypepti	uase	4) Dipeptidase		

133.	Read the following statements about rabbit	142.	Asserti
	L Pensingen and prorennin are proteolytic		theater
	enzymes in gastric juice		D
	II. Trypsingen and chymotrypsingen are		Keasor
	proteolytic enzymes in intestinal juice.		low pH
	III. Lipase is fat digesting enzyme in gastric		I) Both
	iuice.intestinal juice and pancreatic juice.		Reasor
	IV. Nuclease is present in pancreatic juice		2) Bot
	V. Amylase is present in saliva and pancreatic		Reasor
	juice.		explan
	Which of the above are true		3) Ass
	1)All are true 2)All except IV		4) Bot
	3)All except III 4)All except II	143.	Follow
134.	Read the following statements about rabbit		protein
	digestion		action
	I. pepsin and trypsin act as autocatalysts.		a) Dipe
	II. pepsin and HCl activates pepsinogen.		c) Carl
	III. HCl activates both prorennin and pepsinogen.		e) Tryp
	IV. Trypsin activates both trypsinogen and		1)e - b
	chymotrypsinogen.		3)c - a
	Which of the above are correct	144.	Árrang
	1) All except IV 2) All except II		the pro
	3) All except III 4) All are true		a. pepto
135.	Digestion is		d. prote
	1) Conversion of diffusible food particles in to		1) d-c-
	nondiffusible food particles		3) a-d-
	2) Conversion of small food particles into large	145.	Pepsin
	food particles		1) Prote
	3) Conversion of food into protoplasm		2) Prote
	4)Conversion of non- diffusible food particles		3) Prote
	into diffusible food		4) Prote
136.	Digestion in rabbit is	146.	Mate
	1) Intracellular 2) Extra cellular		List-]
	3) Only chemical 4) Only mechanical		A)Pe
137.	In mammals, epiglottis prevents the entry of		iuice
	1) Food into oesophagus		B)Tr
	2) Food into larynx		ingas
	3) Air into oesophagus		C)Ar
	4) Air into larynx		enzvr
138.	Ions essential for the action of ptyalin are		D ca
	1) Ca ⁺ 2) Cl ⁻ 3) Mg ⁺ 4) Na ⁺		conve
139.	Calcium paracaseinate is digested into peptones		v) Pa
	by the action of		is not
	1) Rennin 2) Pepsin 3) Trypsin 4) Chymotrypsin		1)A-i
140.	Castle's intrinsic factor plays an important role		3)
	in the absorption of	147	Emulsi
	1)Cyanocobalmine 2)Folacin	147.	1)Gasti
	3)Naphthoquinone 4)Niacin		2)Pana
141.	Germs entering the body through food are		2)Rila
	mainly killed in the region of alimentary canal		4)Inter
	where PH is		- jines
	1)2 2)7 3)10 4)Zero		

42.	Assertion: The digestive ac	ction of salivary			
	amylase stops when the swallowed bolus enters				
	the stomach.				
	Reason:- Salivary amylase	is inactivated at the			
	low pH of gastric juice				
	1) Both Assertion and Rea	son are true and the			
	Reason is correct explanat	ion of the Assertion			
	2) Both Assertion and Rea	ason are true But the			
	Reason are true, but the R	eason is not correct			
	explanation of the Assertio	n			
	3) Assertion is true but th	e reason is false			
	4) Both assertion and reas	son are false			
13	Following are the enzymes	s that act up on			
т.).	proteins Arrange them in a	s charact up on sequence of their			
	action	a sequence of them			
	a) Dipontidago	h) Dongin			
	a) Carbowrantidaga) Trinontidaga			
	c) Carboxypeptidase d) mpepudase			
	$\frac{1}{2} \frac{1}{2} \frac{1}$	a d a			
	1)e - b - d - c - a = 2)b - e - 2)a - a - d - b - a - 4)d - a	c-u-a			
11	3)c - a - d - b - e + d - c -	a -u-u			
+4.	the process of digestion of	protoing			
	a pentones b amino acid	ls c polypentides			
	d proteins e tripeptides	s f dipentides			
	1) d-c-a-e-f-b 2) d-a-e-	-c-f-b			
	3) a-d-c-e-f-b 4) d-a-c-	e-f-b			
15	Pensin differs from trypsin	in that it digests			
101	1) Protein in acidic mediun	n in duodenum			
	2) Protein in acidic mediun	n in stomach			
	3) Protein in alkaline medi	ım in duodenum			
	4) Protein in alkaline medi	im in stomach			
46	Match the Following cor	rectly			
	List-I	List-II			
	A) Pepsin i) Proteas	se of intestinal			
	iuice and acts on polyper	otides			
	B) Trypsin ii) Secret	tion and its action are			
	in gastric region				
	C) Aminpeptidase i	ii) Autocatalytic			
	enzyme of r	ancreatic inice			
	D) carboxypeptidase	v) Acts on fats and			
	convert them into	o fatty acids			
	v) Pancreatic protease th	at			
	is not activated by entero	kinase			
	1)A-ii B-v C-I D-iii	2)A-ii R-iii C-iv D-i			
	3)A-iii B-ii C-iv D-v 4	1)A-ii B-iii C-i D-v			
7.	Emulsified fats are digested	1 bv			
	1)Gastric juice and pancrea	atic juice			
	2)Pancreatic juice and bile	iuice			
	3)Bile juice and intestinal in	lice			
	- jane jane e ana meesemarje				

4)Intestinal juice and pancreatic juice

148.	Which of the following is not a correct statement				
	1)Pensin acts in acidic medium whereas maltase				
	acts in an alkaline medium.				
	2)Pepsin digests proteins whereas maltase				
	digests maltose.				
	3)Pepsin is present in gastric juice whereas				
	maltase is present in the intestinal juice.				
	4)Pepsin is secreted in active form whereas				
	maltase is secreted in an inactive form.				
149.	Monosaccharide in the following is				
	1) Sucrose 2)Galactose				
	3) Lactose 4)Maltose				
150.	Glucose and galactose are absorbed into				
	epithelial cells by				
	1) Secondary active transport				
	2) Primary active transport				
	3) Facilitated diffusion 4) Diffusion				
151.	Which of the following substances are absorbed				
	into the cells and into the blood by diffusion?				
	1) Amino acids 2) Fructose				
	3) Short chain fatty acids				
150	4) Long chain fatty acids				
132.	1) Pile pigments with long shein fatty agids and				
	abcerol				
	2) Bile salts with long chain fatty acids and				
	alverol				
	3) Bile pigments with short chain fatty acids and				
	glycerol				
	4) Bile salts with short chain fatty acids and				
	glycerol				
153.	Fructose is absorbed into the cell and into the				
	blood by				
	1) Facilitated diffusion				
	2) Primary active transport				
	3) Secondary active transport				
	4) Diffusion				
154.	In rabbit, faeces expelled at night consists of				
	1)Simplified cellulose, naphthoquinone, pyridoxin,				
	pantothenic acid, biotin				
	2)Simplified cellulose and all fat soluble vitamins				
	4) Only simplified cellulose				
	acid biotin				

VITAMINS LEVEL-I

1 ~ ~	D (1) 11	
155.	Person taking rich	i diet of ascorbic acid will not
	1) Dialzata	2) Source
	3) Bari hari	1) Dellagra
156	Digostivo luico re	4) I chagia
150.	soluble vitamin is	equired for the absorption of fat
	1)Succus entericu	s 2)Pancreatic Juice
	3)Bile Juice	4) Gastric Juice
157.	Antixerophthalmi	vitamin is
	1)Retinol	2)Naphthoquinone
	3)Tocopherol	4)Calciferol
158.	Which of the follo	wing is not a vitamin?
	1)Folic acid	2)Nicotinic acid
	3)Panthothenic ac	id 4)Formic acid
159	Vitamins acts as a	n antioxidant is
109	1)Vitamin D	2)Vitamin E
	3)Vitamin A	4)Vitamin K
160	The deficiency of v	which vitamin causes rickets in
	children and osteo	malacia in adults?
	1) Vit-E 2) Vit-D	
	3) Vit-C 4) vit-B o	complex
161	Rich source of Vi	tamin - C is
	1)Carrot	2)Milk
	3)Citrus Juice	4)Meat
162.	Deficiency of Vita	min-E causes
	1)Beriberi	2)Scurvy
	3)Pellagra	4)Muscular dystrophy
163.	Vitamin required	for the synthesis of Prothrombin
	1)Vitamin-B ₁₂	2)Vitamin-K
	3)Vitamin-C	4)Vitamin-D
164.	Which of the follo	wing is not a function of
	Vitamin-C?	
	1)It dissolves cho	lesterol in blood
	2)It mantains the	matrix of cartilage and bone
	3)It is involved in	the synthesis of rhodopsin
	4)It enhances abs	orption of iron
165.	Fat soluble vitami	n synthesised by intestinal
	microbes is	
	1) Pyridoxine	2) Pantothenic acid
	3) Calciferol	4) Naphthoquinone
166.	The sources of Vi	tamin-E are
	1)Wheat germ oil	, nuts, wheat and maize
	2)Citrus fruits, to	nato, potatoes
	3)Fish liver oil, m	ilk, egg, meat
	4) Carrots, pulses	, green leafy vegetables
167.	Vitamin that act a	s Co-enzyme for car
	boxylases is	
	1)Biotin	2)Folacin
	3)Niacin	4)Pyridoxine

168.	NADP	is a/an				I
100.	1)Enzym	e		2)Co-	enzvme	
	3)Activa	tor		4)Pros	sthetic Group	
169.	Water so	luble vit	amins a	re	r	175.
	1)C and	D		2)B ai	nd C	
	3)A and	С		4) A a	nd E	
170	Consum	ption of	raw egg	s cause	s the deficiency	
	of this vit	amin	00		5	
	1)Biotin		2) Cyar	nacobal	lamin	
	3) Ribofla	avin		4)Asc	orbic acid	
		L	EVEL	- II		
171.	Match the	e followir	ng and fi	nd the c	orrect answer	
	Vitamin	rol	Comm	on Nan	<u>ne</u> norrhogia Vitamin	176.
	B) Naptho	auinone	<i>-ر</i> ز ب	II) Anti	Sterility Vitamin	
	C) Retino) 	-	III) Ant	ti ricketic Vitamin	
	D) Tocopł	nerol		IV) Ant	ti xerophthalmic	
		_	_	Vitami	n _	
	4)	A	В	C	D	
	1) 2)	III IV/	1		11	
	2) 3)	III	III IV		" 	
	4)		IV	 III	i	
172.	Match th	e follow	ving and	find ou	t correct	177
	answer		C			
	<u>Vitamin</u>		Chem	ical Na	<u>ime</u>	
	A)Vitam	in-D		I)Asc	orbic acid	
	B) Vitam	in -A		Í) Na	phthoquinone	
	C) Vitam	nin -K		III) Re	etinol	
	D) Vitan	nin - E		IV) To	ocopherol	
				V)Ca	lciferol	
	А	В	С	D		
	1)	V	III	Π	1V	178.
	2)	V	IV	Π	III	
	3)	IV	V	Π	III	
	4)	II	Ι	V	III	
173.	Match th	e follow	ving and	find ou	it the correct one	
	<u>Vitamin</u>	Deffic	<u>iency D</u>	<u>isease</u>		
	A) Vitam	in-B ₁₂		I) Ber	i-beri	
	B) Vitam	in-A		II)Peri	nicious anaemia	
	C) Vtam	$in-B_1$		III) Ste	erility	
	D) Vitam	in-E		IV)Os	steomalacia	170
		P	G	V)Ke	ratomalacia	179.
	A	B	C	D	* 7	
	1)	IV	II W	l	V	
	2)	II N	IV	l		
	5) 1)		V H	l III		
174	4) Matek ti	V	II an crate		1	
174.	Watch the	Dofiei-	ng and fi	na the c	orrect answer	
	<u>vitamin</u> Δ) Thiomi	<u>репсіе</u> ine		ase ara		
	B) Niacin	II) Glos	sitis	yıa		180.
	C) Cvana	cobalar	nin	III) Ber	i-beri	
	D) Ribofla	ivin	IV) Per	nicious	Anaemia	
	,	Α	B	C	D	
	1)	II	I	IV	III	

	2)	III N (IV	II	1
	3) 4)		1	II IV/	111 11
5.	Read the	following	stateme	ents	
	I) Mamm	alian ski	n synthes	sises too	copherol in the
	presence	of sunli	ght.		•
	II) Deficie	ency of V	itamin-K	leads to	delay in blood
	Coagulat	ion.			
	III) Defici	ency of E	Biotin is c	aused b	by the
		ption of ra	aw eggs.	onio onio	l ara avethaaizad
	hv intesti	inal micro	n Panioin Shes	enic acio	are synthesized
	Which of	the abov	ve are col	rrect	
	1) II,III,IV	2) II,IV			
	3) III,IV	4) I,III,I∖	/		
3.	Assertio	<u>n</u> :(A)			
	Vitamin k	< is esse	ntial for t	he proce	ess of blood Co
	agulation	(D)			
	The coac	(K) Julating f	actor pro	thromhir	n is synthesized
	in the pre	esence of	vitamin	K in liver	nis synthesized
	1) A is W	rong and	R is Co	rrect	
	2) A & R	are corre	ect and 'F	R' explai	ns A
	3) A & R a	are corre	ct but R i	s not the	e correct explana
	tion to A	↓ 			
7	4) DOLINA Stateme	nt(S-I)	re wrong	J	
•	Consum	ption of C	Citrus frui	ts cause	es the disease
	'scurvy'				
	Stateme	<u>nt(S-II</u>):			
	Citrus fru	uits conta	in Folic a	acid	
	1) <u>(S-I)</u> is	correct a	and <u>(S-II</u>)	is Wror	ng II) avralaina (S. I)
	2) <u>(3-1)</u> 8 3) (S-1) 8	t <u>(S-II)</u> an t (S-II)an	e correct	: anu <u>(3-</u> : but R i	s not the correct
	explana ti	ion to (S	-I)	butit	
	4) <u>(S-I)</u> ar	nd <u>(S-II</u>) a	are Wron	g	
3.	Assertio	<u>n(</u> A):			
	Pyridoxir	ne deficie	ency does	s not occ	cur normally in
	adults.	D\ •			
	Pvridoxir	rcj. ne is svntl	hesized i	n the ski	n of man by sun-
I	ight	io io ogrit			in or main by can
	1) A is co	orrect but	R is Wr	ong	
	2) A & R	are corre	ect and 'F	R' explai	ns A
	3) A & R a	are corre	ct but R i	s not the	e correct explana
	4) Roth A	م and R a	re Wrong	r	
9	Assertio	n(A):		9	
	Niacin is	involved	in the for	mation c	of ATP molecules
	<u>Reason(</u>	R):			
	Niacin is	a part of	Coenzyr	nes NAI	D,NADP and
	through \	which ele	ctron tra	nsport ta	akes place .
	2) A & R	are corre	ect and 'F	Jiiy R'explai	ns A
	3)A&Ra	are corre	ct but R i	s not the	e correct explana
	tion to A	4			
	4) Both A	and R a	re Wrong)	
J.	Stateme	<u>nt(S-I)</u> : A	Anti beri l	oeri vitar	nın is riboflavin
	Stateme	<u>nt(S-II</u>):	KIDOTIAVI		mponent of two
		s correct	and /e i	i AU Nie wro	νησ
	2)(CI) 0		anu <u>(J-I</u>	and (C	I) evolaine (C I)
	∠ <u>/(J-i</u>) α	<u>10-11</u>) ale		anu <u>(J-1</u>	<u>i</u> , capiants <u>(3-1</u>)

UNIT-III

3) (S-I) & (S-II) are correct but (S-II) is not the correct explanation to (S-I)

4) (S-I) and (S-II) are wrong 181. Which of the following is correct regarding Naph thoquinone? 1)Causes haemorrhage 2)Transported to liver by blood 3)Required for the formation of thrombin from pro thrombin 4)Synthesised by intestinal microbes 182. Dryness of cornea is called 1) Nyctalopia 2) Xerophthalmia 3) Keratomalacia4) Osteomalacia 183. Which of the following nutrients do not provide energy for animals? 1) Fats 2) Carbohydrates 4)Proteins 3) Vitamins 184. Assertion (A): Vitamin D is called antirachitic vitamin Reason (R): Deficiency of vitamin D causes rickets in children 1) Both A and R are true and R is the correct explanation to A 2) Both A and R are true and R is not correct explanation to A 3) A is correct R is false 4) A is false R is correct 185. Read the following I. Health and vigour of epithelial tissues-vitaminA II. Health and integrityr of muscles -vitamin E III. Integrity of endothelium -vitamin C IV. Functioning of gonads- vitamin E Which of the above are true 1) All are true 2)All except IV 4)All are false 3) All except II **MINERALS**

LEVEL-I

		1
186.	Deficiency of Zinc causes	SS
	1)Anaemia	2)Hypogonadism
	3)Sterility	4)Polycythemia
187	Acid-Base equilibrium in	blood is maintained by
	1)Sulphur	2) Chlorine
	3) Magnesium	4) Potassium
188.	Mineral required for the f	ormation of insulin is
	1) Sulphur	2) Iodine
	3) Cobalt	4) Copper
189.	Mineral essential for the	formation of red blood
	cells is	
	1) Iodine	2) Calcium
	3) Manganese	4) Cobalt

LEVEL - II

190. Match the following and find the correct answer

	<u>Mineral</u> A) Zinc B) Manga C) Phosp D) Coppe	Deficie anese horus r	I) Polycythemia I) Polycythemia II) Dwarfism III) Anaemia IV) Sterility V) Osteoporosis		
		Α	В	С	D
	1)	II	IV	I	III
	2)	I	IV	V	III
	3)	IV	III 	 	V
101	4)	 (^)	Ш	V	I
191.	Excess (<u>'I(A)</u> : `obalt le	ade to P	olycythe	mia
	Reason(R):		orycytrie	anna
	Cobalt is	essentia	al for forn	nation of	RBC
	1) A is W	rong and	d R is Co	orrect	
	2) A & R a	are corre	ect and '	R' expla	ins A
	3) A & R a	are corre	ect but R	is not the	e correct explana
	tion to A		ro Mron	~	
100	4) Dolli A	anu Ka	hich on	y a aftha	fallowing got of
192.	mioromin	orola oor		c of the	ionowing set of
			i cause a	nacima	1
	(1) Coball	, ZINC, IC			
	2) Iron, copper, cobalt				
	3) Iron, c	obalt, N	langane	se	
	4lron, co	pper, su	lphur		
193.	Study th	e flowin	ng		
	Macromi	ineral	Functio	ns	Deficiency
	I) Calciur	n N	erve	Ric	ckets in
		irri	tability		children
	II) Sodiur	n M	aintena	nce of	Muscle
		osr	notic ba	lance	cramps
	III) Potass	ium M	ain com	poenen	t Anaemia
		ofl	ECF of	muscle	s
	IV) Man	ganese I	Formatio	on	
	S	terlity			
		of	insulin		
	Which o	f the abo	ove are t	rue	
	1) I, II, IV	/ 2) I, II	, III 3) I	II, IV 4) I, II
	, , ,	, ,	/ /		, ,
	NUTRIT RELA	TIONA TION	L REQ TO BA	UIREN LENCH	IENTS IN E DIET.
		EX	KERC	ISE	

194. The study of food stuff	s and nutrition is called
1.Malnutrition	2) Dietetics
3) Balanced diet	4) Under nutrition
195. Proteins needed by an	average person per day is
1) 500 g	2) 70-100g
3) 50 g	4) 60 g
196. One gram of carbohyd	rate yields
1) 4.0 k.cal energy	2) 3.0 k.cal energy
3) 2.0 k.cal energy	4) 5.0 k. cal energy

- 197. A: Water is considered as an universal solvent
 - R: Many substances dissolve in water.
 - 1) A is Wrong and R is Correct
 - 2) A & R are correct and 'R' explains A
 - 3) A & R are correct but R is not the correct explanation to A
 - 4) Both A and R are Wrong
- 198. Deficiency of protein despite normal caloric intake is
 - 1) kwashiorkor 2) Beri - Beri 3)Anaemia
 - 4) Marasmus
- 199. Retarded growth, low weight, muscle wasting are the symptoms of 1) kwashiorkor 2) Beri - Beri
 - 3)Anaemia 4) Marasmus
- 200. Cardiac disorders are due to
 - 1) Hyper vitaminosis 2) Malnutrition
 - 3) Hypercholesterolemia
 - 4) Hypocholesterolemia
- 201. Protein caloric under nutrition leads to disorder
 - 1) Hypercholesterolemia 2) Over weight
 - 3) Marasmus 4) Obesity
- 202. Obesity & over weight are due to
 - 1) Excess in take of calories
 - 2) Low intake of calories
 - 3) High intake of minerals
 - 4) High intake of proteins

RESPIRATORY SYSTEM

- Anaerobic respiration is the incomplete breakdown of organic molecules - less yield of energy.
- Aerobic respiration yields more energy.
- Aerobic respiration requires oxygen. So cells must be supplied with oxygen for the oxidation of food materials to obtain energy.
- Carbon dioxide, produced as a result of cellular respiration combines with water to form carbonic acid.
- It will lower blood pH, threatening homeostasis.
- CO_2 must be eliminated from the body
- In protozoans and lower metazoans, simple diffusion is sufficient for the exchange of O_2 and CO_2 .
- In higher metazoans there is an increase in the distance over which O_2 and CO_2 must diffuse.
- Exchange of gases between an organism and its medium is called - Respiration
- Physiologically the term respiration may be defined - biochemical activity as
- Biochemical activity taking place in - the protoplasm of a cell
- Respiration occurs in animals in three phases
- (i) External respiration (ii) Transport of gases

(iii) Internal respiration (iv) Cellular respiration

- The process takes place in the respiratory organs (lungs, gills) is - External respiration
- External respiration is also called - breathing and ventilation
- Exchange of gases between air in the alveoli and blood in pulmonary capillaries

- External respiration

- Internal respiration is also called - tissue respiration (or) cellular respiration
- Exchanges of gases between the blood in systemic capillaries and the tissue cells

-Internal respiration

• Oxidation of food materials and production of ATP - Cellular respiration

Respiratory system of rabbit :

- Rabbit is a - Terrestrial animal
- Respiratory organs in Rabbit are - lungs **External nostrils (External nares) :**
- External nostrils are obliquely placed at the tip of - the snout
- External nostrils open into - nasal chambers Nasal chambers :
- . Nasal chambers are separated by- Nasal septum
- Each nasal chamber is divided into three parts (1) anterior vestibular part (2) middle respiratory part (3) posterior olfactory part
- Vestibular part bears- hairs and sebaceous glands
- The major portion of nasal chamber is - respiratory part
- The respiratory part containing twisted bony plates called - Turbinals (or) conchae (or) scroll bones
- The number of turbinals (or) conchae - 3
- Turbinals are superior middle & inferior conchae
- Turbinals are lined by - Ciliated columnar epithelium
- Turbinals are highly vascular and with many mucous cells
- The respiratory parts of nasal chambers act as - natural air conditioners
- Olfactory part - Lining of superior nasal conchae and adjacent septum.

Internal nostrils

- The Nasal passages open into- The nasopharynx
- Internal nostrils are located above

- The soft palate

Pharynx

• The common passage for food and air is

- Pharynx

- At the hind end of laryngo pharynx there is a slit like pore called - glottis •
 - Glottis has a lid called - epiglottis
- Epiglottis is made up of - elastic cartilage
- Glottis opens into - The larynx

LARYNX

- The voice box present at the upper part of Trachea - Larynx is called as
- The glottis is covered and protected by an elastic cartilage plate called - Epiglottis
- The pharynx opens into the voice box through a slit - Glottis called
- The part of the larynx which prevents the entry of ٠ food particles etc into it is called - Epiglottis
- The wall of the larynx is supported by- 4 cartilages
- The cartilage which forms the ventral and lateral sides of larvnx is - Thyroid cartilage
- The largest cartilage protecting the wall of the lar--Thyroid cartilage ynx is
- A ring like cartilage of the larynx is- Cricoid carti-• lage
- Paired cartilages present on the dorsal side of larynx are -Arytenoid cartilages
- The bulged tips of arytenoid cartilages are called - Santorini
- The vocal cords are fibro-elastic strands (vertical flaps) connecting
 - Thyroid cartilage and Arytenoid cartilages
- Number of vocal cords - Two
- Sound is produced by - vocal cords
- Fibro elastic strands are - Vocal cords
- The Epiglottis is a part of this cartilage

- Thyroid cartilage

• The space between two vocal cards is - Rima glottidis

Trachea (wind pipe)

by

- The part of the respiratory system present in the neck region is - Trachea
- Trachea is protected and always kept open by
- 'C' shaped cartilage rings • The ends of 'C' shaped cartilaginous rings are joined
 - - Fibrous and muscular tissue
- The trachea always kept open by the presence of - 'C' shaped cartilaginous rings
- The trachea is internally lined by - Ciliated pseudostratified epithelium

Bronchi and their branches

- Trachea bifurcates into - two bronchi
- Each bronchus enters into - the lungs •
 - Bronchi supported by

- C shaped cartilaginous rings

- Internally bronchi are lined by - Pseudo stratified ciliated epithelium
- The primary bronchi divide into

- Secondary bronchi

- The seondary bronchi divide into Tertiary bron-• chi
- Tertiary bronchii divide into Bronchioles

- Primary bronchiole divides into Secondary bronchiole
- Secondary bronchiole divides into - Tertiary bronchiole
- Tertiary braonchiole divides into - Terminal bronchiole
- Terminal braonchiole divides into - respiratory bronchiole
- Each respiratory bronchiole terminates into a cluster of - alveolar ducts
- Alveolar ducts end in - Alveolar sacs
- Each alveolar sac is formed of many round (or) oval chambers are called - alveoli • Alveolus is lined by

- Simple squamous epithelium

- The exchange of gases takes place in - alveoli Lungs
- In Rabbit a pair of pinkish spongy lungs are present in the thoracic cavity one on either side of heart.
- A double layered pleuro-peritoneum encloses each lung.
- Outer layer - parietal pleura
- Inner layer - viseral pleura
- Wall of the thoracic cavity, diaphragm and mediastinum are lined by

-Parietal pleura

- Total number of lobes in the lungs of Rabbit -Right lung 4 and left lung 2
- The function of pleural fluid is - Lubrication • Pleural fluid protects the lungs from
- External shocks and friction •
 - The unit of lung is - Alveolus
 - Right lung of rabbit has four lobes
 - 1. Anterior azygous 2. right anterior lobe
 - 3. right posterior lobe 4. posterior azygous lobe Left lung of rabbit has two lobes
- - The left anterior lobe, - The left posterior lobe • One layer of alveolus and one layer of endothelium
- of blood capillaries Respiratory membrane

• Thickness of respiratory membrane - 0.5 mm **MECHANISM OF B<u>REATHING</u>**

- The breathing mechanism of Rabbit is typically mammalian and involves alternate expansion and contraction of thoracic cavity.
- Thoracic cavity is a box-like chamber bounded by vertebral column dorsally, sternum ventrally, posteriorly by diaphragm and laterally by twelve pairs of ribs.
- Alternate expansion and contraction of throracic cavity results in - breathing movements
- The cyclical breathing movements occur in • -12 - 16 times per minute in man
- The breathing movements are brought about by inter costal muscles and muscles of diaphragm

EAMCET-SENIOR ZOOLOGY

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- two types of muscles

- The muscles that extend between successive ribs are called inter costal muscles
- Inter costal muscles are two types

- external inter costal muscles,

- internal inter costal muscles

INSPIRATION

- The process of taking in air into lungs is known as - inspiration
- It is active process.
- During inspiration the size of thoracic cavity increases due to contraction of external intercostal muscles and muscles of diaphragm
- Ribs and sternum moves forward while diaphragm becomes flattened.
- This results in drawing air into alveoli of lungs where exchange of oxygen and carbon-dioxide takes place
- As a result lungs are compressed and CO_2 air is expelled out into atmosphere through respiratory passage.
- Contraction of diaphragm accounts for **75%** of air entering into lungs.

Expiration

- It is a passive process.
- The process of elimination of used air from lungs is known as Expiration
- Volume of thoracic cavity decreases anterio posteriorly and darso ventrally due to the relaxation of the muscles of
 - Diaphragam and external intercostal muscles.
- The muscles which contracts during fourcefull expiration are internal intercostal muscles and abdominal muscles.
- Forceful expiration is an active process
- The muscles which relax during expiration are external intercostal muscles and diaphragm muscles

EXCHANGE OF GASES

- Normal atmospheric pressure 760 mm Hg.
- Percentage of O_2 in the atmosphere 20.95%
- P_{O_2} in atmosphere 159 mmHg.
- Pulmonary gas exchange external respiration
- During external respiration O_2 from alveolar air enters into pulmonary capillaries and CO_2 in the opposite direction
- CO_2 is sent out during external respiration.
- Systemic gas exchange Internal respiration
- Differences in PO₂ and PCO₂ favour diffusion of O₂ and CO₂ in opposite direction.
- During internal respiration O₂ from systemic capillaries enters into tissues & CO₂ in opposite direction.

LUNG VOLUMES AN CAPACITIES IN HU-MANS

- Tidal volume (TV): Volume moved in or out of the lungs during a respiratory cycle (500 mL)
- Inspiratory reserve volume (IRV): Volume that can be inhaled during forced breathing in addition to tidal volume (3,000 mL)
- Expiratory resere volume (ERV): Volume that can be exhaled during forced breathing in addition to tidal volume (1,100 mL)
- Residual volume (RV): Volume that remains in the lungs at all times (1,200 mL)
- Inspiratory capacity (IC): Maximum volume of air that can be inhaled following exhalation of tidal volume: IC=TV+IRV
- Functional residual capacity (FRC): Volume of air that remains in the lungs following exhalation of tidal volume FRC=ERV+RV
- Vital capacity (VC): Maximum volume of air that can be exhaled after taking the deepest breath possible : VC=TV+IRV+ERV
- Total lung capacity (TLC): Total volume of air that the lungs can hold: TLC=VC+RV.

Partial Pressure of Gases

Gas	O_2	CO_2
Atmospheric Air	159	0.3
Alveoli	104	40
Deoxygenated Blood	40	45
Oxygenated Blood	95	40
Tissues	40	45

TRANSPORT OF GASES

- Transport of oxygen
- Every 100ml of oxygenated blood can deliver 5ml of oxygen to tissues
- Only about 3 percent of oxygen is transported in dissolved state through plasma.
- Oxygen is transported from respiratory organs to the cells for oxidation and CO_2 is carried from the cells to respiratory organs for elimination.
- Oxygen from lungs is transported to various tissues in two forms
 - (i) through plasma (ii) Through R.B.C
 - Major part of the oxygen transported by

- The red blood cells

- About 97% of oxygen is bound to heamoglobin in RBC
- Haemoglobin consists of four polypeptides
- Each haemoglobin molecule can carry

- four oxygen molecules

- Haemoglobin is dark pigment
- When haemoglobin combined with oxygen it becomes - bright red

EAMCET- SENIOR ZOOLOGY

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- Formation of oxyhaemoglobin in lungs is affected by three factors
 - 1) Normal P^H of blood
 - 2) Low temperature in lungs

3) High oxygen and low carbondioxide concentration

- The saturation of haemoglobin depends on the partial pressure of oxygen.
- The graph showing relationship between partial pressure of O_2 to the percentage of saturation of haemoglobin is called "Oxygen dissociation curve" which is a sigmoid curve.
- At 95 mm Hg 97% haemoglobin is saturated.
- At 40 mm Hg 75% haemoglobin is saturated.
- As the O_2 pressure increases, saturation increases and as O_2 pressure decreases more O_2 is given off from the oxyhaemoglobin and is made freely available to the tissues.
- The effect of carbondioxide and H+ ions on oxygen affinity of haemoglobin is known as

- Bohr effect

- The dissociation of oxyhaemoglobin is affected by • decrease in P^H, • Rise in temperature in tissues,
 - High tension of carbondioxide and low tension of O_{2}
- Oxygen dissociation curve is in the form of - sigmoid curve (S curve)
- Haemoglobin is 100% saturated when it carries 4 oxygen molecules.
- Haemoglobin is 50% saturated when it carries 2 oxygen molecules.

Transport of carbondioxide

23% of CO_2 is transported as

•

- carbamino haemoglobin 7% of CO₂ transported as
 - physical solution
- If all the carbondioxide is transported as physical solution P^H of blood become lowered from
 - 7.4 to 4.4
- 70% of carbondiaxide is transported as
 - bicarbonates
- The CO₂ that is diffused into blood from tissues enter the cytoplasm of red blood cells and combine with water (of cytoplasm) and forms - carbonic acid
- Solubility of CO_2 is 20 to 25 times greater than O_2 in water.
- The carbonic acid is formed in the presence of - carbonic anhydrase
- Formation of carbonic acid is 5000 times faster in RBC than plasma due to the enzyme.
 - -Carbonic anhydrase.

- Chloride shift is also called
- Hamberger's phenomenon • Under normal conditions the cell membranes of red blood cells are - impermeable to cations
 - $(K^+, Na^+ etc)$
- The cell membranes of RBC are permeable to anions • $(HCO_3^-, Cl^- etc)$
- The exchange of Cl⁻ and HCO₃⁻ between plasma and red blood cells is described as - chloride shift
- Chloride shift permits the transport of additional amounts of carbon-di-oxide
 - sodium bicarbonate by plasma
- All the events of chloride shift - reversible
- Binding of oxygen with haemoglobin tends to displace CO_2 from the blood is called as

- Haldane effect

RESPIRATORY SYSTEM LEVEL-I

- 203 Exchange of gases between air or water and blood at respiratory surface is called
 - 1. External respiration
 - 2. Internal respiration
 - 3. Aerobic respiration
 - 4. anaerobic respiration
- 204. The energy liberating process of respiration is
 - 1. External respiration
 - 2. Internal respiration
 - 3. Ventillation 4. Breathing
- 205. Olfactory receptors occur in the epithelium of
 - 2. Bronchi 1. Trachea
 - 3. Larynx 4. Nasal chamber
- 206. An energy liberation process is 1. Digestion
 - 2. Excretion
 - 3. Respiration 4. Circulation
- 207. The number of twisted bony plates (Turbinals) in rabbit's nasal chamber is
 - 1.2 2.4 3.3 4.1
- 208. A thin twisted bony plate in nasal chamber 1. Nasal bone
 - 2. Turbinal bone or chonchae
 - 3. Sphenethmoid bone 4. Sesamoid bone
- 209. Which of the following acts as a natural air conditioner in man?
 - 1. Nasal chamber 2. Larynx
 - 3. Trachea 4. Pharynx
- 210. A thin cartilagenous lid present over the glottis is 1. Thyroid
 - 2. Turbinals
 - 3. Palate 4. Epiglottis
- 211. The epiglottis of rabbit arises from 1. Cricoid cartilage 2. arytenoids
- 3. Thyroid cartilage 4. Santorni 212. The ring like cartilage that supports the larynx is 1. Thyroid 2. Arytenoid 3. Santorini 4. Cricoid

213. A pair of cartilages present on the dorsal side of the larynx is 1. Thyroids 2. Cricoids 3. Aretynoids 4. Santorini cartilages 214. A pair of cartilages present at the tip of arytenoids is 1. Cricoid 2. Thyroid 4. Pre aretynoid 3. Santorini 215. The number of vocal cords present in the larynx of rabbit is 1. One pair 2. Two Pairs 3. Three Pairs 4. Many 216. Space between the vocal cords is 2. Rima glottidis 1. Diastema 4. Glottidis 3. Vestibule 217. The outer covering of the lungs of rabbit is 1. Parietal pleural membrane 2. Arachnoid membrane 3. Visceral pleural membrane 4. Basement membrane 218. In Rabbit the number of lobes in right and left lungs respectively 1.4 & 2 2.3 in each 3.4 in each 4. One in each 219. Alveolus is internally lined by 1. Simple squamous epithelium 2. Columnar epithelium 3. Pseudostratified ciliated epithelium 4. Arachnoid membrane 220. External respiration in rabbit occurs in 1. Lungs 2. Cells present in blood 4. Living cells in the body 3. Liver cells 221. In rabbit, lobes in right lung are 1. Anterior and posterior lobes only 2. Anterior azygous and posterior azygous lobes only 3. Both 1 and 2 4. Anterior azygous and right posterior lobes only 222. This kind of respiration is considered by some authors as a part of internal respiration 1) External Respiration 2) Transport of gases 3) Cellular Respiration 4) Diffusion Number of layers present in the respiratory 223. membrane is 1)2 2)4 4) 3 3) 1 224. Thickness of respiratory membrane is 1) 0.6 mm 2) 0.5 mm 3) 0.7 mm $4)0.4 \,\mathrm{mm}$ LEVEL-II 225. During swallowing the structure which prevents the entry of the food into the trachea is 1. Palate 2. Nasal chamber

3. Epiglottis 4. Santorini cartilages 226. The number of cartilages supporting the wall of larynx is 1.1 2.2 3.4 4.1 227. The largest cartilage supporting the wall of larynx 1. Cricoid 2. Aryteniod 3. Thyroid 4. Santorini 228. In larynx thyroid cartilage is present on 1. Dorsal side 2. Dorsal and Lateral sides 3. Ventral and dorsal side 4. Ventral and lateral side 229. The vocal cords of rabbit are made up of 1. Elastic cartilage 2. Fibro-elastic strands 3. White fibrous cartilage 4. White firbous connective tissue 230. Collapse of trachea and bronchi is prevented by 1. C - Shaped chitin rings 2. C - Shaped cartilage rings 3. O - Shaped chitin rings 4. O - Shaped cartilage rings 231. Elastic vocal cords in the larynx attached between 1. Thyroid and Cricoid 2. Cricoid and Parathyroid 3. Thyroid and arytenoid 4. Cricoid and arytenoid 232. Vibration of vocal cords produces 2. Temperature rise 1. Sound 3. Hickups 4. Shivering 233. The similarity in the trachea of rabbit and cockroach is that 1. Both are ectodermal in origin 2. Both are endodermal in origin 3. Both have non-collapsable wall 4. Both have cartilagnous rings 234. One of the following doesn't possess the supporting rings. 1. Trachea 2. Primary bronchus 3. Secondary bronchus 4. Bronchioles 235. The bronchi are kept in open condition by 1. Complete cartilaginous rings 2. Incomplete cartilaginous rings 3. Cilia 4. Mucus gland cells 236. Bronchioles end in 1. Alveolar ducts 2. Atria 3. Cells 4. Larynx 237. The exchange of gases between air and blood of rabbit takes place in 1. Alveoli 2. Atria 3. Bronchioles 4. Bronchi 238. Human lungs have

1. 300 millions of alveoli2. 850 millions of alveoli3. 650 millions of alveoli4. 770 millions of alveoli

239.	Turbinals or conchae are	lined by
1) Ciliated cuboidal epithelium		
	2. Clilated columnar epithe 3) Pseudo stratified ciliated	llum Iepithilium
	4 Squamous enithelium	repluintuiti
240	Percentage of air that ente	ers during normal
210.	hreathing is	and during normal
	1) 75% 2) 72%	3) 70% 4) 77%
241	In rabbit the two fibro-	elastic strands of the
271.	laruny extend between	the (FAMCET 2008)
	1) Thyraid and arritonal	id cortilogos
	2) Thyroid and arizoid	artilages
	2) Sontorini and thuraid	lantilages
	4) Circoid and tracheal	a cal llages
242	4) Circold and trachear	cartinaginous rings
242.		addit nas three thin
	twisted bony plates cal	(EAMCET 2007)
		(EANICE I 2007)
	1) Streated cuboidal epi	thelium
	2) Simple cuboidal epitr	
	3) Simple squamous epi	thelium
0.40	4) Simple ciliated colum	inar epithelium
243.	The larynx of rabbit is s	supported by
	1) A thyroid cartilage,	a cricoid cartilage and a
pair of arytenoids.		
2) A pair of thyroid cartilages, a cricoid		
cartilage and arytenoid 2) A draws identified in the first state of the state of		
5) A thyroid, a pair of cricoid and a pair of		
arytenoids.		
4) Thyroid, cricoid and arytenoids one pair		
	each	
244.	Rimaglottidis in rabbit i	sa
	1) Space between the v	vocal cards
	2) Space between the a	rytenoids and santorini
	3) Space between the c	ricoids and arytenoids
	4) Space between glott	is and epiglottis
245.	This part does not take	part in the respiration
	ofRabbit	
	1) Diaphragm	2) Sternum
	3) Ribs	4) Vertebrae
		,
	MECHANISM OF I	BREATHING
	LEVEL	-I
246.	The number of ribs in rable	pit is
1. 14 Pairs 2. 12 Pairs		
	3. 10 Pairs	4. 11 Pairs
247.	In rabbit cyclical breathing	movements occur
	1. 12-16 times per minute	2.20 times perminute
	3. 10 times per minute	4.18 times per minute
A 40	DI 1 1	1 11

- 3) Both are active process
- 4) Both are passive process

LEVEL-II

- 250. Dome shaped diaphragm becomes flattened during
 - 1. Inspiration 2. Expiration
 - 3. Both 4. No change
- 251. Entry of the maximum amount of air into the lungs during normal breathing is due to the contraction of
 - 1) External Inter costal muscles
 - 2) Internal Inter costal muscles
 - 3) Diaphragm
 - 4) External and Inter costal nuscles
- 252. Which of the following is correct regarding expiration

1) Increase in thoracic cavity causes elastic recoil of lungs

2) Decrease in thoracic cavity causes elastic recoil of lungs

3) Increase in thoracic cavity results in increase of air pressure

4) Decrease in thoracic cavity results in decrease of air pressure

- 253. In rabbit, during inspiration, the dome-shaped diaphragm becomes
 - 1) More convex anteriorly
 - 2) More concave posteriorly
 - 3) More or less flat
 - 4) Contract to small size

EXCHANGES OF GASES LEVEL-I

- 254. Number of 0_2 molecules bind with a fully saturated haemoglobin molecule in man
 - 1.2 2.4 3.8 4.1
- 255. In atmospheric air the partial pressure of O2 is1) 2095 mm Hg3) 760 mm Hg4) 250 mm Hg
- 256.The percentage of O_2 in the atmospheric air1) 20.95%2) 30%
 - 3) 21% 4) 23%
- 257. **Tidal volume** in humans is 1) 500 ml 2) 3000 ml 3) 1100 ml 4) 1200 ml
- 258. Inspiratory reserve volume in human lungs is1) 500 ml2) 3000 ml
- 3) 1100 ml
 4) 1200 ml

 259.
 Expiratory reserve volume in humans is

 1) 500 ml
 2) 3000 ml

 3) 1100 ml
 4) 1200 ml
- 260.
 Residual volume is

 1) 500 ml
 2) 3000 ml

 3) 1100 ml
 4) 1200 ml

248. Diaphragm becomes dome shaped during1. Inspiration2. Expiration

- 3. Both times 4. No change
- 249. In rabbit, inspiration and expiration are respectively1) Passive and active process2) Active and passive process
- EAMCET-SENIOR ZOOLOGY

261	LEVEL-II Which of the following statements is not true	2 1) TLC-RV 3) TLC-ERV
2011	(Kerala PMT.2007)	
	1) The P.P of O_2 in deoxygenated blood is	TRA
	2) The P.P of O_2 in oxygenated blood is 95m	m 271. Most of the O_2 i
	Hg	ported in the form
	3) The P.P of CO_2 in deoxygenated blood is	1. Oxyhaemoglo
	95mm Hg	3. Myoglobin
2.02	4) The P.P of CO_2 in alveolar air is 40mm Hg	4. Carbamino hae
262.	After deep inspiration, maximum expiration of	$1 = \frac{2}{2}$. The Shape of Ox
	lungs is called (CPN1, 2004)	1. S 2. J 273 In rabbit most of
	2) Total lung capacity	1. Carbonic acid
	3) Inspiratory capacity	3. Carbamine
	4) Functional residual capacity	4. Carboxy haen
263.	During oxygen transport the oxyhaemoglobin	1. Myoglobin
	at the tissue level liberates oxygen to the cells	2. Carboxyhaemo
	due to	3. Cynoglobin
	1) O_2 concentration is high and CO_2 is low	4. Carbamino had
	2) O_2 concentration is low and CO_2 is high	1 Bicarbonates
	3) O_2 tension is low and CO_2 tension is high	3 Carbamino co
• • •	4) O_2 tension is high and CO_2 tension is low	4. Potassium bica
264.	Formula for functional residual capacity is	276.23% of carbondi
	$\begin{array}{c} 1) 1 V + 1 K V \\ 2) V C + D V \\ \end{array}$, 1. Bicarbonates
265	5) $V \subset K V$ 4) $I \vee I K \vee E K \vee$	2. Carbamino hao
205.	1) 3500 ml 2) 4600 ml	3. Physical soluti
	3) 4800 ml 4) 3900 ml	277. Carbonic anhy
266.	If in the human lungs the tidal volume is 500 m	l l. Leucocytes
	and the IRV is 3000 ml then the inspiratory	3. Erythrocytes
	capacity is	270. Halliberger Sei
	1) 3500 ml 2) 4600 ml	3 Lead shift
	3) 4800 ml 4) 3900 ml	5. Deut billt
267.	By adding ERV & RV we will arrive at	279. The effect of CO,
	1) Vital capacity	ofhaemoglobbin
	2) Functional residual capacity 3) Expiratory reserve volume	1. Sewel Wright
	4) Inspiratory capacity	3. Vanderval effe
268.	Arrange the partial pressures of $CO_{\rm c}$ in the	280. Under a given C
	alveoli atmospheric air and deoxygenated	by
	blood respectively	1. Decrease in F
	1) 0.3, 40, 45 2) 40, 0.3, 45	$3. CO_2$ concentr 4 Free fatty acid
	3) 45, 40, 0.3 4) 0.3, 45, 40	281. The diffusion of
269.	The partial pressures of $O_2 \& CO_2$ appear to	and chloride ions
	be the same in	2. Chloride shift
	1) Alveoli & tissues	3. Sodium shift
	2) Alveoli & Oxygenated blood	282. The formation of
	3) Deoxygenated blood & Oxygenated blood	1 I. Plasma
0.70	4) Deoxygenated blood & Tissues	3. KBC
270.	What is vital capacity (V.C) of our lungs (CBSE, 2008)	

LEVEL-I st of the O₂ in the body of a Rabbit is transed in the form of xyhaemoglobin 2. Carboxy haemoglobin **Iyoglobin** arbamino haemoglobin Shape of Oxygen dissociation curve is 3. L 4. I 2. J bbit most of CO₂ is transported in the form of arbonic acid 2. Bicarbonate arbamine arboxy haemoglobin transport of CO₂ by haemoglobin is in the form of *Iyoglobin* arboxyhaemoglobin ynoglobin arbamino haemoglobin of carbondioxide is transported as 2. Physical solution icarbonates arbamino compounds otassium bicarbonate of carbondioxide is transported as icarbonates arbamino haemoglobin hysical solution 4. Potassium bicarbonate bonic anhydrase is found in (CPMT 1994) eucocytes 2. Lymphoctes rythrocytes 4. Blood Plasma **nberger's effect** is also known as(AMU 2001) odium shift 2.Chloride shift ead shift 4. Bicarbonate shift **LEVEL-II** effect of CO₂ and H⁺ ion on the oxygen affinity aemoglobbin is known as ewel Wright effect 2. Bohr effect anderval effect 4. Herring Bruer effect ler a given O_2 concentration in blood, dissoon of oxyhaemoglobin will increase. It is affected Decrease in P^{H} 2. Increase in P^H O₂ concentration of blood falls ree fatty acid concentration in blood falls. diffusion of bicarbonate ions into the plasma chloride ions into the RBC is called ohr effect hloride shift (Hamberger's Phenomenon) 4. Carboxylation odium shift formation of carbonic acid is much faster in 2. WBC lasma

2) IRV+TV

TRANSPORT OF GASES

4) IRV+ERV

3. RBC 4. Blood platelets

96

283.	The CO ₂ , that diffused into blood from tissue en-
	ters the cytoplasm of red blood cells and combines
	with water and forms carbonic acid in the presence
	of

1. Carbonic anhydrase	2. Isomerase
3. Arginase	4. Carbonase

284. Formation of **oxyhaemoglobin** in lungs is affected by

1. Normal P^{H} of blood, low temperature in lungs, High O_{2} and low CO_{2} concentration.

2. Low P^H of blood, high temperature in lungs, high O, and low CO, concentration

3. Low P^{H} of blood, high temperature in lungs, low O_{2} and high CO₂ concentration

4. High P^{H} of blood, low CO_{2} concentration and high temperature in lungs

285. The percentage of CO_2 transported as dissolved

 CO_2 , carbamino compounds and as bicarbonate ions respectively is 1) 23%, 70%, 7% 2) 7%, 23%, 70% 4) 7%, 70%, 23% 3) 70%, 23%, 7% 286. How many molecules of oxygen can associate with a molecule of haemoglobin (CPMT 1998) 1. One 2. Two 3. Three 4. Four 287. In which form CO, is mostly carried in blood (MPPMT 1998) 1. Sodium carbonate 2. Carbonic acid 3. Bicarbonate ions 4. Carbamino haemoglobin 288. Chloride shift occurs in response to (DPMT, 2007) 1) H^+ 2) K^+ 3) Na^+ 4) HCO_{2}^{-} 289. Among the following the unstable compound is 1) Carbon dioxide 2) Haemoglobin 3) Oxhaemoglobin 4) Carbon monoxide 290. The enzyme that catalyses the formation and dissociation of carbonic acid is 1) Carbonic anhydrase 2) Dehydrogenase 3) Catalse 4) Acid phosphatase 291. Amount of O_2 bound to haemoglobin in RBC 2) 97% 1) 100% 3) 90% 4) 50% 292. 75% of haemoglobin is saturated when the P_{O_2} is 1) 30 mm Hg 2) 40 mm Hg 3) 95 mm Hg 4) 98 mm Hg 293. If the partial pressure of oxygen is 95 mm Hg, the percentage of haemoglobin saturation is 2.80% 1) 48% 3) 97 % 4.50%

294. Percentage of CO_2 dissolved in the plasma of blood of lungs is

1) 8% 2) 7% 3) 10% 4) 15%

CIRCULATORY SYSTEM

- In arthropods and molluses the circulatory system is open type
- In open circulatory system, blood is pumped in to the haemocoel by heart.
- In arthropods and molluses the fluid pumped by the heart is heamolymph.
- Circulation is slow in open type due to low pressure
- In annelids, cephalopods and vertebrates there is closed circulatory system.
- Closed circulatory system is more advantageous because the flow fluid can be precisely regulated.
- Constituents of Blood vascular System are
 Blood, Heart, Arterial System and Venous System
- The space between the lungs in the thoracic cavity is Mediastinum
- The blood circulation is being maintained by the central pumping organ is - The heart
- Heart is situated in the mediastinum
- Heart is covered by

- a double layered pericardial membrane

- Outer layer is Fibrous Pericardium
- Inner layer is Serous Pericardium
- Serous Pericardium divided into visceral and parietal layer.
- Parietal layer is fused to fibrous pericardium
- Visceral or epicardium is attached to the surface of heart.
- Pericardial cavity is in between the parietal layer & visceral layer of the serous pericardium.
- Pericardial cavity filled with Pericardial fluid.
- Pericardial fluid protects the heart from

- External shocks and injuries.

- The wall of heart consist of Three layers
- Outer epicardium is formed by Mesothelial cells
- Middle layer of myocardium is formed by

- Inner endocardium is formed by - Squamous epithelium or Endothelium
- Endocardium is continous with the endothelial lining of large blood vessels attached to the heart.

EXTERNAL STRUCTURE OF HEART

- Number of heart chambers
 - Four (Two atria , two ventricles)
- In rabbit heart sinus venosus and truncus arteriosus are absent
- Atria and ventricles are seperated by a groove called - Atria ventricular groove (Coronary sulcus).
- Each atrium extends posteriorly as a flap which covers the anterior margin of the corresponding ventricle is

 Atrial appendix.

 INTERNAL STRUCTURE OF HEART

 Atria :
- The anterior thin walled chambers of the heart are atria.
- Atria are seperated by inter atrial septum
- In the embryonic heart an opening present on the middle of fossa ovalis, called Foramen ovale
- A small oval patch present on the inter atrial septum is called
 Fossa Ovalis
- The blood Vessels which open into right atrium are - Two Pre caval veins and - a post caval vien
- The right atrium is large
- The left atrium is small
- The right atrium receives deoxygenated blood from - different parts of the body (except lungs)
- Left and right precaval veins collects deoxygenated blood from

 head and fore limbs
- Post caval vein collects deoxygenated blood from - posterior parts of the body
- The remnant and non functional valve in adult rabbit is - valve of Eustachian
- The blood from the wall of heart is returned into the right atrium through a coronary sinus.
- Coronary sinus open into- The left pre caval vein
- In the wall of right atrium near Eustachian valve is a small node the sinu atrial node (S.A node)
- Left atrium receives oxygenated blood from lungs through a pair of - pulmonary vein

- The blood vessel which opens into left atrium is
 pulmonary vein
- In the opening of pulmonary veins valves are absent.
- The opening of the post caval vein is guarded by -membranous fold (remnant of Eustachian valve)
- At the opening of coronary sinus which opens in to left pre caval vein is guarded by

- valve of Thebesius

Ventricles :

• Walls of ventricles are

-Thick and highly muscular.

- The pumping chambers are called -Ventricles
- The atria open into the ventricle through
 - Atrio ventricular apertures
- The right atrio ventricular opening is guarded by -Tricuspid valve or right atrio ventricular valve
- The left atrio ventricular opening is guarded by •Bicuspid valve or - Mitral valve or - Left atrio ventricular valve
- Ventricles are seperated by

- Inter ventricular septum.

- Left ventricle is the larger than **Right ventricle**
- Left ventricle is the largest chamber of heart.
- Left atrium is the smallest chamber of heart.
- The thick wall of the ventricles is raised into muscular ridges called : - • • Columnae corneae
- Papillary muscles are connected to the margins of atrio ventricular valves by Chordae tendineae
- Extending between atrio ventricular valves and papillary muscles are connective tissue strands called

- Chordae tendineae

• The function of chordae tendineae is - to prevent

the cusps of AV valves from bulging too far in to atrium

AORTIC ARCHES:-

- The main artery which arise from the anterior part of Rght ventricles is Pulmonary artery
- Kind of blood flows into the pulmonary artery is -Impure blood (De-oxygenated)
- Kind of blood flow into the aorta

- The main aorta which arise from the anterior part of Left ventricle is - Left systemic artery
- The opening of pulmonary aorta guarded each by - Three semilunar valves
- The opening of systemic aorta guarded by

- Three semilunar valves

- The number arterial arches arise from Rabbit heart are **Two**
- At the point of contact of the systemic arch and pulmonary arch a muscle strand is present called

-Ligamentum arteriosum.

• The ligamentum arteriosum is modified

- Embryonic ductus Botalli *FUNCTIONING OF HEART* ORIGIN AND CONDUCTION OF HEART BEAT

• The point of initiation of wave of contraction of cardiac muscle on the heart is called

- Pace Maker

- The number of pace makers in rabbit heart Two
- The sinoatrial node is present in the Rabbit heart on - the dorsal wall of right atrium
- In rabbit atrio ventricular node is present on
 Posterior right border of inter atrial septum
- A bundle of specialized muscle arise from A.V. node is - bundle of His
- The fibres which carry the impulse of contraction to the wall of ventricle are Purkinje fibres
- Action potential pass from atria to ventricle through bundle of His.
- Pace maker is formed by modified cardiac muscle
- so it is called myogenic pace maker
- Such hearts are called Myogenic hearts
- The rhythmic contractions and relaxations of the heart is called. - "Heart Beat"
- The heart contraction is called -systole
- The heart relaxation is called -diastole
- A systole and a diastole constitutes

- the Heart beat

- Atrial Systole

- The cyclical systole and diastole of heart chambers is called Cardiac cycle
- The contraction of atria is called

The contraction of ventricles is called

- Ventricular Systole

- Duration of cardiac cycle 0.8 sec.when heart beat 75 times per minute.
- Duration of atrial systole -0.1 sec.
- 20% of filling of ventricle is accounted by atrial systole.
- End of atrial systole is also the end of ventricular diastole.
- End diastolic volume is 120 ml.
- Duration of ventricular systole 0.3 sec.
- End systolic volume is 50 ml of blood, (In the ventricles)
- Duration of complete cardiac diastole 0.4 sec.
- During the Ventricular systole, the atrio ventricular valves will be closed by making a sound called
 LUBB
- Dilation of ventricles due to relaxation of ventricular muscles is called Ventricular diastole
- During ventricular diastole, the semilunar valves of systemic and pulmonary arteries will be closed by making a sound called
- The systolic sound is LUBB
- The diastolic sound is Dup
- In mammal heart pure and impure blood donot mix and they maintain separate circulation hence it is called - Double circulation
- The volume of blood the heart pumps in each beat is called -stroke volume
- Stroke volume multiplied by the number of beats per minute is called -Cardiac output
- Cardiac output in man is 5040 ml / minute
- Cardiac out put = stroke volume x no.of beats per minute
- Most of ventricular filling occurs during atrial systole phase.

ARTERIAL SYSTEM

- The blood vessels which carry blood from heart to various parts of the body are called Arteries
- The lumen is narrow in Arteries
- Blood flow is wavy in Arteries
- Arteries always terminates with capillaries

 Middle layer is tunica me - smoor Innner layer is tunica interby - a single Deep seated large blood Thick walled blood vesse Normally pure blood flood blood which flows in the 	th and circular muscles erna (endothelium) formed layer of epithelial cells vessels are - Arteries els without valves are - Arteries ows in the arteries but the Pulmonary artery is	 dorsal aorta) in Abdominal cavity Coeliac artery divides into :- (1) Hepatic artery and (2) Lieno-gastric artery Hepatic artery : - supply blood to Liver Lineo -gastric artery : supply blood to - stomach and spleen Anterior mesenteric artery, supplies blood to - Duodenum, Ileum, Caecum Colon and Pan- creas
• The Delmana 1'	- Impure blood	• Left renal artery situated - helow the right renal artery
• The Pulmonary artery div	- Lungs	 Renal arteries - supply blood to (one pair)
 The systemic aorta turns piratory system to becor 	around the part of the res- ne - dorsal aorta	 Kenar arteries - suppry blood to (one pair) Kidneys Gonadial arteries : - (one pair) - supply blood to
• The first blood vessel whi	ich arise from the systemic	- Gonads
aorta	- Coronary arteries	• Gonadial arteries of males are called
• The Coronary artiereis c	arry blood to	- Spermatic arteries.
• 1 1 0	-The muscles of Heart.	• Gonadial arteries of females are called
• The branches of Innomir	nate artery are	Posterior mesenteric artery - Unnaired - supply
• The Right and Left sub-cl	avian arteries devide into -	blood to - Colon and Rectum
1. Vertebral artery 2. Brachial artery 3. Internal mammary a	rtery	 Colon part of alimentary canal receives blood through Anterior and Posterior mesenteric arteries Lumbar arteries :supply blood to
• Vertebral artery supplies	blood to the	- dorsal body wall of Abdominal region
• Drachial artory gunplical	- vertebrai column	Caudal artery - Supply blood to Tail
Bracinar artery suppries of		• The dorsal aorta at its Posterior end finally divides
- mammary glands n	ericardium dianhragm	into - a pair of common iliac arteries
 The Right and Left comm (1) External carotid an artery 	non carotids divide into rtery(2) Internal carotid	 Uterine artery supply blood to - Uterus in female Vesicular artery - supply blood to Urinary bladder and to the Uterus in female.
• External carotid artery su -Tongue,lips, Jaws, Sa of the head	applies blood to livary glands and back	 The common fliac artery divides into : (a) Exter- nal Iliac artery (b) Internal Iliac artery The External Iliac or Femoral artery
• Internal carotid artery : st	upplies blood to - Brain parts	 Supply blood to outer part of hind limbs. Internal Iliac or Hypogastric
• Inter coastal arteries are	- 5 to 7 pairs	- Supply blood to organs of Pelvis
• Intercoastal arteries Supp	plies blood to - intercostal muscles	 Posterior epigastric artery suplies the blood to ventral abdominal wall.

- Pulmonary arch arises from the right ventricle
- Pulmonary artery supply deoxygenated blood to

VENOUS SYSTEM

- The blood Vessels that return blood from different parts of the body to the heart are called Veins
- Normally the blood flows in veins is- Impure blood
- Veins are Superficial
- Veins are always begins with capillaries
- Walls of vein is formed by Three layers
- Outer layer of veins or tunica externa formed by - collagen fibres
- Middle layer of veins is tunica media formed by
 - Thin layer of smooth muscles

- lungs

- Inner layer of veins is tunica interna (endothelium) formed by - a layer of epithelial cells.
- The vein that begins with capilleries in one organ and end in another organ is called **Portal vein**
- The Portal vein present in the Rabbit is Hepatic Portal vien
- Coronary veins : collect blood from the wall of heart
- Impure blood from various parts of the body is collected by - **Right atrium through two precavals and a Post caval Vein**

SYSTEM OF VENACAVAE

- The venous system of rabbit may be divided into - Three components.
 - Anterior venacavae (Precaval veins)
- External Jugular vein collects blood from - Muscles of jaws, tongue, various parts of head.
- Jugular anastamosis is formed by :
 - Right and Left External Jugular veins
- Internal Jugular vein : collects blood from
 - brain and muscles of neck
- Sub clavian vein collects blood from

-shoulder and forelimb

- Anterior inter costal veins (unpaired veins) collect blood from - anterior intercostal spaces
- Azygos cardinal vein (Unpaired Vein) collects blood from - Posterior inter costal spaces Posterior venacava (Post caval vein)
- Hemizygous (unpaired vein) present on left side, and from tranverse anastomosis in association with
 Azygous cardinal vein

Post caval vein collects blood through

- tail, hindlimbs, various parts of abdomen

- Caudal vein collects blood from Tail
- Internal iliac veins : Collect blood from **Different** parts of pelvis and form a median hypogastric vein
- External iliac veins : collect blood from

- Thighs,Urinary bladder, Uterus and adbominal wall

• Ilio lumbar vein : collects blood from

- Muscles of back

- Gonadial vein collects blood from -Gonads
- In males gonadial veins are called

- Spermatic veins

• In females gonadial veins are called

- Ovarian veins

- Renal veins: Collect blood from Kidneys
- Hepatic veins: Collect blood from Liver
- Phrenic veins: Collect blood from Diaphragm

HEPATIC PORTAL SYSTEM

- The vein that begins with capillaries in one organ and end in another organ is called - **Portal vein**
- Blood from visceral organs is collected and enter into the liver through -Hepatic Portal Vein.
- Hepatic portal system collects blood from

- stomach, intestine

- Hepatic portal system supply blood to The liver
- Hepatic portal vein is formed by the fusion of the following Veins.

a) Lienogastric vein: Collect blood from stomach and spleen.

b) Duodenal vein: Collect blood from duodenum and Pancreas.

c) Anterior mesenteric Vein: Collects blood from -IIeum, Caecum and Colon.

d) Posterior mesenteric Vein: Collects blood from -Rectum, Anus.

PULMONARY SYSTEM

- It consists of a pair of pulmonary veins.
- Right and left pulmonary veins open into the left atrium through a common pore

BLOOD COAGULATION

- The process of conversion of liquid blood into jelly like clot is called Blood coagulation
- When the blood is shed, it loses its liquid property in -3-6 minutes

•	Purpose of coagu	lation is three fold i.e.	•	Thromboplastin is also called - Thrombokinase
	(1) Prevent loss	of blood	•	Fibrinogen is synthesized in - The liver
	(2) Prevent entr	y of germs nals from death due to-	•	Fibrinogen is - Plasma protein
	haemorrhages	nais from ucath duc to-	•	Under normal conditions fibrinogen is in dissolved
•	Blood clotting is a	a change in -Plasma		state in - The plasma
•	The yellow fluid	present on the blood clott is called	•	The vitamin essential for the formation of Prothrom-
		-Serum,		bin in liver is - Vitamin K
	Serum does not c	ontain – Plasma proteins		Prothrombin also synthesized in - The liver
•	(Prothrombin and	fibrinogen)		I hromboplastin found in - blood platelets and tissue cells
•	I ne blood clot in	the blood vessels is called	•	Calcium ions are present in - The plasma
•	A free floating cl	- in the blood stream is called -	•	Damaged platelets and runtured tissue cells releases
	Embolus	tot in the blood stream is cance -		- Prothrombinase
•	The number of b	lood factors involved in the pro-	•	Fibrin monomers are held together by hydrogen
	cess of blood clo	tting are - 13		bonds.
BL	LOOD CLOTT	TING FACTORS	•	Soluble fibrin is stabilised by factor XIII as insoluble
	Blood clotting fa	actorCommon name/Chemical		fibrin threads.
	name		•	Factor XIII link the fibrin monomus by covalent
	Factor I	Fibrinogen of Plasma		bonds
	Factor II	Prothrombin of Plasma	•	Clot retraction is the tightening of the fibrin clot.
	Factor III	Thromboplastin from tissues &	•	Prothrombinase is formed in two pathways -
		platelets	•	In intrinsic pathway it is formed from - Platelets
	Factor IV	Calcium ions of Plasma	•	In Extrinsic pathway it is formed from
	Factor V	Labile factor /accelerator		- Damaged tissues
		globulin	•	Intrinsic pathway it initiated by
	Factor VI	omitted now		- Hageman factor
	Factor VII	Proconvertin/stable factor	•	Damaged platelets and ruptured tissue cells releases
	Factor VIII	Anti haemophilic factor-A		- Prothrombinase
		(AHF-A)	•	Calcium ions are required in both
	FactorIX	Christmas factor / Anti		- Extrinsic & Intrinsic pathways
	Eastar V	naemophilic factor B(AHF-B)		- EDTA Citrates & Oxalates
	Factor A	Stuart factor/Prower factor/	•	Vit. K is required for the synthesis of factors
	Factor VI	Antihaemonhilic factor C		- II, VII, IX, X
	Pactor XI	(AHE_C)	•	II, VII, IX & X factors are synthesized by
	Factor XII	Hageman factor		- Hepatic cells of liver
	Factor XIII	Fibrin stabilizing factor	•	Heparin increases the activity of - antithrombin
•	The important blo	and factors are	•	Coumadin is antagonistic to - Vit. K
	1. Fibrinogen (F	Sociactor – I)	•	Coumadin is - From plant anticoagulant
	2. Prothrombin (Factor – II)		•	Thrombin converts the soluble fibrinogen into
	3. Thromboplas	tin (FactorIII) (Factor – IV)		- insoluble fibrin threads
•	The substance wh	ich initiates the blood clotting pro-	•	The substance naturally present in the blood and
	cess is	– Thromboplastin		prevent blood clotting is - Heparin
EA	MCET- SENIOR ZO	OLOGY	02	UNIT-III

•	Heparin prevents blood clotting by forming	1. One 2. Two 3. Three 4. Four 299 The heart of rabbit is present in a space called
	-Hepain prothrombin complex	1.Mediastinum 2.Thorax
•	The substance present in the blood plasma which	3.Abdomen 4.Inguinal canal
	prevents transformation of prothrombin into thrombin	300 The anterior atria are separated from the posterior
	is - Heparin	ventricles by a transverse groove
•	Heparin is popularly called as - Anticoagulant	called
•	Both Heparin and Prothormbin are produced in	1.Coronary sinus 2.Coronary sulcus
	- The liver	3.Anterior choroid plexus
•	Soliva of magguitas contains has maly sin	4.Posterior choroid plexus
•	Sanva of mosquitoe contains - neamorysm	301 Fossa ovalis is present on septum between
•	Saliva of leeches contains - Hirudin.	1. Atria 2. Ventricles
•	Coumarins of plant origin are the precursors of	3. Sinus venosus 4. Aortae
	coumadin (warfarin)	302 Right and left ventricles are externally separated by
•	The process of prevention of loss of blood from the	1. Inter ventricular septum
	hady by blood alotting is known as	2. Inter ventricular groove
	body by blood clothing is known as -	3. Atrial appendix
•		4. Coronary sulcus
•	The process of maintenance of optimum levels of	303. A swollen flap that arises from atria and partly cov-
	water and salts in the body fluids is known as	ers the ventricles is called
	- nomeostasis	1. Vermiform appendix
•	Narrowing blockage of coronary arteries leads to	2. Atrial appendix
	-Coronary artery disease(CAD)	3. Inter ventricular groove
•	The blood vessel from another part of the body is	4. Inter ventricular septum
	grafted to a coronary artery to bypass an area of	304 In the heart of rabbit, two atria open into the ven-
	blockage is done in - Bypass surgery	tricles by
•	Inflating of the balloon to stretch the arterial wall and	1. Foramen ovalis
	to squash the artherio sclerotic playoue is done in	2. Fossa ovalis
	-Coronary angioplasty	3. Two atriculo-ventricular openings
•	Blood flow to myocardium is partially abstracted in	4. One common atrio-ventricular opening
	- myocardial ischemia	305 The pumping chambers of the heart are
•		1. Atria 2. Ventricles
•	Severe pain accompany myocardial ischemia is	3. Sinus venosus 4. Truncus arteriosus
	known as - angina pectoris	306 The right atrio - ventricular opening is guarded by
IN	ATDODUCTION & STDUCTUDE OF HEAT	2. Events a filman valve
11	I EVEL I	3.207 The left stric ventricular opening is guarded by
295	Circulatory system helps in the transportation of	1 Bicuspid (or) mitral valve
275	1 Nutrients & Hormones only	2 Tricuspid valve
	2 Respiratory gases only	3 Semilunar valves 4 Thebesius valve
	3 Nitrogenous wastes only	308 The specialised muscle fibres that spread over the
	4. All the above	walls of ventricles are called
296	5. The heart of rabbit is situated in	1. Columnae corneae 2. Chordae tendineae
_> 0	1. The thoracic cavity 2. The abdominal cavity	3. Purkinie fibres 4. Bundle of His
	3. The synovial cvity 4. Below the lungs	309 The conical elevations present on the inner surface
297	The epithelial membranes that encircle the heart are	of ventricles are called
	called	1. Columnae corneae 2. Chordae tendineae
	1. Arthroidal membranes.	3. Purkinji fibres 4. Bundle of His
	2. Pericardial membranes	310. Mitral valve is the another name of
	3. Peritrophic membranes	1. Right atrio-ventricular valve
	4. Pleural membranes	2. Left atrio-ventricular valve
298	The number of pericardial membranes that encircle	3. Eustachian valve 4. Sprial valve
	the heart is	

311 The number of aortic arches that arise from the ventricles in rabbit 1.1 2.2 3.3 4.4 312 Pulmonary artery in Rabbit arises from 1.Righ ventricle 2.Left ventricle 3.Right atrium 4.Left atrium 313 Ligamentum anteriosus is the modified 1) Whorten's duct 2) Stenson's duct 3) Ductus Botalli 4) Ductus Caroticus 314 The wall of the heart consists of 1.Three layers 2.Two layers 3. Four layers 4.Only one layer 315 Epicardium of rabbit heart is formed by 1.Cardiac muscles 2.Squamous epithelium 3.Mesothelial cells 4.Smooth muscles 316 Endocardium of rabbit heart is formed by 1. Cardiac muscles 2. Squamous epithelium 4. Smooth muscles 3. Mesothelial cells 317 Myocardium of rabbit heart is formed by 1. Cardiac muscles 2. Smooth muscles 3. Skeletal muscles 4. Visceral Muscles 318 The pace maker in the heart of rabbit is 1.S.A.node 2. Sinus venosus 3.Spiral valve 4.A-V node 319 Right atrium of rabbit receives blood from 1.Pulmonary veins 2. Precaval veins only 3.Pre and postcaval veins 4.Sinus venosus 320 The number of valves that guard the opening at the origin of systemic aorta is 1.2 2.3 3.4 4.1 (EAM 2004) Epicardium is 321 1) Parietal layer of pericardium 2) Visceral layer of myocardium 3) Parietal layer of myocardium 4) Visceral layer of pericardium Mesothelium is related to 322 1) Endocardium 2) Epicardium 3) Myocardium 4) Visceral layer Lining that covers the heart valves is derived 323 from 1) Epicardium 2) Myocardium 3) Endocardium 4) Visceral layer 324. Coronary sulcus in the heart separates 1) Two atria 2) Two ventricles 3) Atria & ventricles 4) Coronary sinus from coronary arteries In the heart of rabbit, the mitral valve is 325. attached to the papillary muscles by: (EAM 2003) 2) Purkinje fibres 1) Chordae tendineae 3) Columnae corneae 4) Bundle of His

326.	The number of pace-m	nakers in the heart of
	rabbit is	
	1) Three	2) Only one
	3) Two	4) Four
327.	Purkinje fibres originat	te from
	1) Sinu-atrial node 2)	Atrio-ventricular node
	3) Bundle of His 4)	Sinus venosus
328.	"Bundle of His" is situa	ated in
	1) Left atrium	2) Right atrium
	3) Interatrial septum	
	4) Interventricular sept	um
	LEVEL	-11
329. T	he heart is protected fr	om external shocks and
in	juries by	
1.	Synovial fluid 2	. Pericardial fluid
3.	Cerebro spinal fluid	4. Renal fluid
330.Si	nus venosus and truncu	s arteriosus are absent in
th	e heart of	
1.1	Frog 2.Fish 3.Snal	ke 4.Rabbit
331 Fo	ramen ovalis is present	in
1.	Interatrial septum of em	bryo of frog
2.	Inter atrial septum of a	adult rabbit
3.	Inter ventricular septum	n of rabbit
4.	Inter atrial septum of emb	oryo of rabbit
222 TI		a ata tha true atria in an
332.11	te opening which conn	ects the two atria in em-
1	Source condition of rade	2 Earoman avalia
1.	Fossa ovalis	2. Foramen of monro
333 Th	rorannen magnum	4. Por amen of monito
	arded by	var into the right attruit is
1 ¹	Fustachian valve	2 Ricuspid Valve
3	Atrioventricular valve	4 Sinu atrial valve
334 Th	e opening of the corona	ry sinus which opens into
th	e left precaval vein th	at inturn opens into the
at	rium is guarded by	
1.	Valve of Thebesius	2. Eustachian valve
3.1	Atrio ventricular valve	4. Semilunar valves
335 Th	e left atrium in the hear	t of rabbit receives
1.	Deoxygenated blood fro	om the liver through
ł	nepatic vein	C
2.	Deoxygenated blood fro	om the liver through
ł	nepatic portal vein	
3. Oxygenated blood from the lungs through		
common pulmonary vein		
4.	Oxygenated blood fro	om the kidneys through
po	ost caval vein	
336 Ba	ased on thickness arran	ge the layers of the heart
fo	orm the thinnest to the th	ickest
1)End	ocardium \rightarrow epicardiun	$n \rightarrow myocardium$
2) End	ocardium → myocardiu	$m \rightarrow epicardium$

3) Epicardium \rightarrow endocardium \rightarrow myocardium

4) Myocardium \rightarrow endocardium \rightarrow epicardium

337.The "Bundle of His" in rabbit starts from		
1.S.A node	2.Sinus venosus	
3.A.V.node	4.Truncus arteriosus	
338 Papillary muscles are loca	ated in	
1.Ventricles of heart of ral	bbit	
2.Dermis of mammalian	skin	
3.Orbits of vertebrate eye	es	
4.Pylorus of vertebrate st	comach	
339 Purkinje fibres are presen	t in	
1.Walls of ventricles	2.Walls of atria	
3. Aortic arches	4.Sinus venosus	
340 In the heart of rabbit, the	AV-valves are attached	
to the papillary muscles b	oy (EAM 2003)	
1. Chordae tendinae	2. Purkinje fibres	
3. Columnae corneae	4. Bundle of His	
341 The valve/s present at th	e opening of the pulmo-	
nary arch is / are		
1. Three atrio ventricular	valves	
2. Three pairs of atrio ver	ntricular valves	
3. Single semi-lunar valve	with 3 semi lunar cusps	
4. Three semi-lunar valve	S	
342 The opening of systemic a	artery is guarded by	
1.1 Semilunar valve	2.Bicuspid valve	
3. Tricuspid valve	4. Valve of the basius	
343 The left systemic artery (or) carotico systemic ar-	
tery arises from		
1.Right ventricle	2.Left ventricle	
3.Sinus venosus	4.Left atrium	
344 In the heart of adult rabbi	t, remnant valve is	
1. Eustachian valve	2. thebesisus valve	
3. semilunar valve	4. Bicuspid valve	
FUNCTION	JF HEAKI	
245 Each cordina avala comm	L-I	
1. Atrial systole	2. Ventricular systole	
3. Cardiac diastole	4.All	
346 During atrial systole, the	blood enters into	
1. Atria	2. Ventricles	
3. Pulmonary & systemic	arches	
4.pre caval & post caval v	veins	
347 During ventricular systole		
1. Tri,Bicuspid valves are	closed	
2. Semilunar valves open		
3. Both 1&2		
4. Semilunar and AV valv	res are closed	
348 The heart sound "Lub" is	s produced due to	
1.Opening of tricuspid and	d bicuspid valves	
2.Closure of semilunar val	lves	
3. Opening of semilunar v	alves	
4. Closure of tricuspid and	l bicuspid valves	
349 The heart sound "Dup" is	s produced due to	

1. Opening of tricuspid an	d bicuspid valves	
2. Closure of semilunar valves		
3. Opening of semilunar v	alves	
4. Closure of tricuspid and	l bicuspid valves	
350 Complete double circulati	on is seen in	
1.Frog	2.Snake	
3.Rabbit	4.Fish	
LEVEL	-II	
351 The reverse flow of the blo	ood from the left systemic	
arch or from the pulmona	ary artery is prevented by	
1. Three atrio ventricular v	valves	
2. Three pairs of atrio vent	tricular valves	
3. One semi lunar valve ea	ach	
4. Three pairs of semi luna	ar valves each	
352 In the human heart at each	beat the volume of blood	
numped out by each vent	ricle is	
1 7ml	2 70ml	
3 700ml	4 7000ml	
252 The amount of blood pup	H. 70001111	
sos menuta (ar)the condia	a output is	
1.5040 m^{1}	2 10 litres	
3 121itres	4 16litres	
354 The cardiac output can be	e measured as	
1. Stroke Volume X numb	per of heart beats per hour	
2. Stroke Volume X numl ond	per of heart beats per sec	
3. Stroke Volume X numl minute	per of heart beats per	
4. Stroke Volume X numb	per of heart beats per day	
355 When the S-A node initia	tes the wave of contrac-	
tion		
1. Both the atria contract s	imultaneously	
2. First right atrium contrac	cts and then the left atrium	
3. First left atrium contract	ts and then the right atrium	
4. First ventricles contract	and then the atrium	
356 The direction of the wave	of contraction in the heart	
of human beings is		
1. S-A node, A-V node, a	tria, Purkinje fibers,	
bundleof His, ventricles		
2. S-A node, A-V node, a	tria, Bundle of His,	
Purkinie fibers, Ventric	les	
3. S-A node, atria, A-V no	ode. Ventricles.	
Purkinie fibers, Bundle	ofHis	
4 S-A node atria A-V	/ node bundle of His	
Purkinie fibers Ventricles		
357 Return flow of blood into	, the atria is prevented by	
1 Opening of biougnid &	triousnid volvos	
2. Closing of biougnid & t	micuspiu valves	
2. Chosing of orcuspid & incuspid valves		
4. Closing of semilunar V	aives Ives	
4. Closing of semilunar Va	ives	
$\rightarrow \rightarrow \alpha$ in Finite mathematic mass ox vgenz	II.AI DIOOLICHICIS IIIO SVS-	

- 358 ınto sys-, oxygenated blood enters temic aorta during 2. Atrial diastole
 - 1. Atrial systole 3. Ventricular diastole
 - 4. Ventricular systole

359 Return flow of blood into the	ventricles is prevented	
by		
1. Opening of bicuspid & tricuspid valves		
2. Closing of bicuspid & tric	uspid valves	
3. Opening of semilunar valv	7es	
4. Closing of semilunar valve	S .	
360 Typical 'lub-dup' sounds he	ard during heartbeat	
are due to	(KCET 1994)	
1. Closing of bicuspid an	d tricuspid valves only	
2. Closing of semilunar v	alves only	
3. Blood flow under pres	sure through aorta	
4. Closure of bicuspid an	a tricuspia valves	
filowed by semilunar v	alves	
361 Duration of cardiac cycle i	S () O (
1) 0.1 2) 0.8 3) 0.3	4) 0.4	
362 Based on the duration arran	ge the following	
events from minimal time to	maximal time	
1) Ventricular systole \rightarrow	\cdot cardiac diastole \rightarrow	
Atrial systole	. 1 . 1	
2) Atrial systole \rightarrow ventre	ricular systole	
\rightarrow cardiac diastole		
3) Atrial systole \rightarrow card	$ac diastole \rightarrow$	
ventricular systole		
4) Cardiac diastole \rightarrow a	trial systole \rightarrow	
ventricular systole		
363 20% of filling of ventricle	es in each cardiac	
cycle is accounted by the		
1) Ventricular systole	2) Atrial systole	
3) Cardiac diastole	4) Cardia output	
364 Amount of blood contain	ied by each ventricle	
at the end of its diastole (En	d Diastolic Volume) is	
1) 120 ml	2) 70 ml	
3) 80 ml	4) 100 ml	
365 End Systolic Volume is		
1) 120 ml	2) 70 ml	
3) 50 ml	4) 80 ml	
366 Formula for obtaining str	oke volume is	
1) End diastolic volume r	ninus end systolic	
volume		
2) End diastolic volume	plus end systolic	
volume		
3) Cardiac output minus	end diastolic volume	
4) End systolic volume m	inus end diastolic	
volume		
367 Blood enters into the hea	irt because muscles of	
(Orissa JEE, 2007)		
1) Atria relax	2) Atria contract	
3) Ventricles relax		
4) Ventricles contract		
368 The second heart sound	of rabbit occurs	
1) At the end of atrial sys	stole	
2) At the end of ventricul	ar systole	
3) At the begining of atria	al diastole	

4) At the begining of ventricular diastole 369 The events that occur during a heart beat are together called 1) Contraction 2) Expansion 3) Cardiac cycle 4) Stroke volume **ARTERIAL SYSTEM** LEVEL-I 370 The wall of artery is formed by 1.3 Layers 2.2 Layers 3.4 layers 4. only 1 Layer 371 Tunica externa of artery is formed by 1) Elastic and collagen fibres 2. Smooth and circular muscles 3) Single layer of epithelial cells 4. Only smooth muscles 372 Tunica interna or endothelium of artery is formed by 1) Single layer of visceral muscle cells 2. Single layer of epithelial cells 3) Elastic and collagen fibres 4. Circular muscles 373 Tunica media of artery formed by 1) Smooth and circular muscles 2. Rough and cardiac muscles 3) Elastic and collagen fibres 4. Voluntary and involuntary striped muscles 374 In rabbit, vertebral artery arises from 1. Cartoid artery 2. Dorsal aorta 3. Coronary artery 4. Subclavian artery 375 Vertebral artery supplies blood to 1) Vertebral column 2) Mammary glands 3) Percardium 4) Diaphragm 376 The number of intercostal arteries in rabbit 2.5 to 8 pairs 1.5 to 7 pairs 3.5 to 9 pairs 4.5 to 6 pairs 377 In Rabbit, brachial artery arises from 1. Carotid artery 2. Coronary artery 4. Dorsal aorta 3. Subclavian artery 378 A pair of coronary arteries in rabbit arise from 1.Left systemic 2. Dorsal aorta 3.Pulmonary 4. Cartoid 379 The arteries which supply blood to the kidneys in rabbit are 1.4 pairs of renals 2.2 pairs of renals 3. Three pairs of renals 4.One pair of renals 380 The artery which supplies blood to the testis is 1. Spermatic 2. Ovarian 3. Mesenteric 4.Coeliac 381 Common iliac arteries arise from

- 1. Internal mammary artery 2. Dorsal aorta
 - 3. Coeliac artery 4. Lumbar arteries

382 The artery that carries deoxygenated blood is 1. Coronary artery 2. Carotid arteries 3.Pulmonary artery 4. Mesenteric artery LEVEL-II 383 The artery which supplies blood to right fore limb is 2) Brachial 1) Vertebral 3) Internal carotid 4) External carotid 384 The arteries which supply blood to heart muscles are 1.Coronary 2. Innominate 3. Left carotid 4. Subclavian 385 The artery which supplies blood to diaphragm is 1.Inter costal 2.Phrenic 3. Coeliac 4. Brachial 386 The artery which supplies blood to stomach, liver and spleen is 1. Coeliac 2. Mesenteric 3. Lumbar 4. Lliac 387 Blood is supplied to colon and rectum by 1. Anterior mesentric artery 2. Posterior mesenteric artery 3. Coeliac artery 4. Lumbar artery 388 The dorsal aorta in Rabbit runs posteriorly upto 2. Kidneys 1. Liver 3. Gonads 4. Middle of pelvic region 389 The dorsal body wall is supplied blood by 2. Ilio lumbar 1. iliacs 3. Renal 4. Mesenteric 390 The artery which supplies blood to urinary bladder is 1. Vesicular 2. Femoral 4. Renal 3. Lumbar 391 Femoral artery supplies blood to 2. Hind Limb 1. Kidnevs 3. Abdomen 4. Tail 392 The muscles of diaphragm receive blood from 1. Phrenic arteries 2. Coeliac artery 3. Intercostal arteries 4. Anterior mesenteric artery 393 The muscles of anterior part of colon receive blood from 1. Phrenic arteries 2. Anterior mesenteric artery 3. Coeliac artery 4. Posterior mesenteric artery 394 The muscles of the hinder part of colon receive blood from 1. Phrenic arteries 2. Posterior mesenteric artery 3. Coeliac artery 4. Lumbar arteries 395 Unpaired artery in Rabbit is 1. Coeliac artery 2. Renal artery 3. Testicular artery 4. Gonadial artery

396 Unpaired arteries are 1. Anterior and posterior mesenteric 2. Coeliac and common iliac 3. Renal and gonadial 4. Lumbar and caudal 397 The artery which supplies blood to the pericardium (EAM 2008) is 1) Brachial artery 2) Coronary artery 3) Vertebral artery 4) Internal mammary artery 398 Identify the correct set of arteries formed from each common iliac artery of Rabbit (EAM 2007) 1) Internal iliac, External iliac, Vesicular, Lumbar, Posterior epigastric arteries 2) Internal iliac, External iliac, Vesicular, Posterior mesenteric, Lumbar arteries 3) Internal iliac, External iliac, Vesicular, Uterine, Posterior epigastric arteries 4) Internal iliac, External iliac, Uterine, Lumbar Posterior epigastric arteries 399 The following are the branches of dorsal aorta (EAM 2006) a) Inter costal b) Phrenic c) Coeliac d)Anterior mesenteric e) Posterior mesenteric Of these, which set of arteries supply blood to glands of digestive system 1) a & b 2) c & d 3) d & e 4) b & c 400 The unpaired artery present anterior to the heart in rabbit is 1) Carotid 2) Subclavian 3) Internal mammary 4) Innominate 401 The origin of these same arteries in rabbit are different on the left and right sides 1) External carotids 2) Internal carotids 3) Gonadials 4) Subclavians VENOUS SYSTEM LEVEL-I 402 In Rabbit hepatic portal vein is formed by the union of 1.6 veins 2.4 veins 3.8 veins 4.1 vien 403 Azygous vein opens into 1. Right precaval vein 2. Left precaval vein

402 In Rabbit hepatic portal vein is formed by the union of

6 veins
8 veins
1 vien

403 Azygous vein opens into

Right precaval vein
Left precaval vein
Right carotid
Left carotid

404 Number of hepatic veins normally in rabbit is

2 8
4 4.3

405 The number of gonadial veins in rabbit is

One pair
Two pairs
Three pairs
Four pairs

406 Caudal vein opens into 1. Right pre caval vein 2. Left pre caval vein 3. Post caval vein 4. Internal mammary vein 407 A blood vessel which begins in capillaries in one organ and ends in capillaries in another organ is called 1. Renal vein 2. Portal vein 3. Hepatic vein 4. Coronary vein 408 Wall of vein is formed by 1.3 layers 2.2 layers 3.4 layers 4. only 1 layer 409 Middle tunica media in the wall of vein is formed by 2. Rough muslces 1. Smooth muslces 4. Cardiac muscles 3. Voluntary muscles 410 Outer tunica externa in vein is formed by 2. Collagen fibres 1. Elastic fibres 4. Yellow and white fibres 3. Yellow fibres 411 Inner tunica interna (endothelium) is formed by 1. Layers of epithelial cells 2. Smooth musles 3. Collagen fibres 4. Elastic fibres 412 The main function of pulmonary veins is 1. Collection of oxygenated blood from the lungs 2. Distribution of oxygenated blood to the lungs 3. Collection of deoxygenated blood from the lungs 4. Distribution of deoxygenated blood to the lungs 413 The blood vessels that collect the deoxygenated blood from the wall of the heart are 1. Coronary arteries 2. Jugular veins 3. Internal mammary veins 4. Coronary veins 414 The blood vessel that collects blood from the shoulders is 1. Internal mammary vein 2. Internal jugular vein 3. Inter costal vein 4. Sub clavian vein LEVEL-II 415 In rabbit right precaval vein receives blood from 1.3 veins 2.5 veins 3.6 veins 4.8 veins 416 The vein which collects blood from head, jaws and tongue is 1. External Jugular 2. Subclavian 3. Azygous 4. Internal mammary 417 The vein which collects blood from brain and neck muscles is 1. External Jugular 2. Internal Jugular 4. anterior inter costal 3. Azygos 418 The unpaired vein which collects blood from posterior inter costal muslces is 1. Intercostal 2. Azygous 3. Subsclavian 4. Internal Jugular

419 The vein which carries blood from alimentary canal to liver is 1. Lienogastric 2. Duodenal 3. Mesenteric 4. Hepatic portal 420 The blood returning to the heart from the lungs via pulmonry vein has more 1. RBC per ml of blood 2. Haemoglobin per ml of blood 3. Oxygen per ml of blood 4. Nutrient per ml of blood 421 The vien which collects blood from pancreas in rabbitis 1. Anterior mesenteric 2. Posterior mesenteric 3. Lienogastric 4. Duodenal 422 "Lienogastric" vein collects blood from 1. Stomach and spleen 2. Stomach and liver 3. Liver and pancreas 4. Stomach and salivary glands 423 Blood from the anterior intercostal muscles is collected by 1. Azygous vein 2. Phrenic vein 3. Internal mammary vien 4. Intercostal vien 424 From the Caecum, blood is collected by 1. Anterior mesenteric vein 2. Lienogastric vein 3. Duodenal vein 4. Posterior mesenteric vein 425 In Rabbit, hepatic portal system carries blood from 1. Liver to heart 2. Kidneys to liver 3. Alimentary canal to liver 4. Liver to pancreas 426 Digested foods like glucose and amino acids are transported to the Liver by 1. Phrenic vein 2. Lumbar vein 3. Hepatic vein 4. Hepatic portal vein 427 The blood vessel rich in glucose is 1. Hepatic vein 2. Hepatic portal vein 4. Azvgos vein 3. Ilio lumbar vein 428 Which vein collects blood from muscles of back? 1. Azygous cardinal 2. Iliolumbar 3. Phrenic 4. Gonadal 429 Which vein receives blood from cardiac muscle? 1. Azygous cardinal 2. Coronary 3. Subclavian 4. Iliolumbar 430 The vein that does not directly open into the heart is (EAM 2005) 2. Post caval 1. Pre caval 3. Pulmonary 4. Posterior mesenteric

BLOOD COAGULATION LEVEL-I

431 The process of conversion of liquid blood into a jellylike blood is called1. Clotting2. Clumping

EAMCET-SENIOR ZOOLOGY

UNIT-III

4. Both 1 & 2 3. Bleeding 432 Prothrombin is produced in 1. Blood plasma 2. Liver 3. Bone marrow 4. Spleen 433 The thromboplastin is released from 1. Damaged platelets and tissues 2. RBC 3. WBC 4. only blood platelets 434 One of the following is not a factor of clotting 2. Prothrombin 1. Ca+ions 3. Fibrinogen 4. Vit. K 435 Natural anticoagulant obtained from plants is 1. Lampredin 2. Coumarin 3. Haemolysin 4. Hirudin 436 Blood clot in the blood vessel is called 1. Thrombus 2. Thrombin 3. Embolus 4. Coagulation 437 When the blood is shed, it loses its liquid property in 2.5-6 minutes 1.3 - 6 minutes 3. 5-6 minutes 4.4-7 minutes 438 Total number of blood clotting factors are 1.13 2.14 3. 10 4.4 439 Fibrinogen is 1. Factor - I 2. Factor - II 3. Factor - IV 4. Factor - IV 440 Proconvertin is 1. Factor - II 2. Factor - III 3. Factor - VII 4. Factor - IV 441 Labile factor is 1. Factor - V 2. Factor - VI 3. Factor - III 4. Factor - IV 442 Vitamin K is required in synthesis of 1. Prothrombin 2. Fibrinogen 3. Thrombin 4. Thromboplastin 443 Blood coagulating factor that omitted now is 1. Factor-II 2. Factor-III 3. Factor - VI 4. Factor - IX 444 Prower factor is 1. Factor - V 2. Factor - XII 3. FActor - XI 4. Factor - X 445 Christmas factor is 1. Plasma thromboplastin component (Factor IX) 2. Thromboplastin (FActor III) 3. Plasma thromboplastin antecedent (FActor XI) 4. Prothrombin (Factor II) 446 Stuart factor is 1. Factor IX 2. Factor X 3. Factor XI 4. Factor XIII 447 Fibrin stabilising factor is 1. Factor IX 2. Factor X 3. Factor XI 4. Factor XIII

448 Hageman factor is 1. Factor II 2. Factor III 3. Factor XII 4. FActor XIII 449 Process of prevention of loss of blood from the body by blood clotting is known as 1. Haemostasis 2. Haemorrage 3. Homiostasis 4. Haemolysis 450 Thromboplastin is 1. Factor III 2. Factor IV 3. FactorII 4. Factor I 451 Calcium ions are 1. Factor IV 2. Factor VI 4. Factor XI 3. Factor VII 452 The final step in the coagulation of blood is catalysed by (EAM 2004) 1. Thrombin 2. Factor XIII 3. Factor XII 4. Heparin 453 Vitamin K is required for the synthesis of the following antihaemophilic factor 1) AHF-A 2) AHF-B 3) AHF-C 4) AHF-D

LEVEL-II

454 These do not play any part	in coagulation
1.RBC & WBC	2. RBC & Platelets
3. WBC & Platelets	4. Plasma & Platelets
455 In which way serum is diffe	erent from plasma?
1. Serum contains poteins	like fibrinogen and pro
thrombin but plasma doe	es not
2. Plasma contains protein	s like fibrinogen and pro
thrombin but serum doe	es not
3. Serum clots but plasma	does not
4. Both 2& 3	
456 Identify the correct statem	ent
1. Serum clots but plasma	does not
2. Plasma clots but serum	does not
3. Serum contains protein	s like fibrinogen and
prothrombin but plasm	a does not
4. Increase efficiency of b	lood to absorb CO2
457 Blood coagulation is a cha	nge in
1. RBC	2. WBC
3. Plasma	4. Serum
458 The network of thread like	e fibres found in the clot
are	
1. Collagen fibers	2. Thromboplastin
3. Fibrin fibers	4. Muscle fibers
459 The natural anticoagulant of	or antithrombin present in
the blood is	
1. Fibrinogen	2. Heparin
3. Cephalin	4. Seratonin
460 The vitamin essential for th	ne synthesis of prothrom-
bin	
1. Vit K	2. Vit E
3. Vit D	4. Vit A

461 When the blood vessel	is injured, the blood plate-
lets release	5 / 1
1. Fibrinogen	2. Thromboplastin
3. Coumarin	4. Prostacyclin
462 In extrinsic pathway pro	othrombinase it is released
from	
1. Platelets	2. Damaged tissue
3. Blood	4. Thrombin
463 In Intrinsic pathway prot	hrombinase is released from
1. Fibrinogen	2. Hageman factor
3. Platelets	4. Damaged tissue
464 Ca ⁺⁺ removers that are u	used in storing the blood in
blood banks are	C
1. EDTA, citrates	2. EDTA, oxalates
3. Both 1,2	4. Only citrates
465 Vit. K is required for the	e synthesis of factors like
1. II, VII, IX, X	2. II, VIII, IX, X
3. II, VII, XI, XIII	4. I, IV, V, VI
466 Intrinsic pathway is initi	ated by
1. Factor - I	2. Factor - XII
3. Factor - V	4. Factor - XIII
467 Ethylene diamine tetra	acetic acid are used in the
blood banks to remove	this blood clotting factor
1) I	2) XIII
3) IV	4) VI
468 Soluble fibrinogen is con	nverted into soluble fibrin
by the action of	(EAM 2002)
1. Thromboplastin	2. Cephalin
3. Heparin	4. Thrombin
469 Coagulation will not be	affected in the absence of
factor	(AMC2002)
1. VII 2. XII 3	. VIII 4. X
470 Precursors of warfa	rin are
1) Hemolysins	2) Coumarins
3) Hirudins	4) Heparins
471 Cascade reactions a	re associated with
1) Ultrafiltration	
2) Muscle contraction)n
3) Blood clotting	
4) Conduction of a n	erve impulse
4/2 The blood clotting is	initiated by the formation
of	
1) Thromboplastin	2) Prothrombinase
3) Thrombokinase	4) Hegemen factor
4/3. Select the following:	antihaemophilic factors
1) III, V, VII	$\begin{array}{c} 2) \text{ VIII, IX, XI} \\ 1) \text{ VIII, IX, X} \end{array}$
5) IX, XI, XII	4) VIII, IX,X

LEVEL - III

474.	Match the	following	g and ch	oose the	correct answer			
	<u>Substrate</u>			<u>Mineral</u>				
	A) Insulin			I) Calcium				
	B) Thyroxi	ne		II) Iron				
	C) Cytochr	ome		III) Iodin	e			
	D) Dentine			V) Sulphur				
		^	P	v) Suipi				
	1)	A V						
	2)	v	1					
	3)	IV	III	II	I			
	4)	III	V	II	I			
475.	Match the	following	g and ch	oose the	correct answer			
	Column-I			Column-	-11			
	A) Brunne	r's gland	S	i) Pulp o	cavity			
	B) Casein			II) Ileum	 			
	C) Odoniobiasis				aenum			
	D) Crypts (V) Paper					
		Δ	в	C	D			
	1)		V	IV	-			
	2)	III	IV	I				
	3)	I	IV	I	III			
	4)	I	IV	III	I			
476.	Read the f	ollowing	stateme	ents				
	I) Glisson	capsules	s of liver	contain ł	nepatic cords.			
	II) Vitamins	s provide	energy.					
III) In plants Vitamin A is found in the form of carot								
	IV) The en	izyme ac	ctivator e	enterokin	ase is present in			
	SUCCUS en	tericus.	oro truc					
		ne above	e are true	2)				
	1) I, IV 2) II III			∠)1,11 4)1111\/				
<i>A</i> 77	Read the f	ollowing	stateme	4) III,IV				
777	I) Ptvalin e	enzvme o	converts	the star	ch into dextrins			
	and mal	tose in t	he prese	ence of c	hloride ions.			
	II) Phosph	orous is r	oresent i	n high en	ergy molecules.			
	III) Pegion	breast is	s caused	by the d	eficiency of vita-			
	min D in a	dults.						
	IV) Most o	f the B co	omplex \	Vitamins	act as enzymes.			
	Which of the	ne above	e are true)				
	1) II,III			2) III,IV				
	3) I,II			4) V,IV				
478.	Study the f	ollowing						
Min	eral	Functio	on		Deficiency			
					disorder			
i)Cal	cium	Format	ion of bo	nes	osteomalacia			
ii)Iroi	0	Hoomo	alobin fo	rmation	Polycythemia			
			giobinic	Ination				
	anganese	Reprod	uction		Sterinty			
IV) C	opper	Activity	of enzy	mes	Hypogonadism			
Whi	ch of the ab	ove two	are corre	ect				
1) i & ii 2) i & iii 3) ii & iii 4) ii & iv					i 4) ii & iv			
479	479 Study the following							
Cell	S	Sec	retion	Functio	on			
i)Liv	er cells		Bile	Emulsif	ication of Fats			
ii) O	xyntic cells		HCI	Activatio	on of Pepsinogen			

into pepsin

iii)Chief cells	Mucus Protect	tion of stomach		A	В	С	D		
iv) Parietal cells	Insulin Maintn	ance of	1	. II	Ι	IV	III		
	alucose	e level	2	. IV	III	Π	Ι		
Which of the above two	are correct		3	. III	IV	V	Π		
1) i & ii 2) ii &	iii 3) iii &	iv 4) ii & iv	4	. II	V	IV	III		
480 Study the follow	/ing	_	486. N	Match th	e follow	ving and	d choose	e the corre	ct
Structure	Associated	Function		combi	nation				
i) Cystic duct	Gall bladder	Flow of Gastric		LIST	- I	LIST	' - II		
::)Otomoon's dust	www.tisl.sula.w.sl	juice	A. Rib)S		(I) Ch	onchae		
II)Stenson's duct	parolid gland	carries saliva	B. Tur	binals		(II) In	tercosta	l muscles	5
		cavity	C. Tra	chea		T (ÎII)	Thyroid o	cartilage	
iii)Whorten's duct	Infraorhital	Flow of saliva	D. Lar	ynx		(IV) '	C ⁷ shap	ed cartilag	inous
	aland					rin	ngs	C	r
Which of the ab	ove are correct			А	В	С	D		
1) i & ii	2) ii & i	iii	1.	Π	Ι	IV	III		
3) ii only	4) iii or	nly	2.	III	II	IV	Ι		
481 Arrange the taxor	nomic position of	Rabbit from class	3.	II	IV	III	Ι		
to genus			4.	III	IV	Π	Ι		
A) Eutheria	B) Man	nmalia	487	Match	the follo	wing			
C) Oryctolagus	D) Lago	omorpha	,	LIST	- I	I	JST - I	I	
1) A-B-D-C	2) B-C-	A-D	A. Nas	salcham	ber	(I) Ple	europerit	oneum	
3) B-A-D-C	4) А-В-	С-D	B.Lar	vnx		(I) R	espirato	rv membr	ane
482 Sterility is due to	the deficiency of	DI	C. Lur	lgs			ntercota	l muscles	une
1) Manganese a	nd cobalt		D. Alv	reolus		(IV)	Thyroid (cartilage	
2) Sulphur and z	inc		Dirm	Corus		(V)Ti	urbinals	Juilliage	
3) Manganese ar	nd vitamin E				А	B	С	D	
4) Zinc and coba	alt			1	V	IV	Ĩ	П	
483 Assertion(A): T	he absorption of	fvitamin		2	Ň	V	Ш	П	
B_is stopped due	the destruction c	of oxyntic cells in		3	III	Ň	I	П	
the gastric glands				5. 4	П	m	IV	V	
Reason (R): Or	xvntic cells secr	ete Castle's in -	488 F	ollowing	n are the	statem	ents abo	ut larvny (frabbit
<u>trinsia faatar wh</u>	yntie eens seer	for obsorption of	100 I V	It is th		aradua	ing orga	n na sin a	niaoon
D	lich is essential i	or absorption of	I. It is the voice producing organ.						
B ₁₂	1.5.1		II. It is supported by ten cartilages.						
1) A is correct a	nd R is wrong		III. Thyroid cartilage forms the ventral and lateral						
2) A & R are corr	ect and 'R' expla	ins A	walls of larynx						
3) A & R are corre	ect but R is not the	e correct explana	T	he corre	ct comb	ination	is		
tion to A			1	. All are	true	2. On	ly I & Il	[
4) A is wrong an	d R is wrong		3	. OnlyI	& III	4. On	ly III &	II	
484 Following are th	e digestive inice	sofrabbit	489 F	ollowin	g are the	e staten	ients reg	garding th	e trans-
		5 01140010	n	ortofca	e rhon-dia	oxide			
A. Intestinal juic	e B. Bilej			Mostor	ftha aarl	on di	widaia	tronomorto	d in the
C. Saliva	D. Gast	ric juice	1.	. WIOSUO	$\frac{1}{2}$ the cart	bon-aic	DxIde Is	transporte	amme
E. Pancreatic jui	ce			form c	of bicarbo	onates.			
Based on the rel	ease of the secre	tion 'first' into		I. Least	amount	ofcarb	on-diox	ide is tran	sported
the alimentary can	nal, arrange then	n in a sequence	ir	n the for	n of carl	oonic a	cid.		
1) C-D-B-E-A	2) C-D-	-E-B-A	П	II.Carbo	nic anhv	drase i	s present	t in blood	plasma.
3) C-D-A-B-E	4) C-B-	-D-A-E	т	he corre	et comb	ination	ie	1	F
,	,		1	A 11	4	2 0.	.1	T	
485 Match the following	ισ		1	. All are	true.	2. Or		.1	
List _ I	-5 List_	п	3	. Only I	& III	4. Or	nly III &	: 11	
List - I	Diauronaritan	11	490 A	Arrange t	he follov	ving or	gans of 1	espiratory	tract in
A. Arytenoids	. Pleuroperiton		а	sequent	ial order	•			
B. Larynx II	.One pair of car	mages	А	. Pharvi	ıx	B. Tr	achea	C. Larv	'nx
C. Alveoli I	I Azygous lobe) Interne	 1 nortril	E Ev	ternalna	etrilo	
D. Right lung T	V Functional uni	its of respiration				5 E. EX			
•	V Thyroid			. A - B ·	- C - D -	·E	2. E -	D - A - () - В
			3	. E - D -	- C - B -	- A	4. E -	- D - C - A	4 - B

UNIT-III

491	Arrange the	following struct	ures in a corect se-	1	. I & II 2.	I&IV 3.I	I & III	4. III & IV	
., -	quence	88		496 Study the following					
	A Alveolard	ut BAlveoli			structure	Location	Descri	ntion	
	C. Terminal h	vronchioles D	Drimarybronchus		Thuroid	Ventral and	Lorgest	contiloge of	
402	C. Terminal o	$\frac{1}{2} = \frac{1}{2} = \frac{1}$		1	. 1 IIyiola		Largest	carmage of	
492	I ne following	g are the statemen	its about epigiottis		cartillage	lateral wall	larynx		
	I. It is made u	p of elastic cartil	age			of larynx			
	II. It prevent	s the entry of foo	od particles into the		I. Arytenoids	S Dorsal side	Having	cartilages	
	glottis					oflarynx	ofsanto	rini	
	III. It is voice	producing part			II.Lungs	Mediastinu	m Consi	sts of eight lobes	
	The correct c	ombination is		I	V. Vocal	Between	Sound	production	
	1. All are true	2.]	II and II are true		cards	cricoid &			
	3. I and III an	true 4.	and II are true			arytenoids			
493	The followin	g are the statemer	nts about trachea	V	Which of the	above two a	re corre	et	
	I. Trachea is s	supported by thy	roid cartilage	1	. I & II	2. I & I	IV		
	II. Trachea is	lined by ciliated	pseudostratified epi-		3. II & III	4. III &	z IV		
	thelium	5		_		ASSERTIC	ЭМ ТҮР	E	
	III Trachea i	s supported by '	C' shaned cartilagi.	Note	· For all	Assertion	(A) and	- l Reason (R)	
	nous rings	s supported by	e shuped curthugi	(Duestions, ic	lentify the co	orrect a	nswer from the	
	The correct of	ombinationia			hoices giver	n below.			
			T 4	1. A a	and R are cor	rect and R is	s the corr	ect explanation	
	1. All are true	2.11 and 11	i are true		ofA			····I	
40.4	3. I and III and	e true 4. J	and II are true	2. A	and R are	correct but	R is 1	not the correct	
494	The following	g are the statemer	its regarding respira-	e	explanation o	fA			
	tion			3. Ai	s true but R i	s false			
	I. Celular res	pirtion involves r	not only exchange of	4. Bo	th A & R are	false			
	gases but also	o in production of	fATP	407	Accontion	Though P	in altr	alanainia much	
	II. Inspiratio	n is an active pro	ocess caused due to	497	Assertion	$I nough I_{Co}$	D_2 marve		
	contraction o	f external inter co	ostal muscles.		less compa	ared to P_{O_2} , r	nore per	centage of CO_2	
	III. Force ful	expiration is cau	used due to contrac-	dissolves in plasma than O					
	tion of interna	al intercostal mus	cles.	dissolves in plasma than O_2					
	The correct c	ombination is			Reason: 7	The solubility	y of <i>CO</i> ₂	is 20-25%	
	1. Allare true	2. Only I &	t II	ç	reater than t	hat of <i>O</i> .			
	3. Only I & I	II 4.Only III	& II	498	Assertion	$(\mathbf{A}) \cdot \mathbf{Respire}$	atoryna	rt forms the	
495	Study the foll	owing		770	major nort	ion of nasal a	chamber	and has many	
	Structure	Description	Function		mucous ce	lls	mannoer	and has many	
	I Alveoli	Highly vascular	Exchange of gases		Reason (F	Respirat	orv nart	of nasal cham	
	1.7 11 10001	and lined by	Exchange of gases		her acts as	natural air co	ondition	er	
		solution of the second		400	A	. T			
		squarrous		499.	Assertion	: Transport C	$OICO_2 I$	n the form of	
	TT T		G 1 1 <i>t</i>		carbonic a	cid through p	olasma is	s very less and	
	II. Larynx	Supported by	Sound production		very slow	-1			
		four cartiliages	**** 1 1		Reason: 1	he enzyme of	carbonic	anhydrase is	
	III.Trachea	Lined by	Wind pipe	ء حمم	bsent in plas	ma			
		stratified		500.	Assertion	(A): Lungs	are encl	osed by double	
		squamous			walled plet	uroperitoneui	m	4 4 4 1	
		epithelium			Reason (R	(): I he pleura	al fluid p	rotects the lungs	
	IV. Lungs	Right lung	Respiratory organ	501	trom shock	$rac{1}{r}$	n.	1 . 1	
		has two and		501	Assertion	(A): I hyroi	d cartila	ge is the largest	
		left lung has fou	r		that support	rts larynx.	41		
		has four lobes				(): It Iorms	ine venti	a doma ¹¹	
	Which of the	above two are c	orrect		wans of lat	ynx and is in	complet	e dorsany.	

502	Assertion (A): The process of taking air into		D) 9	95		Ι	V)Al	veoli	
	lungs is known as inspiration.			Α	В	С	Γ)	
	Reason (R) : Inspiration is a passive process.		1)	I	II	III	IV W	V	
503	Assertion (A): The muscles that extend in		2)	l H	IV	II II	III	L	
	between ribs are called intercostal muscles. $\mathbf{P}_{\text{constant}}(\mathbf{p}) = T \mathbf{h}_{\text{constant}} + t \mathbf{h}_{consta$		3) 1)	II II		III	l I	r	
	Reason (R): The contractions and relaxation	512	4) Mat	11 tale th	1 V a fallar	1	11	L	
	of intercostal muscles help in breatning	512	Val		elonow	ving		Canadi	3 7
504				ume				D 1 100	y ml
504	Assertion : CO_2 must be eliminated from the		B)I	RV				I) 1,100 II) 1200	ml
	body			FRV				II) 1200	ml
	Reason : CO ₂ will lower blood pH and			RV				IV) 300) ml
	threatening homeostasis		D)1	A	В	С	Г))	5 1111
505	Assertion: Higher metazoans cannot rely on		1)	Ш	IV	Ĩ	Ī	ſ	
	diffusion for exchange of respiratory gases.	2	2) III		IV	II	Ι	-	
Reaso	n: In higher metazoans there is an increase in the		3)	IV	III	Ι	Ι	[
d	istance over which O ₂ & CO ₂ must diffuse		4)	III	II	IV	/ I		
3	nd there is also an increase in metabolic demand	513	Mat	tch th	e follow	ving			
a fe	or Ω		Lis	t – I		U		List – I	[
506	Assertion: Humans cannot survive long at	A)	Ma	ximu	m volu	ime		I) Resid	lual
v	erv high altitudes that is above 6000 m although	1	olume	e					
a	ir at these altitudes contains 20.95% of O		ofa	ir tha	t can be	e			
	Reason : At very high altitudes the atmospheric		inh	aled f	òllowin	ig exh	alatior	1	
р	ressure will be very low and therefore very low		ofT	.V					
n	artial pressure of <i>O</i> , exists.	B)	Vol	ume 1	moved	in or c	out of	II) Inspir	ratory
г 507	$\mathbf{A}_{1} = \mathbf{A}_{1} + \mathbf{A}_{2} + \mathbf{A}_{1} $		capa	acity					
507	Assertion: Only about 3% of O_2 is transported		lui	ngs di	uring re	spirat	tory		
11	a dissolved state in blood plasma	()	cyc Vol		of oir th	at ran	aninai	in III) Tid	alvaluma
	Reason: O_2 does not easily dissolve in water.		lung	gs foll	owinge	at ren xhala	tion	in in) i iu	ai volume
508	Assertion: A large percentage of O_2 is		ofT	.V	0				
re	eleased from haemoglobin in active tissues such	D)	Vol	ume	ofair th	nat rer	nains	IV) Fun	ctional
a	s skeletal muscles	r	esidua	ıl				in the lu	ngs at all
	Reason : In these tissues P_{O_2} is much lower	t	imes				a	capacity	
tł	nan 40mm Hg.		1)	A	E	5 T	C	D	
509	Assertion: Erythrocytes cannot utilize Q for		$\frac{1}{2}$	I II	I.				
tł	peir cellular respiration		2) 3)		I		IV I		
u	Reason: RBC do not contain mitochondria		3) 4)	II I	1		IV	ТV П	
		514	Mat	tch th	e follow	ving	1 V	11	
510	Under normal conditions the amount of <i>O</i>		Lis	t – I	• 10110 0			Formula	a
510 +1	bot can be delivered by 100 ml of ovv(geneted		A)]	IC				I) VC+F	RV
u h	lood		B) l	FRC				II) ERV	+RV
0	1)5 ml 2)10 ml		C) '	VC				III) TV+	IRV
3	15 ml $2) 10 ml$		D) [TLC				IV)TV+	IRV+ERV
511	Match the following with reference to partial			А	В	С		D	
n	ressure of $\Omega_{\rm r}$ in different media	.	1)	I	III	IV	-	II	
Ч	Column - I Column - II	2	2) II	1	IV	II 	Ι	Ŧ	
	A) 159 Decoverated blood		3)	. 111	Ш	IV		, I	
	B) 104 II) Atmospheric air	515	t) III Notel	tha f	11 11 ortini	1	IV		
	C) 40 III) Oxygenated blood		JST -	I	nowing	5	LIS	ST - 11	
	, , , , , , , , , , , , , , , , , , , ,	A) Fa	ictor -	II		i)Ant	i haen	nophilic f	actor - A
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B) Factor-IV		ii)Anti	haemop	hilic factor-C		3	3	4	1	2
C)Factor - IX		iii)Ant	ihaemop	philic factor-B		4	1	2	3	4
D) Factor-XI		iv) Pro	thrombi	n of plasma	520 Arrange these structures in a sequence from					uence from
		v) Ca ⁺	+ of plas	ma	anterior to posterior part of the heart					
	А	В	C	D		A. AV no	de	1	B. Bu	ndle of His
1)	iv	v	ü	i		C SA no	de		D Pu	rkinie fibres
2)	iv	v	i	ш Ш					2 1	R C D
3)	iv	v	i	i		1. C-A-D			2. A-1	
4)	iv	V	iii	i	- 5 - 1	3. D-C-B	-A	1 1	4. C-J	D-А-В
516 Match the	followi	no	-	-	521	Arranget	he bloc	od clottin	ig factors	s in sequential
A Sinu - atrial	node	115	1 Foss	a ovalis		order				
B Right strial	noue		$2 P_{acc}$	a Ovans Maker		A. Hagen	nan fao	ctor B.	Thromb	ooplastin
ventricular ane	rture		2. 1 acc			C.Labile	factor	D.,	Anti hae	emophilic factor
C Inter atrial a	ontum		3 Trio	uspid volve		1.B-C-A-	D		2. D-	A-C-B
D Atria yents	eptum 	ada	J. Inc.	anid valve		3.B-C-D-	A		4. A-]	D-C-B
D. Auto - venu	icular n	ode	4. Dicu	spid valve	522	Arrange t	he foll	owing ac	tivities tl	nat occur in blood
٨	п	C	J. Dulle			clotting in	a seau	ience		
A	В	Č	D			A Conve	rsion	fibrino	ven to fik	nrin
1. 1	2	3	5			R Runtur	ed nla	telets rel	ease prot	thrombinase
2. 2	3	4	. >			C Format	tion of	nrothror	nhin	linointointase
3. 2	3	1 5)			D. Comma		prounoi	110111 1. : :4	· · · · · · · · · · · · · · · · · · ·
4. 5	4	3 2				D. Conve	rsion c	protinro		o thromoin
517 Match the	followir	ng				I.D-C-B	-A		2. C-1	D-B-A
A. Vesicul	ar artery	7	1. Brai	n		3.A-B-C-	-D		4. C-1	B-D-A
B. Phrenie	c artery		2. Urin	ary bladder	523 Arrange these arteries in sequential order according					
C. Internal	l carotic	l artery	3. Diap	hragm		to their p	ositior	is from a	nterior to	o posterior part
D. Brachi	al artery	/	4. Hind	limb		A. Phreni	c arter	ies	B. He	patic artery
			5. Fore	limb		C. Inter co	ostal a	rteries	D. Co	eliac artery
1	4	В	С	D		1. A-B-C	-D		2. C-	A-D-B
1.	2	3	4	5		3. D-C-B	-A		4. B-0	C-D-A
2.	2	3	1	5	524	Study the	follow	ino		
3.	3	2	1	4	Stri	icture		ation		Function
4.	4	3	2	5		La nodo	Wall	ofright	trium	Decomologr
518 Match the	follwoi	ng					Dala	or right a		I accillance
A. Fibrinogen	L	-	1. Elev	enth factor	11. L		Ben		rior	G 1 1 1 1
B. Plasma thr	ombo		2. Seve	enth Factor		teries	mes	enteric at	ery	Supply blood
plastin com	nnonent									to dorsal
C Stable fac	tor		3 Thir	d factor						abdominal wall
D Thrombor	lactin		4 First	factor	iii.E	External	Nea	r neck		Supplying
D. Hitoinoop	nastin		5 Mint	h factor	cai	otid	and	head		blood to brain
	٨	D	$\frac{1}{2}$. Nim	D	ar	tery				
1	A	Б 1	C S	D	iv. S	ystemic	Left	ventricle		Supplying
1.	4	1	2	5	a	rch				blood to lungs
2.	l	4	5	3	W	hich of the	abov	e two are	e correct	C
3.	4	5	2	3		1)i&	ii		2) ii 8	& iv
4.	1	3	4	5		3) ii &	iii		4) iii .	& iv
519 Match the	followin	ıg			525	5)1100			Study	the following
A. Hirudii	n	1. Plan	t		525	Blood		Con	mon	Discription
B. Haemo	lysin	2. Four	th blood	clotting factor		alotting f	Pooton	CUII	nnun	Discription
C. Couma	din	3. Leec	h	-		clotting	actor	or ci	lenncal	
D. Calcium ions 4. Mosquito			.	D 4.6		nai	ne	0 (1) 1		
		5. Seco	nd bloo	d clotting factor	1.	Fourth fac	ctor	Fibrinog	gen	Synthesized
				8		~				by vitamin A
	А	В	С	D	11.	Second fa	ctor	Prothron	nbin	Synthesised
1	2	3	5	1						inliver
1. 2	<u>ک</u> ۸	5	3	1 7						
۷.	4	5	5	<i>L</i>						

iii.	Third factor	Thromboplastin	Produced
			by ruptured
			platelets
iv.	Tenth factor	Antiheam-	Synthesised
		ophilicfactor	by vitamin K
	Which of the	e above two are corr	ect
	1) i & ii	2) ii &	iii
	3) i & iv	4) iii &	z iv

- Note : For all Assertion (A) and Reason (R) Questions, identify the correct answer from the choices given below.
- 1. A and R are correct and R is the correct explanation of A $% \mathcal{A}$
- 2. A and R are correct but R is not the correct explanation of A
- 3. A is true but R is false
- 4. Both A & R are false
- 526 **(S-I)**: The first heart sound **lubb** is produced by the closure of AV valves
 - (S-II): The second heart sound **dup** is caused by the closure of semilunar valves of aortic arches
- 527 (A): In the wall of right atrium a specialized tissue called sinu-atrial node is present
 - (R): SA node acts as pace maker in mamma lian heart.
- 528 (A): Foramen ovalis is present in the interatrial septum in embryonic stage
 - (R): Foramen ovalis directs the blood from post caval into left atrium in only embry onic stage
- 529 (A): Bundle of His arises from the atrioventricular node
 - (R): Bundle of His spreads into the walls of ventricles as purkinje fibres
- 530 (A): Pulmonary arch supplies deoxygenated blood to lungs for oxygenation
 - (R): Pulmonary arch arises from left ventricle
- 531 (A) In Rabbit only hepatic portal system is present.
 - (R): Hepatic portal system collects blood from liver and supply it to the alimentary canon.
- 532 (A): Dorsal aorta does not terminate into caudal artery
 - (**R**): In the pelvic region, dorsal aorta bifurcates into a pair of common iliac arteries
- 533 (A): Haemolysin is a natural anticoagulant(R): Haemolysin is found in the saliva of leech

- 534 (S-I) : The process of prevention of blood loss is known as haemostasis
 - (S-II): The process of maintenance of optimum levels of water and salts in body fluids is known as homeostasis
- 535 (A): In open circulatory system, circulation is slow.
 - (R): Blood is circulated under low pressure
- 536 (A) : In rabbit, left systemic arch extends as dorsal aorta
 - (R): Dorsal aorta supplies blood to various organs through its branches.
- 537 **(A):** Circulating fluid in arthropods and molluscans is called haemolymph

(**R**): There is no difference between the circulating fluid or lymph in them.

538 The correct sequence of layers in pericardium from inside to outside

1) Visceral layer \rightarrow parietal layer \rightarrow fibrous pericardium

2) Fibrous pericardium \rightarrow parietal layer \rightarrow visceral layer

3) Visceral layer \rightarrow fibrous pericardium \rightarrow parietal layer

4) Parietal layer \rightarrow fibrous pericardium \rightarrow visceral layer

539 Match the following

			10110						
	Sou	irce		Anticoag	ulabt				
	A) l	A) Mast cells & Basophils I) Haemolysin							
	B) I	Mosqu	uito	_	II) Couma	din			
	C) I	Leech	es		III) Hepari	n			
	D) l	Plant			IV) Hirudin				
		А	В	С	D				
	1)	Ι	II	III	IV				
	2)	III	Ι	IV	II				
	3)	III	Ι	II	IV				
	4)	III	IV	Ι	II				
540	Ma	tch the	follow						
	Lis	t-I			List-II				
	A) <i>I</i>	Azygo	us vein	l	I) Collects from diap	blood hragm			
	B)I	liolum	ıbar vei	in	II)Collects from the b	s blood ack			
	C) I fror	Phreni n the a	c vein interior	III)Collect ribs	s blood				
	D)I	Lienog	gastric	vein	IV) Collec	ts blood			
	fror	n post	erior ri	bs	,				
		•			V) Collect	s blood			
					from sple	en			
		А	В	С	D				
	1)	IV	III	V	Ι				
	2)	IV	III	Ι	V				
	3)	IV	П	\mathbf{V}	T				

Π

I

V

4)

IV

KEY

RABBIT EXTERNAL CHARACTERS:										
1) 2	2) 2	3) 4	4) 1	5) 4	6) 3					
7) 1	8) 4									
	RABB	IT DIG	ESTIV	E SYS	ГЕМ					
	AL	IMEN	TARY	CANAL	<u></u>					
9) 2	10) 1	11) 4	12) 3	13) 4	14) 2					
15) 4	16) 1	17) 4	18) 1	19) 1	20) 2					
21) 2	22) 3	23) 4	24) 3	25) 3	26) 3					
27) 1	28) 1	29) 3	30) 2	31) 1	32) 3					
33) 2	34) 3	35) 3	36) 4	37) 2	38) 3					
39) 1	40) 3	41) 3	42) 1	43) 1	44) 2					
45) 2	46) 1	47) 3	48) 1	49) 3	50) 1					
51) 1	52) 4	53) 3	54) 3	55) 1	56) 1					
57) 1	58) 1	59) 1	60) 1	61) 1	62) 2					
63) 3	64) 4	65) 4								
	DIGESTIVE GLANDS									
66) 1	67) 4	68) 2	69) 3	70) 4	71) 1					
72) 2	73) 4	74) 1	75) 2	76) 1	77) 2					
78) 3	79) 4	80) 2	81) 3	82) 3	83) 2					
84) 4	85) 2	86) 4	87) 4	88) 2	89) 4					
90) 3	91) 1	92) 2	93) 2	94) 2	95) 1					
96) 4	97) 4	98) 3	99) 3	100) 4	101) 2					
102) 4	103) 1	104) 3	105) 2	106) 4	107) 3					
108) 1	109) 4									
	PRC	CESS	OF DI	GESTIC	DN					
110) 1	111)4	112) 4	113) 2	114) 2	115) 3					
116) 3	117) 4	118) 1	119) 3	120) 4	121) 4					
122) 1	123) 3	124) 1	125) 3	126) 2	127) 3					
128) 3	129) 2	130) 4	131) 2	132) 3	133) 4					
134) 4	135) 4	136) 2	137) 2	138) 2	139) 2					
140) 1	141) 1	142) 1	143) 2	144) 4	145) 2					
146) 4	147) 4	148) 4	149) 2	150) 1	151) 3					
152) 2	153) 1	154) 1								
		Vľ	TAMIN	IS						
155) 2	156) 3	157) 1	158) 4	159) 2	160) 2					
161) 3	162) 4	163) 2	164) 3	165) 4	166) 1					
167) 1	168) 2	169) 2	170) 1	171) 1	172) 1					
173) 3	174) 4	175) 1	176) 2	177) 4	178) 1					
179) 2	180) 4	181) 4	182) 3	183) 3	184) 1					
185) 1										
		MI	NERAI	LS						
186) 2	187) 2	188) 1	189) 4	190) 2	191) 2					
192) 2	193) 4									

NUTRITIONAL REQUIREMENTS IN

RELATION TO BALENCE DIET.

194)2 195) 2 196)1 197)2 198)1 199) 4 200)3 201) 3 202)1

RESPIRATORY SYSTEM

203)1204) 2205) 4206) 3207) 3208) 2209) 1210) 4211) 3212) 4213) 3214) 3215) 1216) 2217) 1218) 1219) 1220) 1221) 3222) 3223) 1224) 2225) 3226) 3227) 3228) 4229) 2230) 2231) 3232) 1233) 3234) 4235) 2236) 1237) 1238) 1239) 2240) 1241) 1242) 4243) 1244) 1245) 4

MECHANISM OF BREATHING

246) 2 247) 1 248) 2 249) 2 250) 1 251) 3 252) 2 253) 3

EXCHANGES OF GASES

254) 2 255) 2 256) 1 257) 1 258) 2 259) 3 260) 4 261) 3 262) 1 263) 3 264) 2 265) 2 266) 1 267) 2 268) 2 269) 4 270) 1

TRANSPORT OF GASES

271)1	272)1	273)2	274)4	275)2	276)2
277)3	278)2	279)2	280)1	281)2	282)3
283)1	284)1	285)2	286)4	287)3	288)4
289)3	290)1	291)2	292)2	293)3	294)2
INTRO	ODUCT	TION &	x STRU	CTUR	E OF HEAT
295)4	296) 1	297)2	298)2	299)1	300)2
301)1	302)2	303)2	304)3	305)2	306)1
307)1	308)3	309)1	310)2	311)2	312)1
313)3	314)1	315)3	316)2	317)1	318)1
319)3	320) 4	321)4	322)2	323)3	324)3
325) 1	326)2	327)3	328)4	329)2	330)4
331)4	332)2	333)1	334)1	335)3	336)1
337)3	338)1	339)1	340)1	341)3	342)1
343)2	344)1				
	FU	INCTI	ON OF	HEAR	Г

345)4346)2347)3348)4349)2350)3351)3352)2353)1354)3355)1356)4357)2358)4359)4360)4361)2362)2363)2364)1365)3366)1367)1368)4369)3

ARTERIAL SYSTEM

370)1	371)1	372)2	373)1	374)4	375)1
376)1	377)3	378)1	379)4	380)1	381)2
382)3	383)2	384)1	385)2	386)1	387)2
388)4	389)2	390)1	391)2	392)1	393)2
394) 2	395)1	396)1	397)4	398) 3	399)2
400) 4	401) 4				

VENOUS SYSTEM

402)2	403)1	404)3	405)1	406)3	407)2
408)1	409)1	410)2	411)1	412)1	413)4
414)4	415)3	416)1	417)2	418)2	419)4
420)3	421)4	422)1	423)4	424)1	425)3
426)4	427)2	428)2	429)2	430) 4	

BLOOD COAGULATION

431)1	432)2	433)1	434)4	435)2	436)1
437)1	438)1	439)1	440)3	441)1	442)1
443)3	444)4	445)1	446)2	447)4	448)3
449)1	450)1	451)1	452) 2	453) 2	454) 1
455)2	456)2	457)3	458)3	459)2	460)1
461)2	462)2	463)3	464)3	465)1	466)2
467)3	468)4	469) 2	470) 2	471) 3	472)2
473) 2	474) 1	475) 2	476) 4	477) 3	478) 2
479) 1	480) 3	481) 3	482) 3	483) 2	484) 1
485) 4	486)1	487)1	488).3	489)2	490) 2
491) 3	492) 4	493) 2	494)1	495)1	496)1
497) 1	498) 2	499) 1	500) 2	501) 3	502) 3
503) 2	504) 1	505) 1	506) 1	507) 1	508) 1
509)1	510) 1	511) 4	512)1	513) 2	514) 3
515) 1	516) 3	517) 2	518) 3	519) 3	520) 1
521) 3	522) 4	523) 2	524) 1	525) 2	526) 2
527) 2	528) 3	529) 2	530) 3	531) 3	532) 1
533) 3	534) 2	535) 1	536) 2	537) 1	538) 1
539) 2	540) 4				