CUET (UG)

Biology Sample Paper - 7

Solved

Time Allowed: 45 minutes **Maximum Marks: 200**

General Instructions:

1. The test is of 45 Minutes duration.
2. The test contains 50 questions out of which 40 questions need to be attempted.
3. Marking Scheme of the test:

a. Correct answer or the most appropriate answer: Five marks (+5).
b. Any incorrectly marked option will be given minus one mark (-1).
c. Unanswered/Marked for Review will be given zero mark (0).

Attempt any 40 questions

1. Which plant can be propagated Vegetatively by leaf? **[5]**

a) Chrysanthemum
b) Asparagus
c) Bryophyllum
d) Agave

2. Which of the following is not correct about artificial means of vegetative propagation? **[5]**

a) Quick production of new plants
b) Economical
c) Genetic variation
d) Combining good qualities of two different varieties

3. The stigma of pistil receives the pollen grain during pollination, the pollen grains are produced inside: **[5]**

a) Ovule
b) Ovary
c) Anther
d) Pistil

4. In some plants anther and stigma mature at the same time this condition is called: **[5]**

a) Chasmogamy
b) Syngamy
c) Homogamy
d) Allogamy

5. Which of the following structures is well-developed in a mature seed of black pepper? **[5]**

a) Thalamus
b) Peduncle
c) Perisperm
d) Sepals

6. The Gynoecium of flower having two or more carpel fuse together are called _____. **[5]**

a) Megacarpous
b) Syncarpous
c) Apocarpous
d) Microcarpous

7. Which part of the embryo sac receives the male gamete: **[5]**

a) Egg
b) PEN
c) Antipodals
d) Synergid

8. What happens during fertilization after all the sperm reach close to ovum? **[5]**

a) All sperms except one lose their tails.
b) Cells of corona radiate trap all the sperms except one.
c) Only two sperm nearest to ovum penetrate zona pellucida.
d) The secretion of acrosome helps one sperm enter the cytoplasm of the ovum.

9. Which of the following is formed first out of the following in growing foetus: **[5]**

a) Limbs and digits
b) Heart
c) Hairs on head
d) Eye lids

10. Menstrual cycle, in the human female, is completed in: **[5]**

a) 30 days
b) 31 days
c) 28 days
d) 27 days

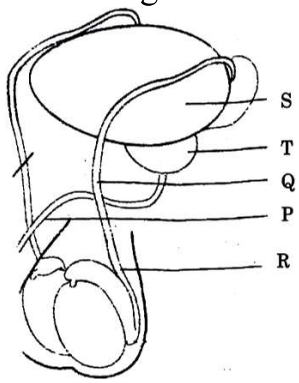
11. Pseudo dormancy differs from normal pregnancy in: **[5]**

a) Developmental change in the endometrium
b) Absence of corpus leuteum
c) Absence of foetus
d) Development of ovum

12. Condoms are one of the most popular contraceptives because of the following reasons: **[5]**

a) These are effective barriers for insemination.
b) They do not interfere with the coital act.
c) All of these
d) These help in reducing the risk of STDs.

13. A human male decides to adopt a surgical method for contraception. Identify the point in the diagram where a cut would be made and tied. **[5]**



a) Point P
b) Point S
c) Point Q
d) Point R

14. XO type of sex determination is found in: **[5]**

a) Elephant
b) Human beings
c) Dog
d) Grasshopper

15. Plotting of specific genes on the chromosome is known as: **[5]**

a) Chromosome map/linkage map/genetic map
b) Chromosome map only
c) Linkage map only
d) Genetic map only

16. Checkerboard method of calculations was developed by **[5]**

a) Mendel
b) Bateson
c) Morgan
d) Punnett

17. The pairs of chromosomes present in human beings somatic cells are: **[5]**

a) 45
b) 46
c) 22
d) 23

18. Which one of the following techniques made it possible to genetically engineer living organisms? **[5]**

a) X-ray diffraction
b) Hybridization
c) Heavier isotope labeling
d) Recombinant DNA techniques

19. Depending on the base composition, length of segment and number of repetitive units, the satellite DNA is classified into many categories such as **[5]**

a) Mega satellites and artificial satellites
b) Micro satellites and mini satellites
c) Mini satellites and mega satellites
d) Small satellites and large satellites

20. In the human genome project, which chromosome was sequenced at last? **[5]**

a) Chromosome 3
b) Chromosome 2
c) Chromosome 21
d) Chromosome 1

21. Palaentological evidences for evolution refer to the: **[5]**

a) Analogous organs
b) Homologous organs
c) Fossils
d) Development of embryo

22. The extinct human who lived 1,00,000 to 40,000 years ago, in Europe, Asia, and parts of Africa, with short stature, heavy eyebrows, retreating foreheads, large jaws with heavy teeth, stocky bodies, a lumbering gait and stooped posture was. **[5]**

a) Neanderthal human
b) Homo habilis
c) Cro-Magnon human
d) Ramapithecus

23. What's the difference between genetic drift and change due to natural selection? **[5]**

a) Genetic drift does not require the presence of variation.
b) Genetic drift never occurs in nature, natural selection does.
c) There is no difference.
d) Genetic drift does not involve competition between members of a species.

24. The clinical test that is used for diagnosis of typhoid is: **[5]**

a) Widal
b) ESR
c) PCR
d) ELISA

25. During organs transplantation, the organs cannot be taken from just anybody since the graft would be rejected sooner or later due to: **[5]**

a) Passive immunity
b) Cell-mediated immune response

c) Innate immunity
d) Blood group

26. Which of the following factor do not motivate youngsters towards drug and alcohol use? **[5]**

a) Need for adventure and excitement
b) Curiosity
c) Experimentation
d) Extra money

27. Cancer causing genes are called: **[5]**

a) expressor genes
b) regulatory genes
c) structural genes
d) oncogenes

28. A group of animals which are related by descent and share many similarities are referred to as: **[5]**

a) breed
b) race
c) species
d) variety

29. Resistance to a virus can be obtained by inoculating a host with: **[5]**

a) Gene for viral nuclease
b) Gene for viral protein
c) Gene of wild plants
d) Gene for virus resistance

30. The explant is required to be disinfected before placing it in a culture medium. This is done by: **[5]**

a) Ultraviolet rays
b) Autoclaving
c) X-rays
d) Clorox or hypochlorite

31. _____ is a pigment that gives a pinkish hue to rhizobium induced root nodules. **[5]**

a) Carotenoid
b) Xanthophyll
c) Mauveine
d) Leghaemoglobin

32. Which of the following will begin fixing nitrogen only after they stop reproducing? **[5]**

a) Penicillium
b) Streptococcus
c) Rhizobium
d) Aspergillus

33. Which one among the following biofertilizers does **not** fix atmospheric nitrogen? **[5]**

a) Rhizobium
b) Oscillatoria
c) Azospirillum
d) Glomus

34. Which of the following statements does not hold true for restriction enzyme? **[5]**

a) It is an endonuclease.
b) It can produce the same kind of sticky ends in different DNA molecules
c) It is isolated from viruses.
d) It recognizes a palindromic nucleotide sequence.

35. The DNA fragments in an agarose gel at the same position signify that the two fragments have: **[5]**

a) Same molecular weight
b) The gel is not properly made
c) Different molecular weights
d) EtBr is hindering the travel of the fragments

36. An antibiotic resistance gene in a vector usually helps in the selection of: **[5]**

a) qualified bacterial cells
b) Transformed bacterial cells
c) Recombinant bacterial cells
d) Competent bacterial cells

37. The cutting out of separated bands of DNA from the agars gel is called: **[1]**

a) Elution
b) Polymerisation
c) Electrophoresis
d) Annealing

38. Role of GEAC is to: **[1]**

a) Study the positive effects of GMO's
b) Commercialize the new technology
c) Bring new technology
d) Take decisions regarding GM research and safety of introducing GM genes.

39. Examples that show commensalism are: **[5]**

i. An orchid growing on mango tree
ii. Cuckoo bird and crow
iii. Cuscuta growing on Nerium tree

iv. Barnacles growing on a whale

a) (ii) and (iii)
b) (i) and (iv)
c) (i) and (ii)
d) (ii) and (iv)

40. Gambusia eating mosquito larvae is an application of: **[5]**

a) scavenging
b) competition
c) biological control
d) parasitic life

41. Which should be considered a more realistic growth model? **[5]**

a) Allen's model
b) Exponential growth
c) Verhulst-Pearl logistic growth
d) Geometric growth

42. Which one of the following is not an ecological pyramid? **[5]**

a) Pyramid of standing crop
b) Pyramid of energy
c) Pyramid of biomass
d) Pyramid of number

43. The cost of nature's ecosystem services is about: **[5]**

a) Twice the global gross national product.
b) Five times the gross national product.
c) Half of the global gross national product.
d) Ten times the gross national product.

44. To attain maximum diversity and niche specialization, biotic succession needs: **[5]**

a) Transitional community
b) Pioneer community
c) Interspecific competition
d) Climax community

45. Vulnerable species are those species: **[5]**

a) Presently the population is sufficient but is undergoing depletion.
b) Presently the population is sufficient and stable.
c) Presently population is insufficient and undergoing depletion.
d) Presently population is insufficient but undergoing addition.

46. Where does the sacred lake is situated? **[5]**

a) Chilka Lake of Orissa.
b) Suraj kund Lake of Haryana.
c) Dal lake of Kashmir.
d) Khecheopalari Lake of Sikkim.

47. Gene flow i.e. movement of genes will: **[5]**

a) Increase impact of natural selection
b) Homogenized population
c) Disturbs and decreases genetic variation
d) Population degradation

48. The gases which are transparent to solar radiation but retain long wave heat radiations are called **[5]**

a) Radioactive gases
b) Inert gases
c) Nitrogenous gases
d) Green house gases

49. To protect and improve the quality of our environment which act was passed and in Which year? **[5]**

a) The environment act 1988
b) The environment act 1986
c) The Water (Prevention and control of pollution) act 1974
d) The Air (Prevention and control of pollution) act 1981

50. Which of the following exhibits biomagnification? **[5]**

a) DDT
b) SO_2
c) Both Mercury and DDT
d) Mercury

Solutions

1. **(c)** Bryophyllum
   Explanation: Bryophyllum plants grow in marshy areas where seeds are not able to germinate. The leaf margin of Bryophyllum contains numerous plantlets before falling on muddy land.
2. **(c)** Genetic variation
   Explanation: During vegetative propagation, new organisms are formed by single plant parts. So, new individuals are genetically similar to each other and there is no genetic variation.
3. **(c)** Anther
   Explanation: Pollen grains are produced inside the anther of the stamen. Each pollen grain produces two male gametes that lead to double fertilization. The anther is a generally bilobed structure located at the tips of the stamen.
4. **(c)** Homogamy
   Explanation: Homogamy – In this case, the anther and stigmas of a bisexual flower mature simultaneously. The pollen grains reach the mature stigma either by contact, wind, gravity, raindrop, or even insects. Self-pollination brought about by contact is called direct autogamy and remaining agencies perform indirect autogamy.
5. **(c)** Perisperm
   Explanation: The well-developed structure in a mature seed of black pepper is the perisperm.
6. **(b)** Syncarpous
   Explanation: The gynoecium is the female reproductive part of the flower. It consists of a single or more than two carpels (pistil). When these carpels are fused together, they are called syncarpous.
7. **(d)** Synergid
   Explanation: The synergids are part of the egg apparatus and are thought to help the pollen nucleus reach the egg cell for fertilization.
8. **(d)** The secretion of acrosome helps one sperm enter the cytoplasm of the ovum.
   Explanation: Millions of sperms are released during insemination that reaches to ovum for fertilisation. Only one sperm enters the ovum by penetrating the zona pellucida layer of ovum using the enzyme present in its acrosome.
9. **(b)** Heart

Explanation: The heart is formed first in the foetus after one month of pregnancy. Limbs and digits after the second month, and external genital organs after three months, and eyelids and hair after six months.

10. **(c)** 28 days
Explanation: The menstrual cycle in human beings is repeated at the interval of 28/29 days. It starts with the rupture of the inner lining of the uterus. In the middle of the menstrual cycle, ovulation takes place.

11. **(c)** Absence of foetus
Explanation: Pseudo dormancy differs from normal pregnancy in the absence of foetus in the uterus. Developmental change in the endometrium and development of ovum occurs during menstrual cycles.

12. **(c)** All of these
Explanation: Condoms are barriers made of thin rubber/ latex sheath that is used to cover the penis in the male or vagina and cervix in the female, just before coitus so that the ejaculated semen would not enter into the female reproductive tract. This can prevent conception. The use of condoms has increased in recent years due to its additional benefit of protecting the user from contracting STDs and AIDS.

13. **(c)** Point Q
Explanation: Point Q

14. **(d)** Grasshopper
Explanation: In grasshopper, sex determination is of XO type, in which the males have only one X-chromosome besides the autosomes whereas females have a pair of X-chromosome.

15. **(a)** Chromosome map/linkage map/genetic map
Explanation: Plotting of specific genes on the chromosome is known as a chromosome map or linkage map or genetic map. It shows the position of genes on the chromosome with respect to others.

16. **(d)** Punnett
Explanation: Punnett's gametic checkerboard method is of great use in deducting the genotype and phenotype of the F2 offsprings of a hybridization cross. The gametic checkerboard has an equal number of squares in horizontal and vertical lines according to the number of gametic combinations of the F1 hybrid.

17. **(d)** 23
Explanation: In human beings, 23 pairs of chromosomes are present out of which 22 pairs are called autosomes and 1 pair is called sex chromosome.

18. **(d)** Recombinant DNA techniques

Explanation: Recombinant DNA technology, joining together of DNA molecules from two different species that are inserted into a host organism to produce new genetic combinations that are of value to science, medicine, agriculture, and industry.
This technique made it possible to genetically engineer the genome of living organisms. It involves a number of procedures like identification, separation, cloning, and introducing into a suitable vector.

19. **(b)** Micro satellites and mini satellites
Explanation: Satellite DNA contains short nucleotide sequences repeated thousands of time tandemly. Satellite DNA is divided into different categories according to their size i.e., micro-satellites, mini-satellites, etc.
    - Micro-satellite consists of 2 – 6 bp repeats.
    - Mini-satellite consists of 10 – 100 bp repeats, they are referred to as VNTRs.

    These sequences generally do not code for any protein.

20. **(d)** Chromosome 1
Explanation: Chromosome 1 is the final one to be mapped out in the Human Genome Project. The chromosome carries an estimated 3,141 genes that manufacture proteins, making it one of the most gene-rich chromosomes.
Chromosome 1 is the largest human chromosome, containing about 8% of the entire genome. That's six times longer than its smallest sibling, chromosome 21. Work on this monster started a couple of years after researchers cracked into some of the other chromosomes. It was completed in May 2006.

21. **(c)** Fossils
Explanation: Different-aged rock sediments contain fossils of different life-forms who probably died during the formation of the particular sediment. Some of them appear similar to modern organisms. They represent extinct organisms (e.g., Dinosaurs). A study of fossils in different sedimentary layers indicates the geological period in which they existed. The study showed that life-forms varied over time and certain life forms are restricted to certain geological timespans. Hence, new forms of life have arisen at different times in the history of the earth. All this is called paleontological evidence.

22. **(a)** Neanderthal human
Explanation: Neanderthals are recognizably human but have distinctive facial features and a stocky build that were evolutionary adaptations to cold, dry environments.
This species lived between 28,000 and 300,000 years ago.
Key physical features :
    i. **Body size and shape:** Neanderthals were generally shorter and had more robust skeletons and muscular bodies than modern humans.
    ii. **Brain size** was larger than the average modern human brain and averaged 1500 cubic centimetres.
    iii. **Skull:** Distinctive skull shape that was long and low, with a rounded braincase. The mid-face region showed a characteristic forward projection (this resulted in a face that looked

like it had been ‘pulled’ forward by the nose). Orbits (eye sockets) were large and rounded. The nose was broad and very large

iv. **Jaws and teeth**: jaws were larger and more robust than those of modern humans and had a gap called the retromolar space, behind the third molars (wisdom teeth) at the back of the jaw. Jaw lacked the projecting bony chin that is found in Homo sapiens. Teeth were larger than those of modern humans.

23. **(d)** Genetic drift does not involve competition between members of a species.
Explanation: Genetic drift and change due to natural selection are different as genetic drift does not involve completion between the members of a species but in natural selection, there is completion between members.

24. **(a)** Widal
Explanation: Typhoid fever could be confirmed by the Widal test.

25. **(b)** Cell-mediated immune response
Explanation: Since the body is able to differentiate self and nonself and cell-mediated immune response is responsible for graft rejection. Tissue matching and blood matching are essential before undertaking and graft or transplant.

26. **(d)** Extra money
Explanation: Curiosity, need for adventure, excitement, and experimentation constitute common causes, which motivate youngsters towards drug and alcohol use.

27. **(d)** oncogenes
Explanation: Several genes called cellular oncogenes (c-onc) or proto-oncogenes have been identified in normal cells which, when activated under certain conditions, could lead to oncogenic transformation of the cells.

28. **(a)** breed
Explanation: A group of animals related by descent and similar in most characters like general appearance, features, size, configuration, etc., are said to belong to a breed.

29. **(b)** Gene for viral protein
Explanation: Resistance to a virus can be obtained by inoculating a host with a gene for viral protein. Antibiotics do not work with the virus.

30. **(d)** Clorox or hypochlorite
Explanation: Explants are the part of the plant which is used for tissue culture. It may contain microbes that may spoil the medium. So, explant is required to be disinfected before placing it in a culture medium. This is done by Clorox or hypochlorite.

31. **(d)** Leghaemoglobin
Explanation: Leghaemoglobin is a pigment that gives a pinkish hue to rhizobium induced root nodules.

32.
(c) Rhizobium
Explanation: Rhizobium bacteria enter the root of leguminous plants and multiply within it to form a nodule. After nodule formation, no more Rhizobium is produced and nitrogen fixation started.
33.
(d) Glomus
Explanation: The genus Glomus exhibits symbiotic association with higher plants.
34.
(c) It is isolated from viruses.
Explanation: Restriction enzymes are isolated from bacteria.
35. **(a)** Same molecular weight
Explanation: Gel electrophoresis is a technique used to separate DNA fragments (or other macromolecules, such as RNA and proteins) based on their size and charge. Electrophoresis involves running a current through a gel containing the molecules of interest. Based on their size and charge, the molecules will travel through the gel in different directions or at different speeds, allowing them to be separated from one another. The DNA fragments in an agarose gel at the same position signify that the two fragments have the same molecular weight and travel the same distance.
36.
(b) Transformed bacterial cells
Explanation: Normally, the genes encoding resistance to antibiotics such as ampicillin, chloramphenicol, tetracycline or kanamycin, etc., are considered useful selectable markers for E. coli. The normal E. coli cells do not carry resistance against any of these antibiotics and only transformed cells will grow.
37. **(a)** Elution
Explanation: In gel-electrophoresis, the separated bands of DNA are cut out from the agarose gel and extracted from the gel piece. This step is called elution.
38.
(d) Take decisions regarding GM research and safety of introducing GM genes.
Explanation: The GEAC is also responsible for approval of proposals relating to the release of genetically engineered organisms and products into the environment including experimental field trials (Biosafety Research Level trial-I and II known as BRL-I and BRL-II).
39.
(b) (i) and (iv)
Explanation: (i) and (iv) show commensalism
40.
(c) biological control
Explanation: Gambusia fish eats mosquito larvae that control the population of a mosquito without using any chemicals. So this mosquito fish is used in biological control of mosquito.
41.
(c) Verhulst-Pearl logistic growth

Explanation: Verhulst-Pearl logistic model of growth is more realistic growth model in comparison to exponential model of growth. Population growing in a habitat having limited resources shows sigmoid curve like growth before reaching to carrying capacity.

42. **(a)** Pyramid of standing crop
    Explanation: The ecological pyramids represent the trophic structure and also a trophic function of the ecosystem. In many ecological pyramids, the producer form the base, and the successive trophic levels make up the apex.
    The ecological pyramids may be of the following three kinds:
    - Pyramid of energy
    - Pyramid of biomass
    - Pyramid of number
43. **(a)** Twice the global gross national product.
    Explanation: A team of researchers from the United States, Argentina, and the Netherlands has put an average price tag of US 33 trillion dollars a year on these fundamental ecosystem services, which are largely taken for granted because they are free. That is nearly twice the value of the global gross national product (GNP) of US 18 trillion dollars.
44. **(d)** Climax community
    Explanation: The climax community is the final community of succession that remain stable for sometimes. They have maximum diversity and niche specialization that makes them stable.
45. **(a)** Presently the population is sufficient but is undergoing depletion.
    Explanation: A vulnerable species is one which has been categorized by the International Union for Conservation of Nature as likely to become endangered unless the circumstances threatening its survival and reproduction improve. The population of Vulnerable species is sufficient but is undergoing depletion due to some factors so that it is facing the risk of extinction in the medium-term in the future.
46. **(d)** Khecheopalari Lake of Sikkim.
    Explanation: Sacred lake is a pool of water generally near religious places were catching fish and other aquatic animals are strictly prohibited. Khecheopalari Lake of Sikkim is a sacred lake in India among many.
47. **(b)** Homogenized population
    Explanation: Gene flow or movement of genes leads to homogenized populations of a species in an ecosystem. Homogenized populations have all the species having almost the same genetic makeup.
48. **(d)** Green house gases
    Explanation: A greenhouse gas (often abbreviated as GHG) is a gas that both absorbs and emits radiation in the infrared range, commonly called thermal radiation or heat. When present in the atmosphere, these gases trap radiation in the form of heat, causing a warming process called the greenhouse effect.
    These gases are transparent to solar radiation.

49.

(d) The Air (Prevention and control of pollution) act 1981

Explanation: An Act to provide for the prevention, control, and abatement of air pollution, for the establishment, with a view to carrying out the aforesaid purposes, of Boards, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connected therewith.

Short title, extent, and commencement.

- This Act may be called the Air (Prevention and Control of Pollution) Act, 1981.
- It extends to the whole of India.
- It shall come into force on such date as the Central Government may, by notification in the Official Gazette, appoint.

50.

(c) Both Mercury and DDT

Explanation: Biomagnification refers to an increase in the concentration of the toxicant at successive trophic levels. This happens because a toxic substance accumulated by an organism cannot be metabolized or excreted, and is thus passed on to the next higher trophic level. This phenomenon is well known for mercury and DDT.