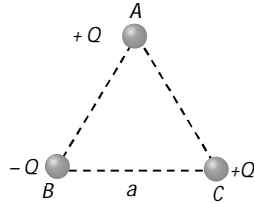


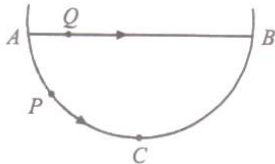
Physics

Q.1 Three charges are placed at the vertices of an equilateral triangle of side 'a' as shown in the following figure. The force experienced by the charge placed at the vertex A in a direction normal to BC is

- (a) $Q^2 / (4\pi\epsilon_0 a^2)$
- (b) $-Q^2 / (4\pi\epsilon_0 a^2)$
- (c) Zero
- (d) $Q^2 / (2\pi\epsilon_0 a^2)$



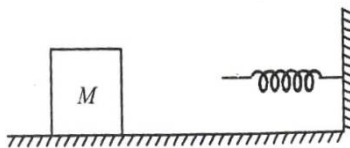
Q.2 A particle P is sliding down a frictionless hemispherical bowl. It passes the point A at $t = 0$. At this instant of time, the horizontal components of its velocity is v . A bead Q of the same mass as P is ejected from A at $t = 0$ along the horizontal string AB, with speed v . Friction between the bead and the string may be neglected. Let t_p and t_Q be the respective times taken by P and Q to reach the point B. Then



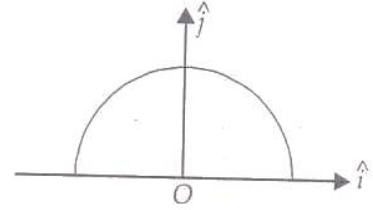
- (A) $t_p < t_Q$
- (B) $t_p = t_Q$
- (C) $t_p > t_Q$
- (D) $\frac{t_p}{t_Q} = \frac{\text{Length of arc ACB}}{\text{Length of chord AB}}$

Q.3 The block of mass M moving on the frictionless horizontal surface collides with the spring of spring constant K and compresses it by length L. The maximum momentum of the block after collision is

- (A) Zero
- (B) $\frac{ML^2}{K}$
- (C) $\sqrt{MK} L$
- (D) $\frac{KL^2}{2M}$

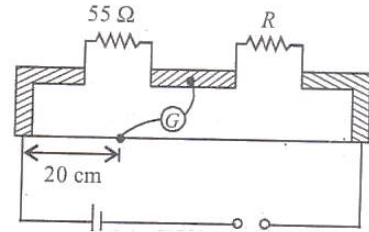


Q.4 A thin semi-circular ring of radius r has a positive charge q distributed uniformly over it. The net field \vec{E} at the centre O is



- (A) $\frac{q}{2\pi^2\epsilon_0 r^2} \hat{j}$
- (B) $\frac{q}{4\pi^2\epsilon_0 r^2} \hat{j}$
- (C) $-\frac{q}{4\pi^2\epsilon_0 r^2} \hat{j}$
- (D) $-\frac{q}{2\pi^2\epsilon_0 r^2} \hat{j}$

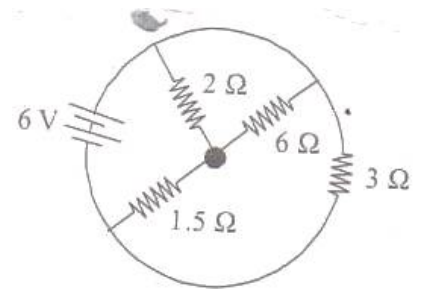
Q.5 Shown in the figure below is a meter-bridge set up with null deflection in the galvanometer. The value of the unknown resistance R is



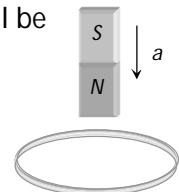
- (A) 55Ω
- (B) 13.75Ω
- (C) 220Ω
- (D) 110Ω

Q.6 The total current supplied to the circuit by the battery is

- (A) 1A
- (B) 2A
- (C) 4A
- (D) 6A



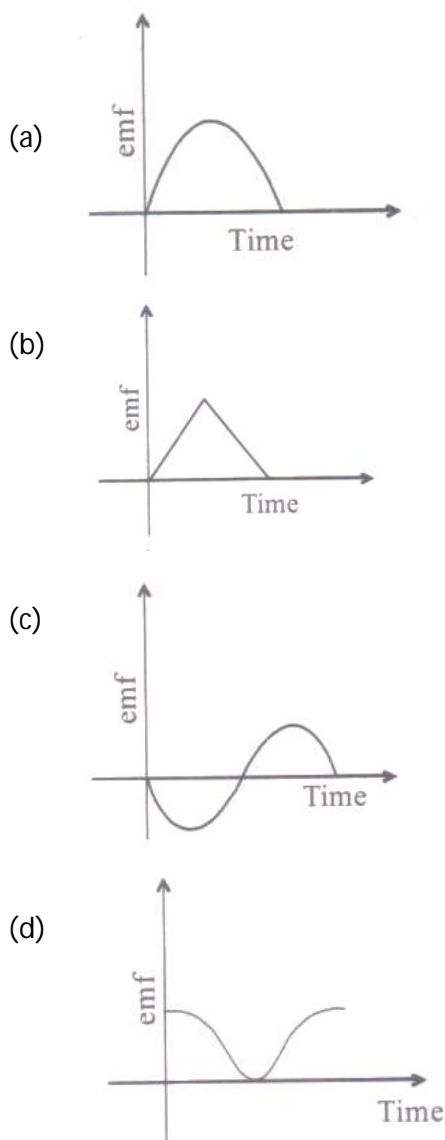
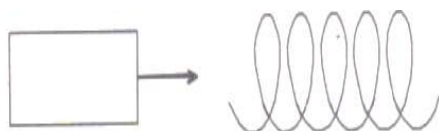
Q.7 A metallic ring is attached with the wall of a room. When the north pole of a magnet is brought near to it, the induced current in the ring will be



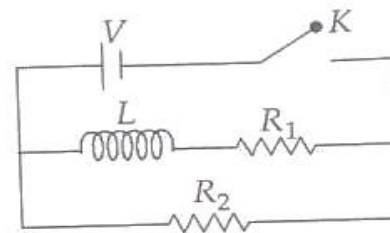
- (a) First clockwise then anticlockwise
- (b) In clockwise direction
- (c) In anticlockwise direction
- (d) First anticlockwise then clockwise

Q.8 The material suitable for making electromagnets should have
 (A) High retentivity and high coercivity
 (B) Low retentivity and low coercivity
 (C) High retentivity and low coercivity
 (D) Low retentivity and high coercivity

Q.9 A small bar magnet is being slowly inserted with constant velocity inside a solenoid as shown in figure. Which graph best represent the relationship between emf induced with time?



Q.10 In the circuit shown below, the key K is closed at $t = 0$. The current through the battery is



- (A) $\frac{V(R_1+R_2)}{R_1R_2}$ at $t = 0$ and $\frac{V}{R_2}$ at $t = \infty$
- (B) $\frac{VR_1R_2}{\sqrt{R_1^2+R_2^2}}$ at $t = 0$ and $\frac{V}{R_2}$ at $t = \infty$
- (C) $\frac{V}{R_2}$ at $t = 0$ and $\frac{V(R_1+R_2)}{R_1R_2}$ at $t = \infty$
- (D) $\frac{V}{R_2}$ at $t = 0$ and $\frac{VR_1R_2}{\sqrt{R_1^2+R_2^2}}$ at $t = \infty$

ANSWER KEY:-

- 1.(C) 2.(A) 3.(C) 4.(D) 5.(C) 6.(C)
 7.(C) 8.(B) 9.(C) 10.(C)

chemistry

Q.11 If the bond enthalpy of O_2 , N_2 and H_2 are 498 KJ mol^{-1} , 946 KJ mol^{-1} and $435.8 \text{ KJ mol}^{-1}$ respectively. Choose the correct order of decreasing bond strength.

- (a) $H_2 > N_2 > O_2$
- (b) $N_2 > O_2 > H_2$
- (c) $O_2 > H_2 > N_2$
- (d) $H_2 > O_2 > N_2$

Q.12 At 25°C and 760 mm of Hg pressure a gas occupies 600 mL volume. What will be its pressure at a height where temperature is 10°C had volume of the gas is 640 mL?

- (a) 677 mm Hg
- (b) 600 mm Hg
- (c) 700 mm Hg
- (d) 752 mm Hg

Q.13 The total number of equilateral triangle faces in an truncated tetrahedron is (truncated along all corners):

- (a) 0
- (b) 4
- (c) 6
- (d) 1

- Q.14 18 g of glucose ($C_6H_{12}O_6$) is added to 178.2 g water. The vapour pressure of water (in torr) for this aqueous solution is
- (a) 76.0
(b) 752.4
(c) 759.0
(d) 7.6

- Q.15 A hydrogen gas electrode is made by dipping platinum wire in a solution of HCl and pH=10 and by passing hydrogen gas around the platinum wire at 1 atm pressure. The oxidation potential of electrode would be
- (a) 0.059 V
(b) 0.59 V
(c) 0.118 V
(d) 0.18 V

- Q.16 Select the statement which is not true?
- (a) A colloid is a heterogeneous system
(b) The substance which is depressed in another substance is called dispersed phase
(c) Depending upon the shape of particles, solution may be true solution or colloid or suspension
(d) The dispersed phase of colloid may contain a single macromolecules or an aggregate of many atom, ions or molecule.

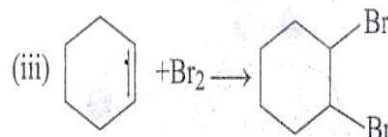
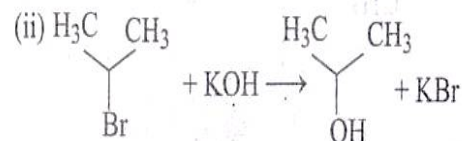
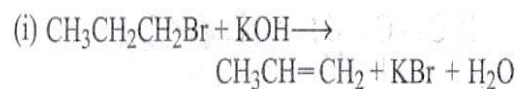
- Q.17 Match items of Column I with the item of Column II and assign the correct code

Column I	Column II
A. Cyanide process	1. Ultrapure Ge
B. Froth floatation process	2. Dressing of ZnS
C. Electrolytic reduction	3. Extraction of Al
D. Zone refining	4. Extraction of Au
	5. Purification of Ni

Codes

	A	B	C	D
(a)	4	2	3	1
(b)	2	3	1	5
(c)	1	2	3	4
(d)	3	4	5	1

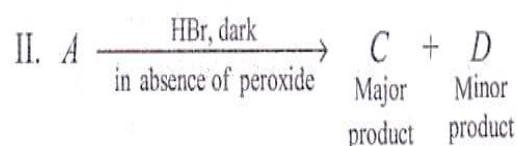
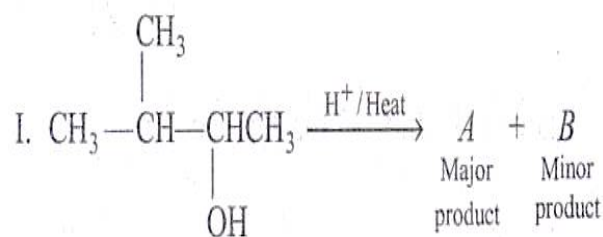
- Q.18 For the following reactions:



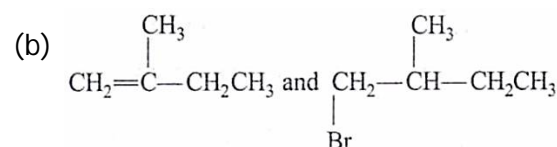
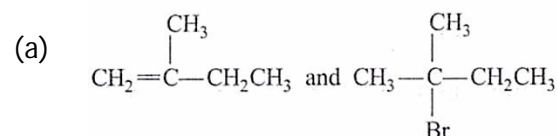
Which of the following statement is correct?

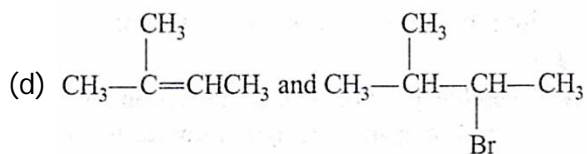
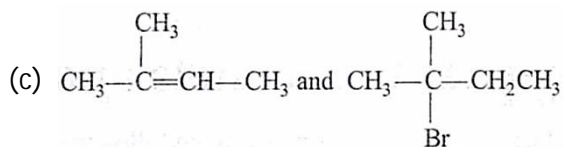
- (a) (i) is elimination reaction (ii) is substitution and (iii) is addition reaction
(b) (i) is elimination, (ii) and (iii) are substitution reactions
(c) (i) is substitutions, (ii) and (iii) are addition reactions
(d) (i) and (ii) are elimination reactions and (iii) is addition reaction

- Q.19 In the following reactions:



The major products (A) and (C) are, respectively





Q.20 When the temperature rises, what happens to the peak of the curve in the Maxwell-Boltzmann distribution graph?

- (a) Shifts forward and upward
- (b) Shifts forward and downward
- (c) Shifts backwards and upward
- (d) Shifts backwards and downward

ANSWER KEY:-

- 11.(B) 12.(A) 13.(B) 14.(B)
15.(B) 16.(B) 17.(A) 18.(A)
19.(C) 20.(B)

biology

Q.21 Read the following statements and find out the incorrect statement.

- a. In majority of organisms, male gamete is motile and female gamete is non-motile (stationary).
- b. In algae and fungi, both male and female gametes are non-motile.
- c. In seed plants, pollen grains are the carrier of male gametes and ovule has the egg.
- d. In dioecious plants, pollination facilitates transfer of pollen grains to the stigma.
- e. In monoecious animals, since male and female gametes are formed in different individuals, the organism must evolve special mechanism for gamete transfer.

- (A) b and e
- (B) a and d
- (C) b and c
- (D) c and e

Q.22 Number of male gametes formed by 16 microspore mother cell is

- (a) 128
- (b) 64
- (c) 32
- (d) 16

Q.23 Which of the following approaches does not give the defined action of contraceptive?

- (a) Hormonal contraceptives – prevent/retard entry of sperms, prevent ovulation and fertilization
- (b) Vasectomy – prevents spermatogenesis
- (c) Barrier methods – increase phagocytosis of sperms, suppress sperm motility and fertilizing capacity of sperms
- (d) Intra uterine devices – increase phagocytosis of sperms motility and fertilizing capacity of sperms.

Q.24 Match the columns.

Column I	Column II
a. Monoploidy	1. $2n - 1$
b. Monosomy	2. $2n + 1$
c. Nullisomy	3. $2n + 2$
d. Trisomy	4. $2n - 2$
e. Tetrasomy	5. n

- (A) a- 1, b- 5, c- 3, d- 4, e- 2
- (B) a- 5, b- 2, c- 4, d- 1, e- 3
- (C) a- 5, b- 1, c- 4, d- 2, e- 3
- (D) a- 1, b- 5, c- 3, d- 2, e- 4.

Q.25 If the length of E. coli DNA is 1.36 mm, then how many base pairs are present in E. coli?

- (a) 3.6×10^4
- (b) 3.6×10^6
- (c) 4.0×10^6
- (d) 4.6×10^6 .

Q.26 Number of codons coding GGG is

- (a) 6
- (b) 4
- (c) 2
- (d) 1

Q.27 Match the column I and II, and choose the correct combination from the options given.

Characteristic	Crop/ Variety
(i) Protein content and quality	(a) Maize
(ii) Vitamin content	(b) Carrots
(iii) Micronutrient content	(c) Spinach
(iv) Amino acid content	(d) Atlas- 60

- (a) (i) -d, (ii) - b, (iii) - c, (iv) -a,
- (b) (i)- d, (ii)- b, (iii)- a, (iv)- c

- (c) (i) – c, (ii)- a, (iii) – b, (iv) – d
 (d) (i) – d, (ii), (iii)-c, (iv) – a.

Q.28 In a hardy Weinberg population, homozygous recessive are 9% of total population than what will be % value of homozygous dominant and heterozygous respectively
 (a) 49%, 42%
 (b) 81%, 10%
 (c) 42%, 10%
 (d) 16%, 36%.

Q.29 Foramen ovale-
 (a) Connects the 2 atria in foetal heart
 (b) Connects pulmonary trunk and aorta in foetus heart
 (c) Is a condition in which heart valves do not completely close
 (d) Is a shallow depression on the inter at real Septum

Q.30 Select the correct sequence of events takes place during muscle contraction.
 (a) ATP hydrolysis → Sliding → cross bridge formation → breaking of cross bridge
 (b) ATP Hydrolysis → Cross bridge formation → Power stroke → breaking of cross bridge
 (c) ATP Binding to ATP – Binding site → Breaking of cross bridge → sliding → ATP hydrolysis
 (d) ATP hydrolysis → Rotation of head → Calcium released from L- tubules → Breakage of cross bridge.

ANSWER KEY:-

- 21.(A) 22.(D) 23.(D) 24.(C) 25.(C)
 26.(C) 27.(A) 28.(A) 29.(A) 30.(B)

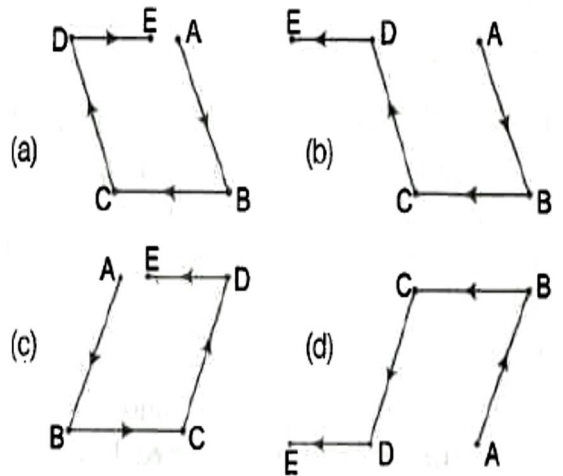
Mental ability

Q.31 If 'FULFNHW' is the code for 'CRICKET', then 'EULGH' is the code for which word?
 (a) PRIDE
 (b) BRIDE
 (c) BLADE
 (d) BLIND.

Q.32 A man travels 4 km due North, then travels 6 km due East and further travels 4 km due North. How far he is from the starting point?

- (a) 6 km
 (b) 14 km
 (c) 8 km
 (d) 10 km.

Q.33 Career Academy MBBS Topper Shivani starts from A and walks towards South – East to B. She turns West and walks to C. Then, she turns North- West and walks to D. Finally, she turns East and walks to E. Which of the answer exactly shows the path Shivani traced?



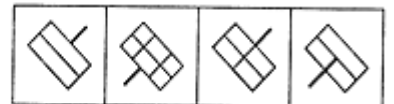
Q.34 You are given a figure (x) following by four (a), (b), (c) and (d) such that (x) is embedded in one of them. Trace out the correct alternative.

Problem Figure



(X)

Answer Figures



(a)

(b)

(c)

(d)

Q.35 If + means ×, – means ÷, × means + and ÷ means –, then $10 \times 18 - 9 + 3 \div 1$ is equal to
 (a) 16
 (b) 15
 (c) 17
 (d) 18.

Q.36 P, Q, R, S, T, U and V are seven members of a family of four adults and three children, two of whom, U and V are girls.

P and S are brothers and Q is a doctor. T is an engineer married to one of the brothers and has two children. Q is married to S and V is their child. Who is R?

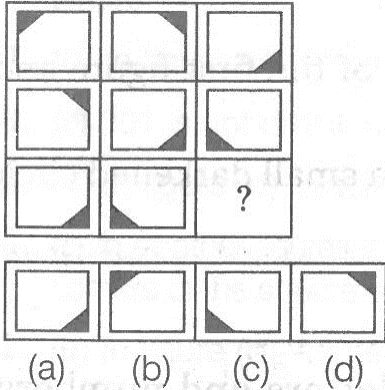
- (a) P's son
- (b) T's daughter
- (c) U's father
- (d) V's brother

- (c) 5
- (d) 4

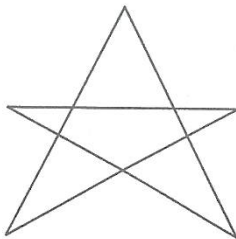
ANSWER KEY:-

- 31.(B) 32.(D) 33.(A) 34.(C) 35.(B)
36.(A) 37.(A) 38.(C) 39.(B) 40.(B)

Q.37



Q.38 How many triangles are there in the figure given below?

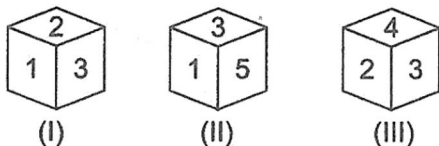


- (a) 6
- (b) 7
- (c) 10
- (d) 8

Q.39 In a row of thirty boys, R is fourth from the right end and W is tenth from the left end. How many boys are there between R and W?

- (a) 15
- (b) 16
- (c) 17
- (d) cannot be determined

Q.40 Which number is opposite to face 3?



- (a) 1
- (b) 6