

class 10



TARGET

NTSE

National Talent Search Examination

Solved Paper

2013

Stage 2

Time : 90 Minutes

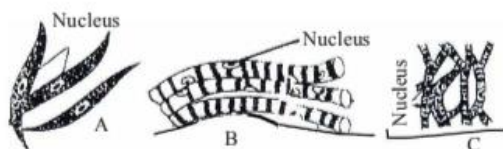
Max. Marks : 100

Instructions for Candidates

Read the following instructions carefully before you answer the questions :

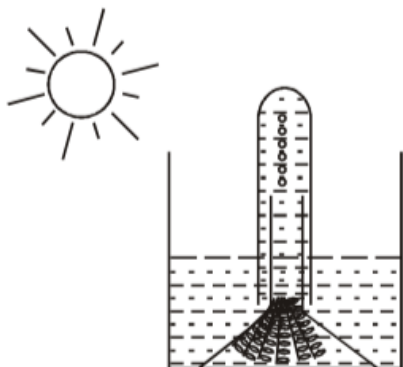
1. Answers are to be given on a SEPARATE ANSWER-SHEET.
2. Write your eight-digit Roll Number very clearly on the test-booklet and answer-sheet as given in your letter/admission card.
3. Write down the Booklet Number in the appropriate box on the answer-sheet.
4. There are 100 questions in this test. All are compulsory. The question numbers 1 to 40 belong to Science, 41 to 60 pertain to Mathematics and 61 to 100 are on Social Science subjects.
5. Please follow the instructions given on the answer-sheet for marking the answers.
6. For questions 1-100, put a cross mark (X) on the number of the correct alternative on the answer-sheet against the corresponding question number.
7. If you do not know the answer to any question, do not waste time on it and pass on to the next one. Time permitting, you can come back to the questions, which you have left in the first instance and attempt them.
8. Since the time allotted for this question paper is very limited you should make the best use of it by not spending too much time on any one question.
9. Rough work can be done anywhere in the booklet but not on the answer-sheet/loose paper.
10. Every correct answer will be awarded one mark.
11. Please return the Test-booklet and Answer-sheet to the invigilator after the test.

- An animal cell, a plant cell and a bacterium share the following structural features :
 - Cell membrane, endoplasmic reticulum, vacuoles
 - Cell wall, plasma membrane, mitochondria
 - Cell wall, nucleus, cytoplasm
 - Plasma membrane, cytoplasm, ribosomes
- Given below are figures of three kinds of muscle fibres.



Which one/ones would you find in the grasshopper's legs?

- A only
 - B only
 - A and C
 - B and C
- A plant that has well differentiated body, special tissues for transport of water and other substances, but does not have seed or fruits is a (n) :
 - Bryophyte
 - Angiosperm
 - Gymnosperm
 - Pteridophyte
- Raju was suffering from severe stomach pain and the doctor diagnosed that he was suffering from peptic ulcers and treated him with antibiotics. He was relieved of pain. What could be the reason for peptic ulcers?
 - Reduced secretion of hormones.
 - Reduced water content.
 - Growth of *Helicobacter pylori*.
 - Excess secretion of enzyme.
- The average temperature of the Earth remains fairly steady as compared to that of the moon because of the
 - atmosphere
 - lithosphere
 - biosphere
 - hydrosphere
- In flowers, which one of the following conditions will increase chances of self-pollination?
 - Pistil is longer than stamens in a flower.
 - Stamens are just above the stigma of a pistil in a flower.
 - In all flowers of the plant only pistil is present.
 - In all flowers of the plant only stamens are present.
- Photosynthesis in an aquatic plant was measured by counting the number of O_2 bubbles coming out of the cut end of the plant. What will happen to O_2 production if you use a pipe to blow air from your mouth into water in the beaker?



- Air from mouth contains O_2 which is being added to the plant. Hence increase in O_2 production.
 - Air from mouth contains CO_2 which is utilized in photosynthesis. Hence increase in O_2 production.
 - Bacteria from mouth will infect plant. Hence reduction in O_2 production.
 - Water is already in contact with air. Hence air from mouth will have no effect.
- A person with blood group 'A' can donate blood to the persons with blood group 'A' or 'AB' because it
 - has both 'A' and 'B' antigens.
 - has only 'A' antigen and 'B' antibodies.
 - has only 'B' antigen and 'A' antibodies.
 - does not have any antigens and antibodies.
- What would happen to the person if cerebellum of his brain is damaged?
 - He will lose his memory power.
 - He will not be able to swallow food properly.
 - He will be unable to coordinate and stand properly.
 - He will lose his power of vision and hearing.
- Which of the following statements are correct?
 - Tapeworms are hermaphrodites and undergo self-fertilization
 - Earthworms are hermaphrodites and undergo self-fertilization
 - Tapeworms are hermaphrodites but undergo cross-fertilization
 - Earthworms are hermaphrodites but undergo cross-fertilization
 - A and B
 - B and C
 - C and D
 - D and A

Directions (Qs. 11 & 12) : A group of red beetles lives on green leaves of a tree. Beetles multiply through sexual reproduction. One day, some green beetles are seen among the red beetles. Green beetles breed to produce green progeny. Crows on the tree eat beetles.

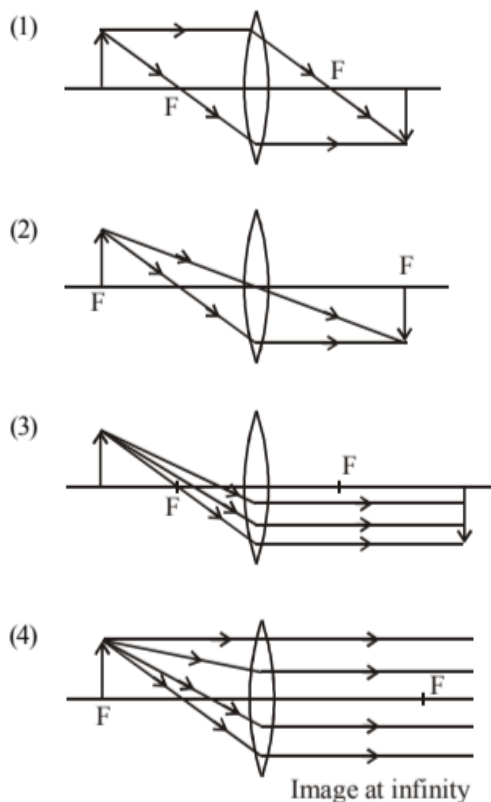
- Some green beetles appear among the red beetle because
 - beetles become green by accumulating chlorophyll from the green leaves that they eat.
 - natural variations occur during sexual reproduction.
 - red beetles mimic green colour of leaves whenever they see crows.
 - beetles change colour from red to green with change of season.
- The colour composition of beetle population is likely to change in the following manner :
 - Both red and green beetles survive equally.
 - Only the red beetles survives.
 - More red beetles survive than the green.
 - More green beetles survive than the red.
- In the following food chain who gets less energy than the tertiary consumer and more than the primary consumer?
 Grass → Grasshopper → Frog → Snake → Eagle
 - Grasshopper
 - Frog
 - Snake
 - Eagle

14. If a non-degradable and fat soluble pollutant, such as DDT enters the food chain, the pollutant
- magnifies in concentration at each trophic level.
 - degrades at first trophic level.
 - accumulates in the body fat of organism at first trophic level and does not pass to second trophic level.
 - decreases in concentration at each trophic level.
15. A drop each of two non-corrosive and non-irritating liquids A and B at a temperature of 22°C are placed on the skin. Liquid A gives a more cooling sensation than liquid B. Which of the following can be said about the liquids A and B?
- Liquid A has higher boiling point than that of liquid B.
 - Liquid A has higher latent heat of vaporisation than that of liquid B.
 - Liquid A has lower latent heat of vaporisation than that of liquid B.
 - The boiling points of liquid A and B are equal.
16. There is a mixture of three solid compounds A, B and C. Out of these compounds A and C are soluble in water and compound C is sublimable also. In what sequence the following techniques can be used for their effective separation?
- Filtration
 - Sublimation
 - Crystallisation from water extract
 - Dissolution in water
- (II), (I), (IV), (III)
 - (IV), (I), (II), (III)
 - (I), (II), (III), (IV)
 - (II), (IV), (I), (III)
17. Which of the following is a suitable example for illustrating the law of conservation of mass? (Atomic mass of $\text{O} = 16$; $\text{H} = 1$)
- 18g of water is formed by the combination of 16g oxygen with 2g of hydrogen.
 - 18g of water in liquid state is obtained by heating 18g of ice.
 - 18g of water is completely converted into vapour state on heating.
 - 18g of water freezes at 4°C to give same mass of ice
18. An element X has 7 electrons in its L shell. What is true about the element X?
- It belongs to period 9 of modern periodic table.
 - Its atom contains 9 protons.
 - It has a valency of 7.
 - Its atoms can accept an electron to acquire noble gas configuration.
- (I) and (II)
 - (II) and (III)
 - (III) and (IV)
 - (II) and (IV)
19. The reaction between carbon and oxygen can be represented as
- $$\text{C(s)} + \text{O}_2\text{(g)} \rightarrow \text{CO}_2\text{(g)} + \text{heat}$$
- In which of the following type(s), the above reaction can be classified?
- Combustion reaction
 - Displacement reaction
 - Endothermic reaction
 - Combination reaction
- (I) and (III)
 - (I), (III) and (IV)
 - (I) and (IV)
 - (I) only
20. A metal carbonate X on treatment with a mineral acid liberates a gas which when passed through aqueous solution of a substance Y gives back X. The substance Y on reaction with the gas obtained at anode during electrolysis of brine gives a compound Z which can decolorise coloured fabrics. The compounds X, Y and Z respectively are
- CaCO_3 , Ca(OH)_2 , CaOCl_2
 - Ca(OH)_2 , CaO , CaOCl_2
 - CaCO_3 , CaOCl_2 , Ca(OH)_2
 - Ca(OH)_2 , CaCO_3 , CaOCl_2
21. A salt can be produced by reaction between
- a weak acid and weak base.
 - metal oxide and water.
 - metal and a mineral acid.
 - metal oxide and a mineral acid.
- A, B and C
 - B, C and D
 - C, D and A
 - D, A and B
22. Which of the following is true about the two statements?
- Statement I :** Reactivity of aluminium decreases when it is dipped in nitric acid
- Statement II :** A protective layer of aluminium nitrate is formed when aluminium is dipped in nitric acid.
- I is correct but II is incorrect
 - I is incorrect but II is correct
 - Both the statements are correct and II is also the correct explanation of I
 - Both the statements are correct but II is not correct explanation of I
23. A silvery white metal X reacts with water at room temperature to produce a water soluble compound Y and a colourless gas Z. The reaction is highly exothermic and the Z catches fire immediately during the reaction. The solution of Y in water on reacting with stoichiometric amount of dilute solution of hydrochloric acid gives a solution of $\text{pH} = 7.0$. The compounds X, Y and Z respectively are :
- Al, Al(OH)_3 and H_2
 - Ag, AgOH and H_2
 - K, KCl and H_2
 - Na, NaOH and H_2
24. A compound X is obtained by the reaction of alkaline KMnO_4 with another compound Y followed by acidification. Compound X also reacts with compound Y in presence of few drops of H_2SO_4 to form a sweet smelling compound Z. The compound X, Y and Z are, respectively.
- Ethanol, Ethene, Ethanoic Acid
 - Ethanoic Acid, Ethanol, Ethylethanoate
 - Ethanoic Acid, Ethanal, Ethene
 - Ethanol, Ethanoic Acid, Sodium Ethanoate
25. Which of the following pairs of compounds of carbon will undergo combustion as well as addition reaction?
- CH_4 and C_2H_6
 - $\text{C}_2\text{H}_6\text{O}$ and $\text{C}_3\text{H}_8\text{O}$
 - $\text{C}_2\text{H}_4\text{O}_2$ and $\text{C}_3\text{H}_6\text{O}$
 - C_2H_2 and C_3H_6
26. An element X combines with hydrogen to form a compound XH_3 . The element X is placed on the right side of the periodic table. What is true about the element X?
- Has 3 valence electrons.
 - Is a metal and is solid.
 - Is a non-metal and is a gas.
 - Has 5 valence electrons.
- E. XH_3 reacts with water to form a basic compound
- A, B and C
 - B, C and D
 - C, D and E
 - E, A and B

27. An element X (atomic number 12) reacts with another element Y (atomic number 17) to form a compound Z. Which of the following statements are true regarding this compound?

I. Molecular formula of Z is XY_2 .
 II. It is soluble in water.
 III. X and Y are joined by sharing of electrons.
 IV. It would conduct electricity in the molten state.

- (1) (II) and (III) (2) (I) and (III)
 (3) (I), (III) and (IV) (4) (I) and (IV)
28. A ship sends a sonar wave to the sea bed which is flat and measured several times over a large area. One day the reflected sound wave takes longer time than in previous measurements. The possible reason is:
- (1) the frequency of the sonar wave, generated by the equipment is lower than previous measurements.
 (2) there is a solid object of large size in the path of sonar wave.
 (3) there is a huge air bubble in the path of sonar wave
 (4) the loudness of the sonar wave, generated by the equipment is lower than previous measurement.
29. Which of the following ray diagram is correct?



30. A concave lens always gives a virtual image. In optical lenses worn by humans which of the following statements is true?
- (1) The lens can never be concave.
 (2) In some cases the lens can be concave if the focal length is much larger than 2.5 cm.
 (3) All focal length concave lenses are possible.
 (4) All focal length convex lenses are possible.

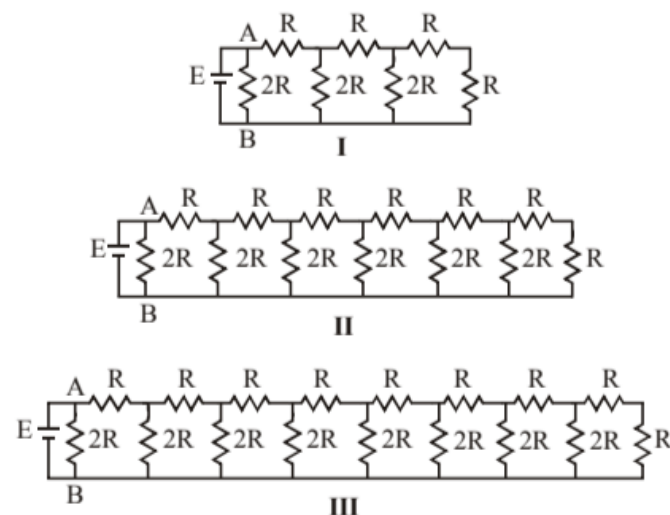
31. A geo-stationary satellite is orbiting around earth at height of 30,000 km in circular orbit. The radius of the earth is taken as 6000 km. The geo-stationary satellite comes back to its position after one revolution in exactly 24 hours. Let the acceleration due to gravity (g) be 10 m/s^2 and mass of satellite be 1000 kg; calculate the work done in 12 hours when moving under gravitational force.

(1) $3.6\pi \times 10^{14} \text{ J}$ (2) $2\pi \times 7.2\pi \times 10^{14} \text{ J}$
 (3) $1.8\pi \times 10^{14} \text{ J}$ (4) 0J

32. Consider a simple circuit containing a battery and three identical incandescent bulbs A, B and C. Bulb A is wired in parallel with bulb B and this combination is wired in series with bulb C. What would happen to the brightness of the other two bulbs if bulb A were to burn out?

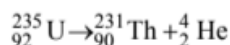
(1) Only bulb B would get brighter.
 (2) Both A and B would get brighter.
 (3) Bulb B would get brighter and bulb C would get dimmer.
 (4) There would be no change in the brightness of either bulb B or bulb C.

33. Three different circuits (I, II and III) are constructed using identical batteries and resistors of R and 2R ohm. What can be said about current I in arm AB of each circuit?



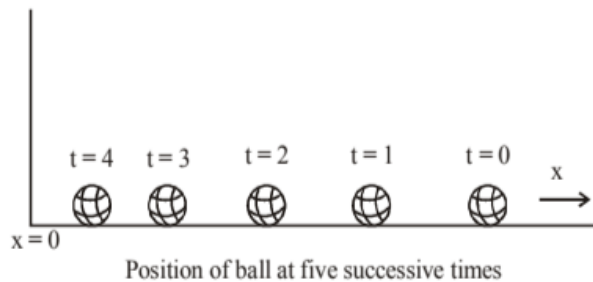
(1) $I_{II} < I_I < I_{III}$ (2) $I_I < I_{II} < I_{III}$
 (3) $I_I = I_{II} = I_{III}$ (4) $I_I > I_{II} = I_{III}$

34. A uranium nucleus at rest decays into a thorium nucleus and a helium nucleus, as shown below. Which of the following is true?

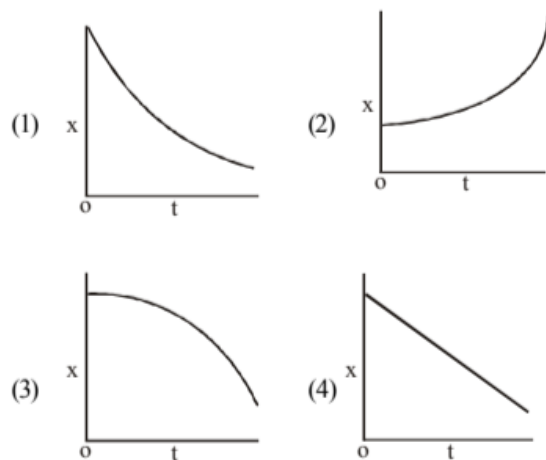


(1) Each decay product has the same kinetic energy.
 (2) The decay products tend to go in the same direction.
 (3) The thorium nucleus has more momentum than the helium nucleus.
 (4) The helium nucleus has more kinetic energy than the thorium nucleus.

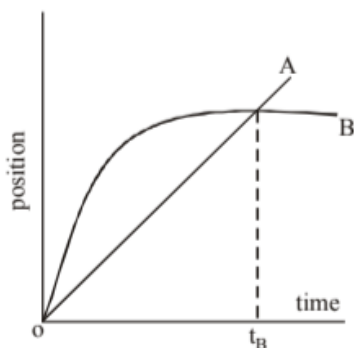
35. The figure below shows the position of a ball at $t = 0$, $t = 1$ s, $t = 2$ s, $t = 3$ s and $t = 4$ s



Which of the graph below is a possible graph of the position $x(t)$?

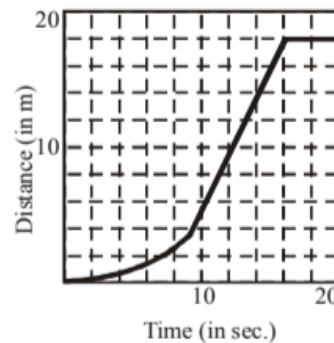


36. The graph shows position as a function of time for two trains A and B running on parallel tracks. For time greater than $t = 0$, which of the following statement is true?



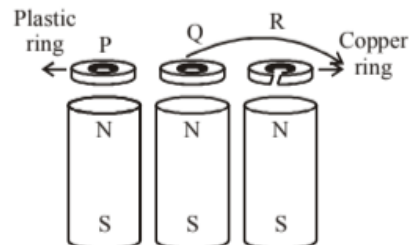
- (1) At time t_B , both trains have the same velocity.
- (2) Both trains speed up all the time.
- (3) Both trains may have the same velocity at some time earlier than t_B .
- (4) Graph indicates that both trains have the same acceleration at a given time.

37. The figure shown below depicts the distance travelled by a body as a function of time.



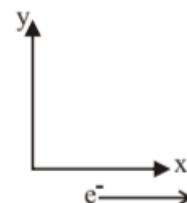
The average speed and maximum speed between 0 and 20 s are

- (1) 1 m/s, 2.0 m/s respectively.
 - (2) 1 m/s, 1.6 m/s respectively.
 - (3) 2.0 m/s, 2.6 m/s respectively.
 - (4) 1.3 m/s, 2.0 m/s respectively.
38. A hypothetical planet has density ρ , radius R , and surface gravitational acceleration g . If the radius of the planet were doubled, but the planetary density stayed the same, the acceleration due to gravity at the planet's surface would be:
- (1) $4g$
 - (2) $2g$
 - (3) g
 - (4) $g/2$
39. Three rings P, Q and R are dropped at the same time over identical hollow magnets as shown below :



Which of the following describes the order in which the ring P, Q and R reach the bottom of the magnet?

- (1) They arrive in the order P, Q, R.
 - (2) They arrive in the order P, R, Q.
 - (3) Rings P and R arrive simultaneously, followed by Q.
 - (4) Rings Q and R arrive simultaneously, followed by P.
40. An electron moving with uniform velocity in x-direction enters a region of uniform magnetic field along y-direction. Which of the following physical quantity(ies) is (are) non-zero and remain constant?



- I. Velocity of the electron
 - II. Magnitude of the momentum of the electron.
 - III. Force on the electron.
 - IV. The kinetic energy of electron.
- (1) Only I and II.
 - (2) Only III and IV.
 - (3) All four
 - (4) Only II and IV.

41. An open box is made from a square lamina of side 12cm, by cutting equal squares at the corners and folding up the remaining flaps. The volume of this box cannot be
 (1) 115 c.c. (2) 120 c.c.
 (3) 125 c.c. (4) 130 c.c.
42. A has a pair of triangles with corresponding sides proportional, and B has a pair of pentagons with corresponding sides proportional.
 $S_1 \equiv$ A's triangles must be similar
 $S_2 \equiv$ B's pentagons must be similar
 Which of the following statement is correct?
 (1) S_1 is true, but S_2 is not true.
 (2) S_2 is true, but S_1 is not true.
 (3) Both S_1 and S_2 are true.
 (4) Neither S_1 nor S_2 is true
43. ΔABC is an equilateral triangle of side $2\sqrt{3}$ cm. P is any point in the interior of ΔABC . If x, y, z are the distances of P from the sides of the triangle, then $x + y + z =$
 (1) $2 + \sqrt{3}$ cms. (2) 5 cms.
 (3) 3 cms. (4) 4 cms.
44. Which of the following numbers is the fourth power of a natural number?
 (1) 6765201 (2) 6765206
 (3) 6765207 (4) 6765209
45. The square of an odd integer must be of the form
 (1) $6n + 1$
 (2) $6n + 3$
 (3) $8n + 1$
 (4) $4n + 1$ but may not be $8n + 1$
46. ABCD is a square with side a . With centres A, B, C and D four circles are drawn such that each circle touches externally two of the remaining three circles. Let δ be the area of the region in the interior of the square and exterior of the circles. Then the maximum value of δ is
 (1) $a^2(1 - \pi)$ (2) $a^2\left(\frac{4 - \pi}{4}\right)$
 (3) $a^2(\pi - 1)$ (4) $\frac{\pi a^2}{4}$
47. The value of $\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 89^\circ$ is
 (1) 0 (2) 1
 (3) 2 (4) $\frac{1}{2}$
48. $ax^2 + bx + c = 0$, where a, b, c are real, has real roots if
 (1) a, b, c are integers. (2) $b^2 > 3ac$
 (3) $ac > 0$ and b is zero (4) $c = 0$.
49. An open box A is made from a square piece of tin by cutting equal squares S at the corners and folding up the remaining flaps. Another open box B is made similarly using one of the squares S. If U and V are the volumes of A and B respectively, then which of the following is not possible?
 (1) $U > V$
 (2) $V > U$
 (3) $U = V$
 (4) minimum value of U > maximum value of V.

50. Which of the following statements holds always ?
 (1) Every rectangle is a square.
 (2) Every parallelogram is a trapezium
 (3) Every rhombus is a square
 (4) Every parallelogram is a rectangle
51. Which of the following polygons are uniquely determined when all the sides are given?
 (1) Quadrilateral (2) Triangle
 (3) Pentagon (4) Hexagon
52. There are several human beings and several dogs in a room. One tenth of the humans have lost a leg. The total numbers of feet are 77. Then the number of dogs is
 (1) not determinable due to insufficient data
 (2) 4
 (3) 5
 (4) 6
53. All the arcs in the following diagram are semi-circles. This diagram shows two paths connecting A to B. Path I is the single large semi-circle and Path II consists of the chain of small semi-circles.



- (1) Path I is longer than path II
 (2) Path I is of the same length as Path II
 (3) Path I is shorter than Path II
 (4) Path I is of the same length as Path II, only if the number of semi-circles is not more than 4.
54. One integer is chosen out of 1, 2, 3, ..., 100. What is the probability that it is neither divisible by 4 nor by 6.
 (1) 0.59 (2) 0.67
 (3) 0.41 (4) 0.33
55. $\sqrt{(a-b)^2} + \sqrt{(b-a)^2}$ is
 (1) Always zero
 (2) Never zero
 (3) Positive if and only if $a > b$
 (4) Positive only if $a \neq b$
56. A solid metal sphere of surface area S_1 is melted and recast into a number of smaller spheres. S_2 is the sum of the surface areas of all the smaller spheres. Then,
 (1) $S_1 > S_2$
 (2) $S_2 > S_1$
 (3) $S_1 = S_2$
 (4) $S_1 = S_2$ only if all the smaller spheres of equal radii
57. Which of the following is an irrational number?
 (1) $\sqrt{41616}$ (2) 23.232323....
 (3) $\frac{(1+\sqrt{3})^3 - (1-\sqrt{3})^3}{\sqrt{3}}$ (4) 23.10100100010000...
58. Re. 1 and Rs. 5 coins are available (as many required). Find the smallest payment which cannot be made by these coins, if not more than 5 coins are allowed.
 (1) 3 (2) 12
 (3) 14 (4) 18

59. Median of a data set is a number which has an equal number of observations below and above it. The median of the data 1, 9, 4, 3, 7, 6, 8, 8, 12, 15 is
 (1) 7.5
 (2) 7
 (3) 8
 (4) any number between 7 and 8
60. Suppose you walk from home to the bus stand at 4 km/h and immediately return at x km/h. If the average speed is 6 km/h then x is
 (1) 8 km/h (2) 10 km/h
 (3) 12 km/h
 (4) cannot be determined unless the distance from home to bus stand is known.
61. From about 13th century to the time of the French Revolution sumptuary laws were expected to be followed strictly to :
 (1) regulate the behaviour of the royalty.
 (2) regulate the income of people by social rank.
 (3) control the behaviour of those considered social inferiors.
 (4) provide religious sanctity to social behaviour.
62. Choose the correct response from the given options.
 On 3rd March 1933 the famous Enabling Act was passed to:
 (a) establish dictatorship in Germany.
 (b) give Hitler the power to rule by decree.
 (c) ban all trade unions.
 (d) ban all political parties and their affiliates.
 (1) only (a) and (b) are correct
 (2) only (c) and (d) are correct
 (3) (a), (b) and (c) are correct
 (4) only (d) is correct
63. Enclosures in England were seen as :
 (1) hindrance to agricultural expansion and crop rotation.
 (2) hindrance to commercialization of agriculture.
 (3) necessary to make long-term investment on land, agriculture and to plan crop rotation to improve the soil.
 (4) necessary to protect the interests of those who depended on the commons for their survival.
64. The Balkans, which was a serious source of nationalist tension in Europe after 1871, was region comprising of :
 (1) Romania, Germany, Poland, Bulgaria.
 (2) Romania, Prussia, Greece, Croatia and Serbia.
 (3) Serbia, Austria, Bulgaria, Slovakia and Poland
 (4) Serbia, Bulgaria, Greece, Croatia, Romania.
65. What was Rinderpest?
 (1) A disease of cattle plagues that spread in Africa in the 1890s.
 (2) Bubonic plague which spread in the region of Maharashtra in the 1890s.
 (3) A type of cholera that spread in Assam in the 1890s.
 (4) A devastating bird disease that was imported to Italy from British Asia, through chicken meat.
66. Which of the following is a correct match?
 (1) Rashesundari Debi – Istri Dharma Vichar
 (2) Ram Chadda – Amar Jiban
 (3) Kashibaba – Chote Aur Bade Ka Sawaal
 (4) Sudarshan Chakra – Gulamgiri
67. Printing created possibilities of wider circulation of ideas. Who of the following hailed printing as the ultimate gift of God?
 (1) Martin Luther (2) Menocchio
 (3) Roman Catholic Church
 (4) Gutenberg
68. The Forest Act of 1878 divided forests into :
 (1) reserved and protected forests.
 (2) protected and village forests.
 (3) bio-sphere reserves and wild life sanctuaries.
 (4) reserved, protected and village forests.
69. Consider the following statements and identify the correct response from the options given thereafter :
Statement I : Hitler said 'In my state the mother is the most important citizen'.
Statement II : In Nazi Germany while boys were taught to be aggressive, muscular and steel hearted; girls were told that they had to become good mothers.
 (1) Statement I is true but statement II is false.
 (2) Both statement I and statement II are true but statement II is not the correct explanation of statement I.
 (3) Both the statements are false.
 (4) Both statement I and statement II are true and statement II is the correct explanation of statement I.
70. Consider the following statements and choose the correct response from the options given thereafter :
Statement I : The major cricket tournament of colonial India, the 'Quadrangular' did not represent regions but religious communities.
Statement II : The victory of the 'Hindus' in the 'Quadrangular' cricket tournament in 1923 was equated by a cricket fan with Gandhiji's war on 'untouchability'.
 (1) Statement I is true but statement II is false.
 (2) Statement I is false but statement II is true.
 (3) Both statement I and statement II are true and II is correct explanation of statement I.
 (4) Both statement I and statement II are true but statement II is not the correct explanation of statement I.
71. Match the following columns :

Column A	Column B
(I) Ambedkar established the Depressed Classes Association	(A) December, 1929
(II) Gandhiji began the Civil Disobedience Movement	(B) August, 1930
(III) Gandhiji ended the Civil Disobedience Movement	(C) March, 1930
(IV) Congress adopted the demand for 'Purna Swaraj'	(D) March, 1931

 (1) (I) – (C), (II) – (D), (III) – (B), (IV) – (A)
 (2) (I) – (B), (II) – (C), (III) – (D), (IV) – (A)
 (3) (I) – (C), (II) – (A), (III) – (B), (IV) – (D)
 (4) (I) – (D), (II) – (C), (III) – (B), (IV) – (A)

72. Consider the following statements and choose the correct response from the options given thereafter :

Statement I : The Act of Union 1707 led to the formation of the "United Kingdom of Great Britain".

Statement II : The British parliament was henceforth dominated by its English members.

- (1) Both statement I and statement II are false.
- (2) Both statement I and statement II are true and statement II is the result of statement I.
- (3) Statement I is true but statement II is false.
- (4) Both statement I and statement II are true but statement II is not a result of statement I.

73. Consider the following statements and choose the correct response from the options given thereafter:

Statement I : Traders and travellers introduced new crops to the land they travelled.

Statement II : Noodles most likely travelled from China through Arab traders to Sicily.

Statement III : Potato reached the West through travellers and became the staple diet of the poor.

- (1) Statement I and statement III are true.
- (2) Statement II and statement III are true.
- (3) All three statements are true.
- (4) Statement I and statement II are true.

74. **Assertion (A) :** Gandhiji's idea of satyagraha emphasised on the power of truth and the need to search for truth.

Reason (R) : Gandhiji believed that a satyagrahi could win the battle by appealing to the conscience of the oppressor. Select the correct option from the given alternatives.

- (1) A is true and R is false.
- (2) Both A and R are true but R is not the correct explanation of A.
- (3) Both A and R are true and R is the correct explanation of A.
- (4) Both A and R are false.

75. **Assertion (A) :** The Civil Disobedience Movement was different from the Non-cooperation Movement.

Reason (R) : People in the Civil Disobedience Movement were asked not only to refuse cooperation with the British but also to break colonial laws.

Select the correct option from the given alternatives.

- (1) Both A and R are true but R is not the correct explanation of A.
- (2) Both A and R are false.
- (3) A is false but R is true.
- (4) Both A and R are true and R is the correct explanation of A.

76. **Assertion (A) :** Coal is a fossil fuel.

Reason (R) : It is formed due to compression of inorganic material over millions of years.

Select the correct option from the given alternatives.

- (1) Both (A) and (R) are true, and (R) explain (A)
- (2) Both (A) and (R) are true, but (R) does not explain (A)
- (3) (A) is true and (R) is false
- (4) (A) is false and (R) is true

77. **Assertion (A) :** The sun rises in Arunachal Pradesh about two hours before Gujarat.

Reason (R) : Arunachal Pradesh is on a higher latitude than Gujarat.

Select the correct option from the given alternatives.

- (1) Both (A) and (R) are true, and (R) explain (A)
- (2) Both (A) and (R), are true, but (R) does not explain (A)
- (3) (A) is true and (R) is false
- (4) (A) is false and (R) is true

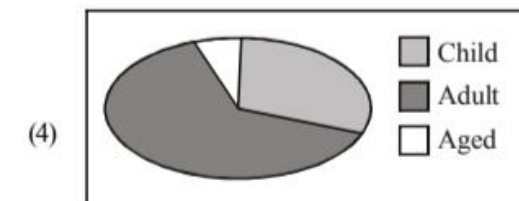
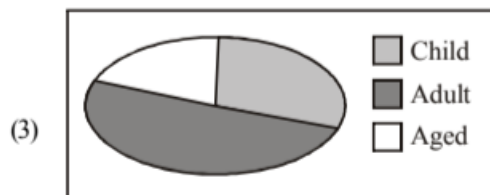
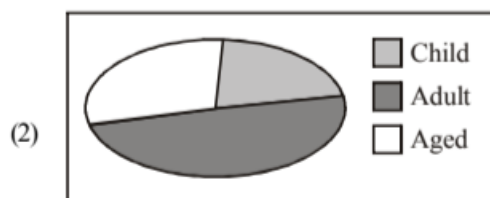
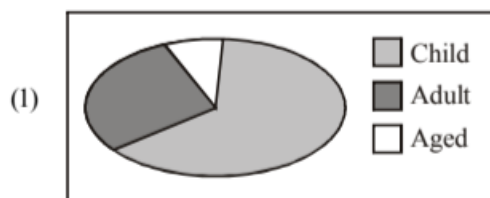
78. **Assertion (A) :** In India, east coast has more seaports than the west coast.

Reason (R) : The east coast is broader and is an example of emergent coast.

Select the correct option from the given alternatives.

- (1) Both (A) and (R) are true, and (R) explain (A)
- (2) Both (A) and (R) are true, but (R) does not explain (A)
- (3) (A) is true and (R) is false
- (4) (A) is false and (R) is true

79. Which pie diagram represents India's age composition in 2001?



80. **Assertion (A) :** The north western parts of India receive rainfall in winter.

Reason (R) : The winter rainfall in India occurs due to North East monsoon.

Select the correct option from the given alternatives.

- (1) Both (A) and (R) are true, and (R) explain (A)
- (2) Both (A) and (R) are true, but (R) does not explain (A)
- (3) (A) is true and (R) is false
- (4) (A) is false and (R) is true

81. Which four major ports of India lie on the Golden Quadrilateral?

- (1) Chennai, Tuticorin, Mangalore, Marmagao
- (2) Kolkata, Chennai, Mangalore, Mumbai
- (3) Marmagao, Mumbai, Kandla, Mangalore
- (4) Kolkata, Mumbai, Vishakhapatnam, Chennai

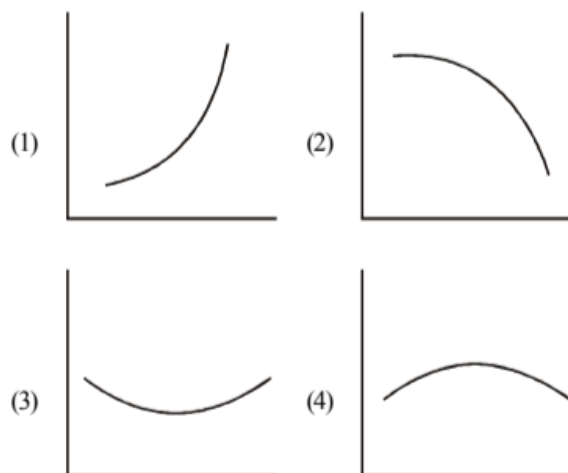
82. Match the fishing ports indicated on the map of India (I, II, III and IV) with their respective names.

- | | |
|--------------|--------------|
| A. Kakinada | B. Alappuzha |
| C. Porbandar | D. Tuticorin |



- (1) II-A, III-B, I-C, IV-D
- (2) I-A, II-B, III-D, IV-C
- (3) I-C, II-B, III-A, IV-D
- (4) I-D, II-B, III-A, IV-C

83. Which figure relates the trend of population Growth rate of India from 1951-2001?



84. **Assertion (A)** : The Himalayan ranges show change in vegetation from tropical to tundra.

Reason (R) : In mountainous area with increase in altitude there is corresponding decrease in temperature, which leads to change in vegetation types.

Select the correct option from the given alternatives.

- (1) Both (A) and (R) are true, and (R) explain (A)
- (2) Both (A) and (R) are true, but (R) does not explain (A)
- (3) (A) is true and (R) is false
- (4) (A) is false and (R) is true

85. Which of the following methods are used to restrict soil erosion?

- A. Ploughing along contour lines
- B. Strip cropping
- C. Jhumming
- D. Mixed farming

- (1) A and B
- (2) A and C
- (3) B and D
- (4) B and C

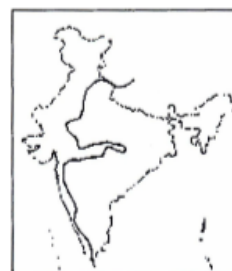
86. **Assertion (A)** : Although only the southern part of India lies in tropical region, the whole of India has tropical climate.

Reason (R) : Himalaya mountain ranges protect it from the northerly cold winds.

Select the correct option from the given alternatives.

- (1) Both (A) and (R) are true, and (R) explain (A)
- (2) Both (A) and (R) are true, but (R) does not explain (A)
- (3) (A) is true and (R) is false
- (4) (A) is false and (R) is true

87. What does the zig-zag line indicate on the map of India?



- (1) Advancement of summer monsoon on 1st June.
- (2) Line dividing tropical evergreen and deciduous forest.
- (3) Water divide between east and west flowing rivers.
- (4) Line dividing annual rainfall above and below 100 cm.

88. Which of the following feature has similar geological structure with Meghalaya, Karbi Anglong plateau and Cachar Hills?

- (1) Aravalli Range
- (2) Purvanchal Hills
- (3) Siwaliks
- (4) Chotanagpur Plateau

89. **Assertion (A)** : Sex Ratio in India is low.

Reason (R) : Indian society has been unfavourable to females.

Select the correct option from the given alternatives.

- (1) Both (A) and (R) are true, and (R) explain (A)
- (2) Both (A) and (R) are true, but (R) does not explain (A)
- (3) (A) is true and (R) is false
- (4) (A) is false and (R) is true

90. A pilot takes off from an airport at 15°S latitude and flies 55° due North. What latitude the pilot has reached?

- (1) 55° N
- (2) 40° N
- (3) 70° N
- (4) 15° N

91. Which of the following is not a feature of Indian federalism?

- (1) The Constitution creates a strong Centre.
- (2) The Constitution provides for a single judiciary.
- (3) The Constitution provides for a common All India Services.
- (4) The Constitution provides equal representation to the States in the Upper House of the Parliament.

92. Which of these features is not a guiding value of the Indian Constitution?

- (1) No external power can dictate to the Government of India.
- (2) The head of the State is a hereditary position.
- (3) All people are equal before law.
- (4) Citizens have complete freedom to follow any religion.

93. According to Dr. B.R. Ambedkar, which of the following is the 'heart and soul' of our Constitution?
- The Preamble
 - Right to Equality
 - Right against Exploitation
 - Right to Constitutional Remedies
94. Democracy is considered to be better than other forms of government. Which of the following statements support this claim?
- It is a more accountable form of government.
 - It improves the quality of decision-making.
 - It ensures rapid economic development of citizens.
 - It enhances the dignity of citizens.
- A, B and D
 - A and C
 - A, B and C
 - B, C and D
95. The Constitution of India was amended in 1992 to make the third-tier of democracy more effective. As a result, at least one-third of all positions in the local bodies are reserved for women. This is because
- women are good at managing resources.
 - although women constitute nearly half of the population, they have inadequate representation in decision-making bodies.
 - we have many powerful women leaders.
 - women are obedient and would follow the constitutional provisions well.
96. In which of the following economies are people more of a resource?
- Country A with 78% of the working age population illiterate and with very low life expectancy
 - Country B with 10% of the working age population illiterate and with high life expectancy
 - Country C with 60% of people in the working age illiterate, but with high life expectancy
 - Country D with only 10% of population is the working age illiterate, but has very low life expectancy.
97. Which of the following statements is true of agriculture in Indian economy between 1973 and 2003?
- The sectorial share of agriculture in employment has decreased far more than its share on total output.
 - The sectorial share of agriculture in total output has decreased, but its share in employment has increased.
 - The sectorial share of agriculture in total output has increased, but its share in employment has decreased.
 - The sectorial share of agriculture in output has decreased far more than its share in total employment.
98. Which of the following can be considered as Foreign Direct Investment made in India?
- The TATAs acquire Corus steel plant abroad.
 - Mr. Donalds, an American citizen, acquires 100 shares of an Indian listed company.
 - The remittances sent by an Indian doctor in Dubai back to his hometown in Kerala.
 - The US multi-national Google opens its full-fledged unit at Gurgaon, Haryana.
- A and D
 - A and B
 - D only
 - B and C
99. We accept paper money as a medium of exchange because
- it has gold backing.
 - the law legalizes it.
 - Reserve Bank of India has precious metals against which it prints notes.
 - everyone else accepts it.
100. Which of the following refers to trade barrier in the context of WTO?
- Restrictions on domestic trade
 - Not allowing companies to do foreign trade beyond specific quantity
 - Restrictions on the export and import of goods
 - Restrictions on the price fixed by companies
- (I), (II) and (III)
 - (II), (III) and (IV)
 - (III) and (IV)
 - (I), (II) and (IV)

ANSWER KEY

1	(4)	11	(2)	21	(3)	31	(4)	41	(4)	51	(2)	61	(3)	71	(2)	81	(4)	91	(4)
2	(2)	12	(4)	22	(2)	32	(4)	42	(1)	52	(3)	62	(1)	72	(2)	82	(3)	92	(2)
3	(4)	13	(4)	23	(1)	33	(3)	43	(3)	53	(2)	63	(3)	73	(4)	83	(4)	93	(4)
4	(3)	14	(1)	24	(3)	34	(4)	44	(1)	54	(2)	64	(4)	74	(3)	84	(1)	94	(1)
5	(1)	15	(3)	25	(2)	35	(1)	45	(4)	55	(4)	65	(1)	75	(4)	85	(1)	95	(2)
6	(2)	16	(4)	26	(1)	36	(4)	46	(2)	56	(3)	66	(3)	76	(3)	86	(1)	96	(2)
7	(2)	17	(1)	27	(2)	37	(1)	47	(2)	57	(4)	67	(1)	77	(2)	87	(3)	97	(4)
8	(2)	18	(2)	28	(3)	38	(2)	48	(4)	58	(3)	68	(1)	78	(1)	88	(4)	98	(3)
9	(3)	19	(1)	29	(1)	39	(3)	49	(4)	59	(1)	69	(4)	79	(4)	89	(1)	99	(2)
10	(4)	20	(1)	30	(2)	40	(4)	50	(2)	60	(3)	70	(4)	80	(2)	90	(3)	100	(3)

Hints & Explanations

1. (4) Animal and plant cells are eukaryotic cells having cell membrane, cytoplasm, true nucleus, and various organelles (like ER, Golgi complex, ribosomes ((80S) etc.) Bacterial cell is prokaryotic cell in which plasma membrane, cell wall, primitive type of nucleus, ribosomes (70S) etc. present but cell organelles are absent. Animal cells lack cell wall. But there are some structural features which are common in these cells like plasma/cell membrane, cytoplasm and ribosomes.
2. (2) In the given figure, A shows smooth muscles present at the wall of internal organs such as blood vessels, stomach and intestine. C shows cardiac muscle tissue which is a contractile tissue present only in the heart. B is skeletal muscle tissue which is closely attached to skeletal bones. So, we found skeletal muscles in the grasshopper's legs.
3. (4) Bryophytes lack true roots, stem or leaves. Angiosperms are flowering plants having roots, stem, leaves, flowers, fruits, seed, well developed vascular system. Gymnosperms are a group of plants in which seeds are not covered, i.e., are naked. Pteridophytes are group of plants that have well differentiated body, special vascular tissues (xylem and phloem) but donot have seed or fruits. They having spores.
4. (3) A peptic ulcer generally occurs on the area of the gastrointestinal tract. It is usually acidic and extremely of the painful. These types of ulcers are associated with *Helicobacter pylori*, a helical shaped bacterium that lives in the acidic environment of the stomach.
5. (1) The average temperature of the earth remains fairly steady as compared to that of the moon because of the earth's atmosphere. Atmosphere of earth absorbing ultraviolet solar radiation, warming the surface through heat retention (green house effect), and reducing temperature extremes between day and night. Moon has no atmosphere.
6. (2) Self-pollination is the transfer of pollen grains from anther to stigma of same or similar flower. If stamens are just above the stigma of a pistil in a flower, then large numbers of pollen grains are fallen on the stigma and the chances of fertilisation increases.
7. (2) Photosynthesis is a process by which green plants make their food from CO_2 and H_2O in the presence of sunlight. If we blow air into water in a beaker then air from mouth that contains CO_2 utilized in photosynthesis. Hence O_2 production increases.
8. (2) A person with blood group 'A' can donate blood to the person with blood group 'A' or 'AB' because it has only 'A' antigen on RBCs and B-antibodies in plasma. In blood grup AB, there is no antibody in plasma so persons with 'AB' group can accept blood from persons with AB as well as the other groups of blood.
9. (3) Cerebellum coordinates muscular activity of the body. It also maintains equilibrium or posture of the body as during walking, jumping, lifting, catching and bending etc.
10. (4) Most tapeworms are hermaphroditic (i.e. male and female reproductive organs occur in the same individual). They are usually self-fertilizing. Earthworms are hermaphrodite. But they undergo cross-fertilization, i.e., a mutual exchange of sperms occurs between two worms during mating.
11. (2) Some green beetles appear among the red beetles because natural variations occur during sexual reproduction. Each generation provides the next generation with a common basic design and some subtle changes or variations. The variations accumulate and pass on to more and more individuals with each generation.
12. (4) More green beetles survive than the red because they are selected by nature. Green beetles are not easily recognized by the crows on the tree as compare to the red one whose recognition possibilites are higher.
13. (4) In the given food chain, grasshopper is the primary consumer. Frog is secondary and snake at tertiary. According to ten percent law (10%) given by Lindemann, during energy transfer, only 10% is stored at higher trophic level while remaining 90% is lost in respiration, digestion and transfer. Eagle is the top carnivore having less energy than the tertiary but more than the primary because there is no further energy transfer in the given chain.
14. (1) Various harmful chemicals like DDT not only enter the food chain but also get concentrated at each successive trophic level due to non-degradation and accumulation through repeated supply from lower trophic level. Such a high concentration of harmful chemicals proves extremely injurious or fatal to higher trophic levels.
15. (3) Liquids evaporate by gaining energy from skin molecules thereby resulting into cooling effect. Liquid A gives a more cooling sensation the liquid B means liquid A is easily vaporised incomparison to liquid B. Thus, liquid A has less B P and lower later heat of vaporisation than that of liquid B.
16. (4) C is sublimable thus it can be separated from given mixture by sublimation. The remaining mixture of A and B can be put in water compound B being in soluble in water can be separated out by filtration. Compound A can be recovered from filterate by crystallisation.
17. (1) According to law of conservation of mass
Mass of rectants = Mass of products

$$2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$$

4 gm	32 gm	36 gm
2 gm	16 gm	18 gm
$2 + 16 = 18 \text{ gm}$		

18. (2) Given No. of electrons in L shell = 7

$$\text{Hence, No. of protons} = 2 + 7 = 9$$

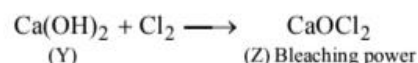
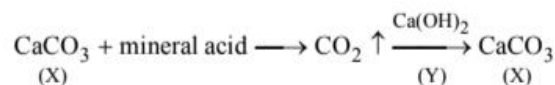
(K-shell) (L-shell)

Electronic configuration = 2, 7

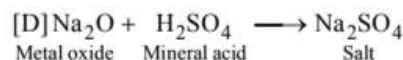
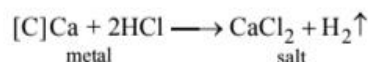
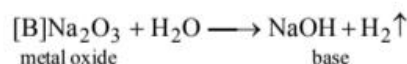
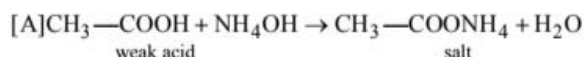
To complete octate requires one e^- . hence valency will be one.

19. (1) This reaction takes place in presence of oxygen. Hence, it is a combustion reaction and in this reaction the two elements C and O_2 combine to form CO_2 . So it is combination reaction.

20. (1)



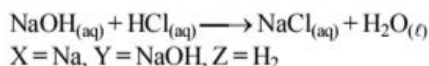
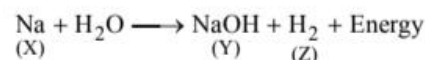
21. (3)



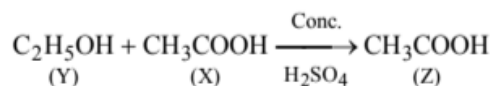
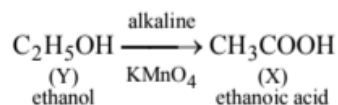
22. (2) When Aluminium metal is clipped in nitric acid it forms a layer of alumina on it (Al_2O_3) which acts as a protective layer hence its reactivity decreases.



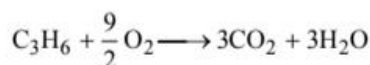
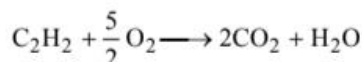
23. (1) Since Z catches fire immediately during reaction and the reaction with water is highly exothermic. Hence it should be Na



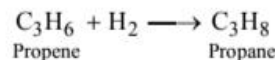
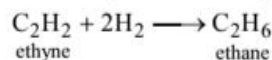
24. (3) The characteristics of compound Z shows that it is an ester which form by reaction of an alcohol with reaction of a carboxylic acid in presence of conc. H_2SO_4 further X is formed by acidification of Y. hence Y should be an alcohol, X a carboxylic acid. hence the reactions will be



25. (2) both C_2H_2 (Ethyne) and C_3H_6 (propene) ethyl ethanoate are hydrocarbon. Hence they would undergo combustion



Both C_2H_2 and C_3H_6 are unsaturated compounds. Hence they would undergo addition reaction.

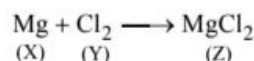


26. (1) $2X + 3H_2 \longrightarrow 2XH_3$
Since element 'X' is placed on R.H.S. of periodic table, it is non-metal.

Element 'X' on combining with three monovalent H-atoms form XH_3 . Hence its valency is three and has 5 valence electrons.



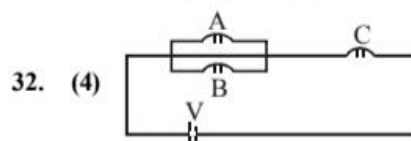
27. (2) Atomic number of element 'X' ($Z = 12$) suggests it Mg and atomic number of Element 'Y' ($Z = 17$) is Cl.



Molecular formula of Z is XY_2 .

Compound 'Z' is ionic compound, hence it would conduct electricity in molten state.

28. (3) If air bubble is in the path then sound wave will take more time to travel this distance.
29. (1) A ray parallel to principal axis must pass through focus and a ray passing through focus must go parallel to principal axis.
30. (2) In optical lens (for eye defects) concave lens is used. focal length must be much larger than 2.5 cm if it is equal or less than 2.5 cm then it means that the power point is at approximately 2.5 cm, which is not possible.
31. (4) Since F_g is perpendicular to displacement at each instant so
Work done = $F \cdot ds \cdot 0$ [$\because \theta = 0$]



Resistance of each bulb is R.

$$I = \frac{2V}{3R}$$

$$P_A = P_B = \left(\frac{V}{3R} \right)^2 R = \frac{V^2}{9R} \quad \dots(i)$$

$$P_C = \frac{4V^2}{9R} \quad \dots(ii)$$

When bulb A is fused, then

$$\text{Now, current, } I = \frac{V}{2R}$$

$$\text{So, } P_B = P_C = \frac{V^2}{4R} \quad \dots(iii)$$

So, B will be brighter and C will be dimmer.

33. (3) Since V_{AB} and resistance ($2R$) is same for branch AB and Resistance of the rest of the circuit is $2R$ for all the circuits so ' i ' will be same.

34. (4) $KE = \frac{p^2}{2m}$

$|\vec{P}|$ is same because initially uranium is at rest

non-uniformly so $KE \propto \frac{1}{m}$.

35. (1) x is decreasing with increasing time non-uniformly

36. (4)

37. (1) Average speed = $\frac{20}{20} = 1 \text{ m/s}$

maximum speed from graph is between time $t = 10 \text{ sec.}$ and $t = 18 \text{ sec.}$

$$V_{\max} = \frac{20-4}{18-10} = \frac{16}{8} = 2 \text{ m/s}$$

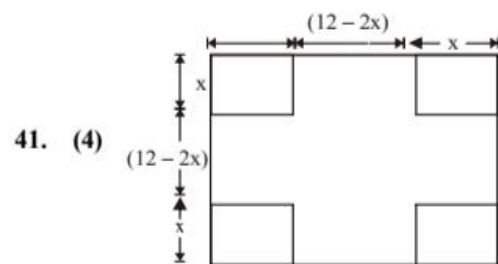
38. (2) $g = \frac{GM}{R^2} = \frac{G \frac{4}{3} \pi R^2 \rho}{R^2}$

$$= \frac{4}{3} \pi G \rho R$$

$$= g \propto R$$

39. (3) Plastic is non magnetic substance and open ring does not form magnetic poles so due to induction only ring Q will experience retarding force by forming magnetic poles.

40. (4) Velocity and force change due to change in direction but magnitude of P and KE of electron remain constant speed is coast.



$$V = x(12-2x)^2$$

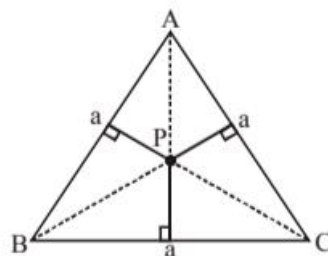
This box has maximum volume when $x = 2 \text{ cm}$ which is 128 c.c.

So, volume 130 cc is not possible.

42. (1) For similarity of triangles we have SSS criteria. So S_1 in true.

But for polygon : two polygon to be similar if the corresponding sides are in same ratio then corresponding angle must be same. So S_2 is not correct.

43. (3)



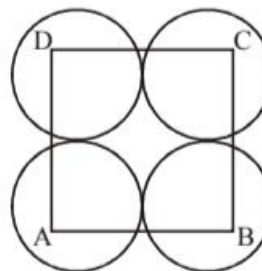
$$a = 2\sqrt{3} \text{ cm}$$

$$\frac{1}{2} a(x+y+z) = \frac{\sqrt{3}}{4} a^2$$

$$x+y+z = \frac{\sqrt{3}}{4} a = \frac{\sqrt{3}}{2} \times 2\sqrt{3} = 3 \text{ cm}$$

44. (1) $\sqrt[4]{6765201} = 51$

45. (4) All odd square can be written in the form $8n+1$
 $1^2 = 1 = 8 \times 0 + 1$
 $3^2 = 9 = 8 \times 1 + 1$
 $5^2 = 25 = 8 \times 3 + 1$
 $7^2 = 49 = 8 \times 6 + 1$



46. (2)

$$\text{Area of interior region} = a^2 - \pi \left(\frac{a}{2} \right)^2$$

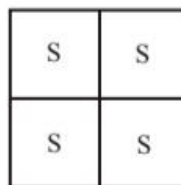
$$= a^2 - \pi \frac{a^2}{2}$$

$$= a^2 \left(\frac{4-\pi}{4} \right)$$

47. (2) $\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 89^\circ$
 $= (\tan 1^\circ \tan 89^\circ) (\tan 2^\circ \tan 88^\circ) \dots \tan 45^\circ$
 $= (\tan 1^\circ \cot 1^\circ) (\tan 2^\circ \cot 2^\circ) \dots (1)$
 $= (1)(1) \dots (1)$
 $= 1$

48. (4) $ax^2 + bx + c = 0$ will have real roots when $c = 0$.

49. (4)



If we cut square S from a piece of tin at that time the volume of open box is 0.

But the volume of open box made from S is always be greater than 0.

So according to this 4th option is not possible.

50. (2) Every parallelogram is a trapezium.

51. (2) Triangle (By SSS criteria).

52. (3) Let there are x human being and y dogs

\therefore Total legs = $2x + 4y$
one tenth of x human being lost a leg.

$$\therefore (2x + 4y) - \frac{x}{10} = 77$$

$$\frac{19x}{10} + 4y = 77 \dots (1)$$

when $x = 10$, from (1)

$$4y = 77 - 19 = 58 \text{ (which is not possible)}$$

when $x = 30$, from (1)

$$57 + 4y = 77$$

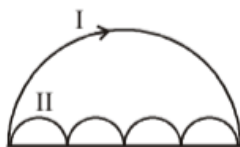
$$4y = 20$$

$$y = 5$$

\therefore Number of dogs = 5

53. (2) Let there are n small semi circles in the chain of small semicircles with radius r .

$$\therefore \text{Radius of single large semi-circle} = \frac{n}{2} (2r) = nr$$



Path I = $n\pi r$

Path II = $n(\pi r)$

So part I and II always be equal.

54. (2) From 1 to 100.

No. which are divisible by 4 = 25

No. which are divisible by 6 = 16

No. which are divisible by 12 = 8

No. which are divisible by 4 or 6 = $25 + 16 - 8 = 33$

So, number which are not divisible by 4 or 6

$$= 100 - 33 = 67$$

$$\text{So, required probability} = \frac{67}{100} = 0.67$$

$$55. (4) \sqrt{(a-b)^2} + \sqrt{(b-a)^2}$$

$$= |a-b| + |b-a|$$

Let $a > b$

then

$$|a-b| + |b-a|$$

$$= a-b + a-b$$

$$= 2a - 2b$$

i.e. +ve

So answer is always +ve if $a \neq b$

Let $a < b$

then

$$|a-b| + |b-a|$$

$$= b-a + b-a$$

$$= 2b - 2a$$

i.e. +ve

$$56. (3) \frac{4}{3} \pi R^3 = \frac{4}{3} \pi (r_1^3 + r_2^3 + r_3^3 + \dots r_n^3) \dots (1)$$

$$S_1 = 4\pi R^2$$

$$S_2 = 4\pi (r_1^2 + r_2^2 + r_3^2 + \dots r_n^2)$$

From (i), we get

$$R^3 = r_1^3 + r_2^3 + r_3^3 + \dots r_n^3$$

If all smaller sphere are of equal radius i.e. r

$$\text{then, } \frac{4}{3} \pi R^3 = \frac{4}{3} \pi \times nr^3 \quad [\text{From (i)}]$$

$$R^3 = nr^3$$

$$\frac{S_1}{S_2} = \frac{R^2}{n \times r^2} = \frac{(nr^3)^{2/3}}{nr^2} = \frac{n^{2/3} \times r^2}{nr^2}$$

$$nS_1 = n^{2/3} S_2 \Rightarrow n^{1/3} S_1 = S_2 \therefore S_2 > S_1.$$

57. (4) 23, 10 1 1 000 1 0000 is an irrational number as it is Non-terminating and non-repeating.

58. (3) Out of the options, 14 cannot be made as it required 2, Rs. 5 coins & 4, Rs. 1 coin i.e. 5, 5, 1, 1, 1, 1.

59. (1) Ascending order
1, 3, 4, 6, 7, 8, 8, 9, 12, 15

$$\text{Median} = \frac{7+8}{2} = 7.5.$$

60. (3) Average speed = 6 km/hr.

$$6 = \frac{2 \times 4 \times x}{4 + x}$$

$$24 + 6x = 8x$$

$$2x = 24$$

$$x = 12 \text{ km/hr.}$$

61. (3) From about 1294 to the time of the French Revolution in 1789, the people of France were expected to strictly follow what were known as "Sumptuary Laws". The laws tried to control the behaviour of those considered social inferiors, preventing them from wearing certain clothes, consuming certain foods and beverages and hunting game in certain areas.

62. (1) On 3rd March 1933, the Famous enabling Act was passed. This Act established dictatorship in Germany. It gave Hitler all powers to sideline Parliament and rule by decree. All political parties and trade unions were banned except for the Nazi party and its affiliates. The state established complete control over the economy, media, army and Judiciary.

63. (3) Enclosures in England were seen as necessary to make long term investments on land and plan crop rotations to improve the soil. Enclosures also allowed the richer landowners to expand the land under their control and produce more for the market.

64. (4) The Balkans was a region of geographical and ethnic variation comprising modern-day Romania, Bulgaria, Albania, Greece, Macedonia, Croatia, Bosnia-Herzegovina, Slovenia, Serbia and Montenegro whose inhabitants were broadly known as the Slavs. As the different Slavic nationalities struggled to define their identity and independence, the Balkan area became an area of intense conflict.

65. (1) In Africa, in the 1890s, a fast spreading disease of cattle plague or rinderpest had a terrifying impact on people's livelihoods and the local economy.

66. (3) "Istri Dharam Vichar" wrote by Shri Ram Chaddha, Kashibaba, a mill worker of Kanpur published 'Chote Aur Bada ka Sawal'.
Rassundari Devi, wrote a story of her life, 'Amar Jiban' (My life), that was published in 1876.
Jyotiba Phula wrote Gulamgiri, it was based on the caste system.
67. (1) Through the publications of his protestant ideas, Martin Luther challenged the orthodox practices and rituals of the Roman Catholic Church. He wrote 95 theses criticizing many of the practices of the Roman Catholic Church. Luther's writings were immediately reproduced in vast numbers and read widely. This led to a division within the church and to the beginning of the Protestant Reformation. He also translated the New Testament of which 5000 copies were sold within a few days. These were impossible without the printing technology. Deeply grateful to the print, Luther said, "Printing is the ultimate gift of God and the greatest one."
68. (1) After the Forest Act was enacted in 1865, it was amended twice, once in 1878 and then in 1927. The 1878 Act divided forests into three categories reserved, protected and village forests.
69. (4) In 1933 Hitler said: 'In my state the mother is the most important citizen.' Children in Nazi Germany were repeatedly told that women were radically different from men. The fight for equal rights for men and women that had become part of democratic struggles everywhere was wrong and it would destroy society. While boys were taught to be aggressive, masculine and steel hearted, girls were told that they had to become good mothers and rear pure-blooded Aryan children.
70. (4) This history of gymkhana cricket led to first-class cricket being organised on communal and racial lines. 'The Hindus' brilliant victory was due more to the judicious and bold step of the Hindu Gymkhana in appointing Mr Vithal, brother of Mr Baloo - premier bowler of India - who is a member of the Untouchable Class to captain the Hindu team. The moral that can be safely drawn from the Hindus' magnificent victory is that removal of Untouchability would lead to swaraj - which is the prophecy of the Mahatma.'
71. (2) Ambedkar established the Depressed Classes Association in August 1930. Gandhiji began the Civil Disobedience movement in March 1930 and ended in March 1931. In December 1929, Lahore congress adopts the demands for 'Purna Swaraj'.
72. (2) Both statements are correct. The Act of union 1707, led the formation of the United Kingdom of Great Britain.
73. (4) Both statements are true. Traders and travellers introduced new crops to the land they travelled and Noodles most likely travelled from China through Arab traders to Sicily.
74. (3) According to Gandhi ji, without seeking vengeance or being aggressive, a Satyagrahi could win the battle through non-violence. This could be done by appealing to the conscience of the oppressor.
75. (4) Both statements are true
On 6th April Gandhi ji and his followers reached Dandi, and ceremonially violated the law, manufacturing salt by boiling sea water. This marked the beginning of the Civil Disobedience movement.
76. (3) In India, Coal is the most abundantly available fossil fuel. It is formed due to compression of plant material over millions of years.
77. (2) From Gujarat to Arunachal Pradesh there is a time lag of two hours. Hence, time along the Standard Meridian of India (82°30'E) passing through Mirzapur (in Uttar Pradesh) is taken as the standard time for the whole country. The latitudinal extent influences the duration of the day and night, as one moves from south to north
78. (1) Long coastline of 7516.6 km, India is dotted with 12 major and 181 medium and minor ports.
79. (4) The age composition of a population refers to the number of people in different age groups in a country. According to 2001, The age composition of India is :
Adults - 58.7%
Aged - 6.9%
Children - 34.4%
80. (2) During winter season, the northeast trade winds prevail over the country. They blow from land to sea and hence, for most part of the country, it is a dry season. Some amount of rainfall occurs on the Tamil Nadu coast from these winds as, here they blow from sea to land.
81. (4) The four major ports of India lie on the golden Quadrilateral is Kolkata, Mumbai, Vishakhapatnam and Chennai.
82. (3) Tuticorin in Tamil Nadu port has a natural harbour and rich hinterland.
83. (4) India's population has been steadily increasing from 361 million in 1951 to 1028 million in 2001. In 1951 the annual growth rate was 1.25% ,in 1981 it was 2.22% and in 2001 it was 1.93% Hence option 4 is correct.
84. (1) In mountainous area, the decrease in temperature with increasing altitude leads to the corresponding change in natural vegetation.
85. (1) Contour plowing (or contour ploughing) or contour farming is the farming practice of ploughing across a slope following its elevation contour lines. The rows form slow water run-off during rainstorms to prevent soil erosion and allow the water time to settle into the soil.
Strip cropping is a method of farming used when a slope is too steep or too long, or otherwise, when one does not have an alternative method of preventing soil erosion.

86. (1) The Tropic of cancer passes through the middle of the country. Almost half of the country lying south of the Tropic of cancer, belongs to the Tropical area. The Himalayas prevent the cold winds from Central Asia from entering the subcontinent. It is because of these mountains that this subcontinent experiences comparatively milder winters as compared to central Asia. Hence Indian Climate is tropical in nature.
87. (3) This line shows the water divide between east and west flowing rivers.
88. (4) Chotanagpur Plateau marks the further eastward extension drained by the Domodar river.
89. (1) Sex ratio is defined as the number of females per 1000 males in the population. According to 2001, the sex ratio is 933.
90. (3) The pilot has reached at 70°N.
91. (4) Federalism is a system of government in which the power is divided between central authority and various constituent units of the country.
92. (2) According to Indian Constitution, All people are equal before the law and free to chose any religion.
93. (4) According to B.R. Ambedkar, Right to Constitutional Remedies is the "Heart and Soul" of our Constitution.
94. (1) Democracy is better form of government because, it is more accountable form of government and it enhances the dignity of citizens.
95. (2) In 73rd Amendment Act, at least one third of seats in Local Self Government are reserved for women because women constitute nearly half of the population.
96. (2) Low illiteracy level shows the category of developed country.
97. (4) In Indian economy between 1973 and 2003, the sectorial share of agriculture in output has decreased for more than its share in total employment.
98. (3) The U.S multinational Google opens it fully fledged unit at Gurgaon, Haryana is the example of foreign direct investment.
99. (2) We accept paper money as a medium of exchange because the law legalizes it. It is the currency authorized by the government of the country.
100. (3) World Trade Organisation (WTO) is an organisation whose aim is to liberalise international trade. It is not involved in domestic trade