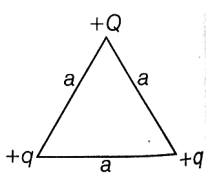



SAMPLE PAPER - 92

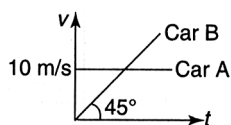
Time : 1 : 15 Hr.

Question : 60

PHYSICS

01. The electric potential inside a conducting sphere
 (1) increases from centre to surface
 (2) decreases from centre of surface
 (3) remains constant from centre to surface
 (4) is zero at every point inside
02. The work done in bringing a unit positive charge from infinity distance to a point at distance X from a positive charge Q is W. When the potential ϕ at that point is
 (1) $\frac{WQ}{X}$ (2) W (3) $\frac{W}{Q}$ (4) WQ
03. The charge q is projected into a uniform electric field E, work done when it moves a distance y is
 (1) qEy (2) $\frac{qy}{E}$ (3) $\frac{qE}{y}$ (4) $\frac{y}{qE}$
04. Three charges are placed at the vertex of an equilateral triangle as shown in figure. For what value of Q, the electrostatic potential energy of the system is zero?
- 
- (1) -q (2) q/2
 (3) -2q (4) -q/2
05. If a positive charge is shifted from a low potential region to a high potential region, then electric potential energy
 (1) decreases (2) increases
 (3) remains same (4) may increase or decrease
06. A spherical drop of capacitance $1 \mu\text{F}$ is broken into eight drops of equal radius. Then, the capacitance of each small drop is
 (1) $\frac{1}{2} \mu\text{F}$ (2) $\frac{1}{4} \mu\text{F}$ (3) $\frac{1}{8} \mu\text{F}$ (4) $8 \mu\text{F}$
07. A boy releases a ball from the top of a building. it will clear a window 2 m high at a distance 10 m below the top in nearly
 (1) 1.3 s (2) 1 s (3) 0.13 s (4) 0.6 s
08. A particle located at $x = 0$ at time $t = 0$, starts moving along the positive x-direction with a velocity v that varies as $v = \alpha\sqrt{x}$. The displacement of the particle varies with time as
 (1) t^3 (2) t^2 (3) t (4) $t^{1/2}$
09. Two boys are standing at the ends A and B of a ground, where $AB = a$. The boy at B starts running in a direction perpendicular to AB with velocity v_1 . The boy at A starts running simultaneously with constant velocity v and catches the other boy in a time t, where t is :
 (1) $\frac{a}{\sqrt{v^2 + v_1^2}}$ (2) $\sqrt{\frac{a^2}{v^2 - v_1^2}}$
 (3) $\frac{a}{(v - v_1)}$ (4) $\frac{a}{(v + v_1)}$
10. A ball released from the top of a tower travels $\frac{11}{36}$ of the height of the tower in the last second of its journey. The height of the tower is
 (Take $g = 10 \text{ m s}^{-2}$)
 (1) 11 m (2) 36 m (3) 47 m (4) 180 m
11. A particle moving in a straight line covers half the distance with speed of 3 m/s. The other half of the distance is covered in two equal time intervals with speed of 4.5 m/s and 7.5 m/s respectively. The average speed of the particle during this motion is :
 (1) 4.0 m/s (2) 5.0 m/s (3) 5.5 m/s (4) 4.8 m/s
12. A particle starting from rest has a constant acceleration of 4 m/s^2 for 4 seconds. It then retards uniformly for next 8 seconds and comes to rest. Average acceleration during the motion of the particle is
 (1) 4 m/s^2 (2) zero (3) 8 m/s^2 (4) -4 m/s^2

13. Initially car A is 10.5 m ahead of car B. Both start moving at time $t = 0$ in the same direction along a straight line. The velocity-time graph of two cars is shown in figure. The time when the car B will catch the car A, will be



- (1) $t = 21$ sec (2) $t = 2\sqrt{5}$ sec
 (3) 20 sec (4) none
14. An object moving with a speed of 6.25 m/s, is decelerated at a rate given by :

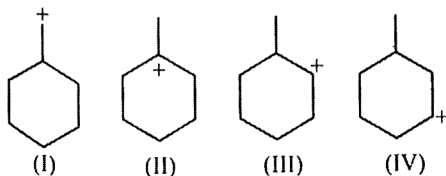
$$\frac{dv}{dt} = -2.5\sqrt{v};$$

where v is instantaneous speed. The time taken by the object, to come to rest, would be :

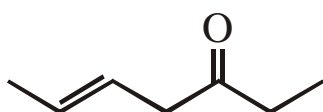
- (1) 1 s (2) 2 s
 (3) 4 s (4) 8 s
15. A projectile is given an initial velocity of $\hat{i} + 2\hat{j}$. The Cartesian equation of its path is : ($g = 10 \text{ m/s}^2$)
- (1) $y = 2x - 5x^2$ (2) $y = x - 5x^2$
 (3) $4y = 2x - 5x^2$ (4) $y = 2x - 25x^2$

CHEMISTRY

16. Correct order of basic strength of different methyl amines in gaseous state:
- (1) $(\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_3\text{N} > \text{NH}_3$
 (2) $(\text{CH}_3)_3\text{N} > (\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > \text{NH}_3$
 (3) $(\text{CH}_3)_2\text{NH} > (\text{CH}_3)_3\text{N} > \text{CH}_3\text{NH}_2 > \text{NH}_3$
 (4) $(\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > \text{NH}_3 > (\text{CH}_3)_3\text{N}$
17. The stability order of the following carbocations is:

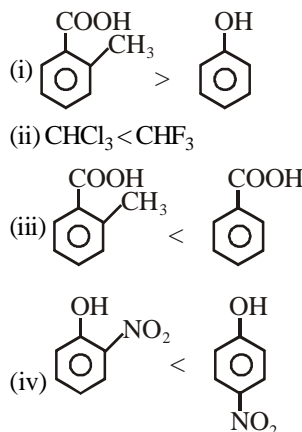


- (1) $\text{I} > \text{II} > \text{III} > \text{IV}$ (2) $\text{II} > \text{IV} > \text{III} > \text{I}$
 (3) $\text{IV} > \text{III} > \text{II} > \text{I}$ (4) $\text{II} > \text{III} > \text{I} > \text{IV}$
18. The C4 - C5 carbon-carbon bond in the following molecule results from the overlap of which orbitals (in the order C4 - C5)?



- (1) $sp-sp^2$ (2) $sp-sp^3$ (3) sp^2-sp^2 (4) sp^3-sp^2

19. Which of the following is correct order of acidic strength :-



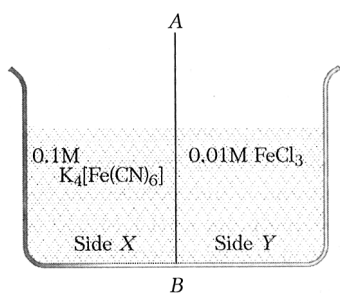
- (1) (i) & (iv) (2) (i), (iii) & (iv)
 (3) (i) & (iii) (4) (i), (ii), (iii) & (iv)

20. Wrong statement about ?

- (1) It has two chiral centers
 (2) It will have one meso-stereoisomer
 (3) Out of all possible stereo isomers it will have two optically active stereo isomers.
 (4) It will have all chiral stereoisomers its all stereoisomers will be chiral

21. van't Hoff factors are x, y, z in the case of association, dissociation and no change respectively. Increasing order is
- (1) $x < y < z$ (2) $x = y = z$
 (3) $y < x < z$ (4) $x < z < y$
22. Mole fraction of vapours A above the solution in the mixture of A and B ($\chi_A = 0.4$) will be ($p_A^\circ = 100 \text{ mm}$, $p_B^\circ = 200 \text{ mm}$)
- (1) 0.4 (2) 0.8
 (3) 0.25 (4) None of these
23. The relationship between osmotic pressure at 273 K when 10 g glucose (p_1), 10 g urea (p_2) and 10g sucrose (p_3) are dissolved in 240 mL of water is
- (1) $p_1 > p_2 > p_3$ (2) $p_3 > p_1 > p_2$
 (3) $p_2 > p_1 > p_3$ (4) $p_2 > p_3 > p_1$
24. We have three aqueous solutions of NaCl labelled as A, B and C with concentrations 0.1 M, 0.01 M and 0.001 M, respectively. The value of van't Hoff factor for these solutions will be in the order.....
- (1) $i_A < i_B < i_C$ (2) $i_A > i_B > i_C$
 (3) $i_A = i_B = i_C$ (4) $i_A < i_B > i_C$

25. FeCl_3 on reaction with $\text{K}_4[\text{Fe}(\text{CN})_6]$ in aqueous solution gives blue colour. These are separated by a semi permeable membrane AB as shown.



Due to osmosis there is

- (1) blue colour formation in side X
- (2) blue colour formation in side Y
- (3) blue colour formation in both of the sides X and Y
- (4) no blue colour formation

26. Determine correct matching between column-I & Column-II

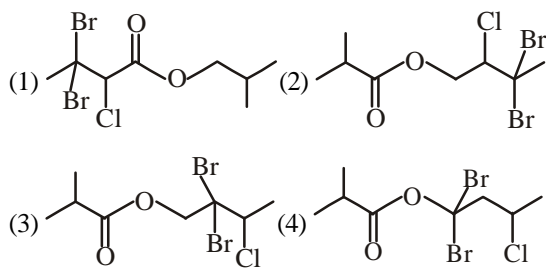
Column-I	Column-II
A. Element Z = 71	p - group 16, period-7
B. Element Z = 116	q - p-block, group-13
C. Element - He	r - s - block
D. Element Z = 49	s - f-block

(1) A-s, B- p, C - r, D - q (2) A-s, B- q, C - r, D - p
 (3) A-p, B- q, C - r, D - s (4) A-p, B- r, C - q, D - s

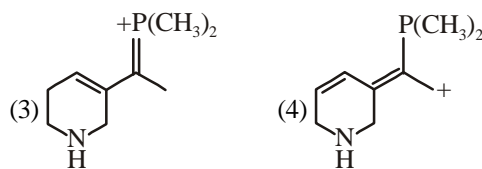
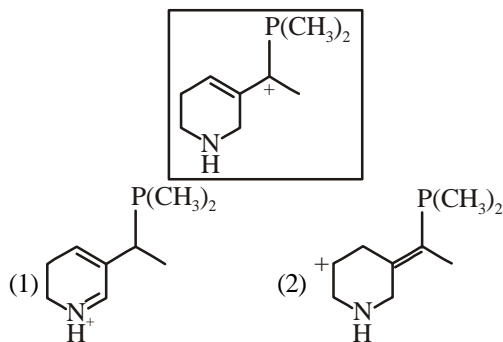
27. Consider the isoelectronic species, Na^+ , Mg^{2+} , F^- and O^{2-} . The correct order of increasing length of their radii is _____.

- (1) $\text{F}^- < \text{O}^{2-} < \text{Mg}^{2+} < \text{Na}^+$
- (2) $\text{Mg}^{2+} < \text{Na}^+ < \text{F}^- < \text{O}^{2-}$
- (3) $\text{O}^{2-} < \text{F}^- < \text{Na}^+ < \text{Mg}^{2+}$
- (4) $\text{O}^{2-} < \text{F}^- < \text{Mg}^{2+} < \text{Na}^+$

28. Which of the following is correct structure of 3, 3-dibromo-2-chlorobutyl 2-methyl propanoate?



29. Which of the following species is a resonance form of the species in the box?



30. Which of the following compounds will show geometrical isomerism?

- (1) Propene
- (2) 2-Methyl-2-butene
- (3) 1-Phenylpropene
- (4) 2-Butyne

BOTANY

31. Which of the following options is true for a secretory cell?

- (1) Golgi apparatus is absent
- (2) RER is easily observed in the cell
- (3) Only SER is present
- (4) Secretory granules are formed in nucleus

32. What is a tonoplast ?

- (1) Outer membrane of mitochondria
- (2) Inner membrane of chloroplast
- (3) Membrane boundary of the vacuole of plant cells
- (4) Cell membrane of a plant cell

33. A bivalent of meiosis-I consists of:

- (1) Two chromatids and one centromere
- (2) Two chromatids and two centromeres
- (3) Four chromatids and two centromeres
- (4) Four chromatids and four centromeres

34. If the initial amount of DNA is denoted as 2C then the amount of DNA after S-phase will be:

- (1) 4C
- (2) 6C
- (3) C
- (4) 2C

35. How many of the following properties are related to lysosomes?

- Membrane bound vesicular structure, hydrolases, basic pH, formed in the RER, capable of digesting nucleic acids.
- (1) Two
 - (2) Three
 - (3) Four
 - (4) Five

36. One single maize root apical meristem can give rise to how many new cells per hour ?

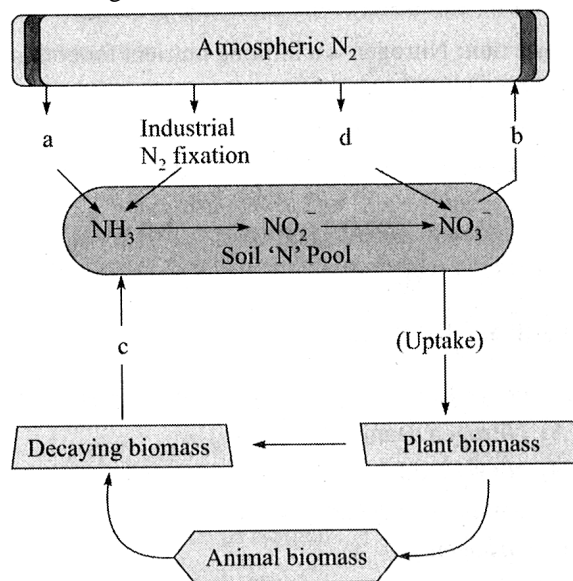
- (1) 17500
- (2) >17500
- (3) <17500
- (4) None of these

37. Select the correct sequence of electron transfer in Z-scheme of light reaction.

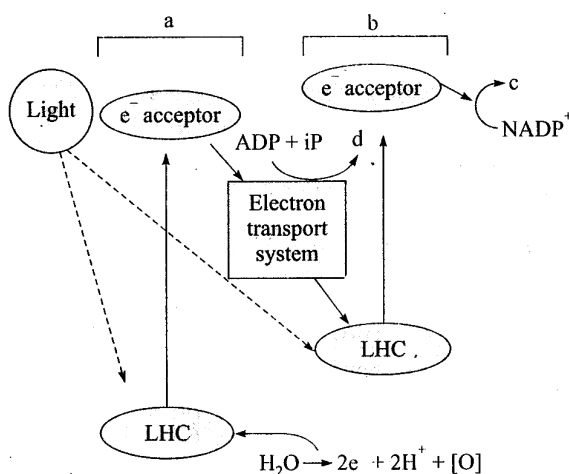
- (1) e^- Acceptor \rightarrow ETS (made of cytochrome) \rightarrow PS II \rightarrow NADP $^+$ \rightarrow PS I \rightarrow e^- Acceptor
- (2) PS II \rightarrow e^- Acceptor \rightarrow ETS (made of cytochrome) \rightarrow PS I \rightarrow e^- Acceptor \rightarrow NADP $^+$
- (3) ETS (made of cytochrome) \rightarrow PS I \rightarrow e^- Acceptor \rightarrow PS II \rightarrow e^- Acceptor \rightarrow NADP $^+$
- (4) e^- Acceptor \rightarrow PS I \rightarrow PS II \rightarrow e^- Acceptor \rightarrow ETS (made of cytochrome) \rightarrow NADP $^+$

38. Fill in the blanks:
- ATP synthase consists of two major components, F_0 and F_1 . Thea.... headpiece is peripheral membrane protein complex and contains the site for synthesis of ATP from ADP and inorganic phosphate.
 -b.... is an integral membrane protein complex that forms the channel through which proton crosses the membrane.
 - For each ATP produced,c..... passes throughb.... from thed.... to thee.... down the electrochemical proton gradient.
- a- F_0 , b- F_1 , c- $2H^+$, d-matrix, e-inner membrane
 - a- F_1 , b- F_0 , c- $2H^+$, d-intermembrane space, e-matrix
 - a- F_0 , b- F_1 , c- $2H^+$, d-intermembrane space, e-matrix
 - a- F_1 , d- F_0 , c- $2H^+$, d-matrix e-intermembrane space
39. Read the following statements and find out the incorrect statements.
- Water is essential for all physiological activities of the plant and plays a very important role in all living organisms
 - A mature corn plant absorbs almost five litres of water in a day
 - A mustard plant absorbs water equal to its own weight in about 3 hours
 - Water is often the limiting factor for plant growth and productivity in both agricultural and natural environments
 - A watermelon has over 92 percent water, most herbaceous plants have only about 10 to 20 percent of its fresh weight as dry matter
- b, c, e
 - a, b, d
 - a, c, e
 - b, c, d
40. Action spectrum of photosynthesis resembles roughly the
- Absorption spectrum of chlorophyll *a*
 - Absorption spectrum of chlorophyll *b*
 - Absorption spectrum of chlorophyll *c*
 - Absorption spectrum of chlorophyll *a* and *b*
41. In a diploid cell, there are 14 chromosomes and the DNA content is $2C$ after M-phase what would have been the number of chromosomes and amount of DNA at G_1 , after S and G_2 phase respectively?
- No. of chromosomes-14, 14, 14; Amount of DNA- $2C$, $4C$, $4C$
 - No. of chromosomes-14, 28, 28; Amount of DNA- $2C$, $2C$, $4C$
 - No. of chromosomes-14, 14, 28; Amount of DNA- $4C$, $4C$, $4C$
 - No. of chromosomes-28, 14, 14; Amount of DNA- $4C$, $2C$, $2C$
42. Arrangement of microtubules in a flagellum and a centriole is respectively
- $9 + 2$ and $9 + 1$
 - $9 + 1$ and $9 + 0$
 - $9 + 0$ and $9 + 2$
 - $9 + 2$ and $9 + 0$

43. Study the figure shown below and select the option which gives correct words for all the blanks

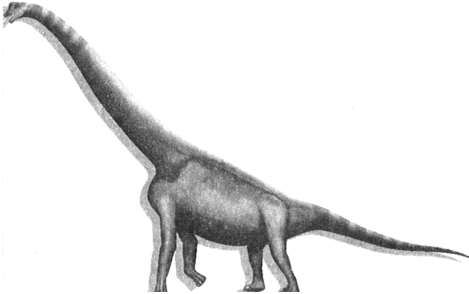


- a-Biological N_2 - fixation, b- Denitrification, c- Ammonification, d-Electrical N_2 - fixation
 - a-Ammonification, b- Biological N_2 - fixation, c- Electrical N_2 - fixation, d- Denitrification
 - a-Biological N_2 - fixation, b-Electrical N_2 - fixation, c- Denitrification, d-Ammonification
 - a-Biological N_2 - fixation, b- Ammonification, c- Denitrification, d-Electrical N_2 - fixation
44. Which of the following pairs of bacteria are involved in two step conversion of NH_3 into nitrate ?
- Azotobacter* and *Nitrosomonas* respectively
 - Nitrosomonas* and *Nitrobacter* respectively
 - Azotobacter* and *Nitrobacter* respectively
 - Pseudomonas* and *Nitrobacter* respectively
45. Recognise the figure and find out the. correct matching.



- a-PS I, b-PS II, c-ATP, d-NA DH
- a-PS II, b-PS I, c-NADPH, d-ATP
- a-PS I, b-PS II, c-NADPH, d-ATP
- a-PS II, b-PS I, c-ATP, d-NA DH

ZOOLOGY

46. Inheritance of blood group is a condition of
1. Codominance
2. Incomplete dominance
3. Multiple allelism
4. Multiple gene
5. Dominance
(1) 1, 2, 3 (2) 2, 4, 5
(3) 2, 3, 4 (4) 1, 3, 5
47. In a medico legal case of accidental interchange between two babies in hospital, the baby of the blood group A could not be rightly given to a couple with
(1) Husband of 'B' group and wife of 'O' group
(2) Husband of 'A' group and wife of 'B' group
(3) Husband of 'O' group and wife of 'AB' group
(4) Husband of 'AB' group and wife of 'A' group
48. A child suffers from erythroblastosis foetalis if
(1) mother is Rh⁺, father is Rh⁻
(2) mother is Rh⁻, father is Rh⁺
(3) both are Rh⁻
(4) both are Rh⁺
49. Growth factors are
(1) Secreted by non-endocrine tissues
(2) Not essential for repairing or regeneration
(3) Secreted by endocrine tissues
(4) Secreted by juxtaglomerular cells
50. The function of thyrocalcitonin is
(1) Lowers Ca²⁺ level in blood
(2) Elevates K⁺ level in blood
(3) Elevates Ca²⁺ level in blood
(4) None of the above
51. Earth was formed _____ billion years back.
(1) 4.5 (2) 5.5 (3) 3.5 (4) 1.5
52. The fitness referred to in Darwin's theory is
(1) Physical fitness
(2) Mental fitness
(3) Reproductive fitness
(4) All of these
53. Life came from outer space, this theory is called
(1) Spore theory
(2) Naturalistic theory
(3) Special creation theory
(4) Spontaneous generation
54. The aves have additional chamber in digestive tract, where.....is for food storage and is for food grinding
(1) Crop, gizzard (2) Gizzard, crop
(3) Crop, pharynx (4) Pharynx, gizzard
55. What does this diagram show?

(1) Brachiosaurus (2) Stegosaurus
(3) Triceratops (4) Tyrannosaurus
56. Which of the following shows convergent evolution?
(1) Mouse and Marsupial mouse
(2) Bobcat and Spotted cuscus
(3) Anteater and Marsupial mole
(4) Lemur and Tasmanian wolf
57. The organs of different species that are related to each other through common descent through becomes functionally different are called
(1) Vestigial (2) Analogous
(3) Homologous (4) None of these
58. % weight of few elements in human body are given. Identify the incorrect information.
(1) Hydrogen - 3.5
(2) Carbon - 18.5
(3) Oxygen - 65.0
(4) Sulphur - 0.3
59. Arachidonic acid has how many carbon atoms?
(1) 16 (2) 15 (3) 20 (4) 21
60. Class name is 'Cyclostomata' means
(1) Marine but reproduction takes place in fresh water
(2) Mouth is circular and suctorial
(3) Ectoparasite of fishes
(4) Jaws are absent