PHYSICS

BOOKS - CAREER POINT

MOCK TEST 1

Part A Physics

1. A body is projected up with a velocity equal to $3/4th$ of the escape velocity from the surface of the earth. The height it reaches is (Radius of the earth is R)

A. $\dfrac{3R}{10}$

B. $\dfrac{9R}{7}$

C. $\dfrac{8R}{5}$

D. $\dfrac{9R}{5}$

Answer: B

2. The equation of SHM of a particle is given as $2\dfrac{d^2x}{dt^2} + 32x = 0$ where x is the displacement from the mean position. The period of its oscillation (in seconds) is -

A. 4

B. $\dfrac{\pi}{2}$

C. $\dfrac{\pi}{2\sqrt{2}}$

D. 2π

Answer: B

3. A long straight wire carrying current of $30A$ is placed in an external unifrom magnetic field of induction $4 \times 10^4 T$. The magnetic field is acting parallel to the direction of current. The maggnetic of the resultant magnetic inuduction in tesla at a point $2.0cm$ away form the wire is
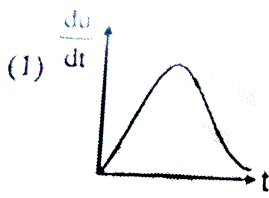
    A. 10^{-4}

    B. 3×10^{-4}

    C. 5×10^{-4}

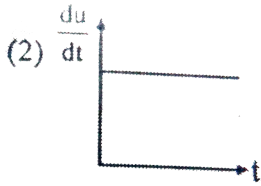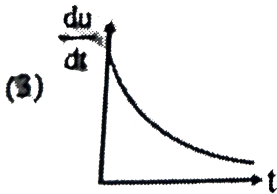   D. 6×10^{-4}

Answer: C

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4. Rate of increment of energy in an inductor with time in series RL circuit getting charged with battery of EMF Eis best represented by:
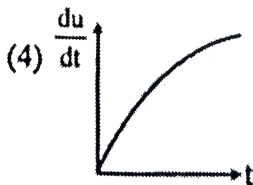
(1) $\dfrac{du}{dt}$

A.

(2) $\dfrac{du}{dt}$

B.

(3) $\dfrac{du}{dt}$

C.

(4) $\dfrac{du}{dt}$

D.

Answer: A

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5. In a series LR circuit, the voltage drop across inductor is 8 volt and across resistor is 6 volt. Then voltage applied and power factor of circuit respectively are:

    A. Volatage of the source will be leading current in the ciruit

    B. Volatage drop across each element will be less the appliced voltage

    C. Power factor of circuit will be 4/3

    D. None of these

Answer: D

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6. A gas is found to obey the law P^2 V= constant the innitial temperature and volume are T_0 and V_0. If the gas expands to volume $2V_0$, its final temperature becomes-

    A. $\sqrt{2}T_0$

B. $2T_0$

C. $T_0/2$

D. $T_0/\sqrt{2}$

Answer: A

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7. Three objects coloured black, gray and white can withstand hostile conditions upto $2800°C$. These objects are thrown into a furance where each of them attains a temperature of $2000°C$. Which object will glow brightest?

A. white object

B. Black object

C. All glow with same brightness

D. Grey object

Answer: C

8. Main scale of a vernier callipser has 100 divisions in 5 cm . Its vernier scale has 25 divisons in one cm . The least count is -

A. 0.01 cm

B. 0.005 cm

C. 0.01 mm

D. None of these

Answer: A

9. In a semi conductor diode , the barrier potential offers opposition to only -

A. Majority carriers in both regions

B. Minority carriers in both regions

C. Free electrons in the n- region

D. Holes in the p-region

Answer: A

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10. A progressive wave y = A sin (k x - ωt) is reflected by a rigid wall at x = 0

. Then the reflected wave can be represented by -

A. y = A sin (kx + ωt)

B. y = A cos (kx + ωt)

C. y = - A sin (kx - ωt)

D. y = - A sin (kx + ωt)

Answer: D

11. The frequency of fundamental tone in an open organ pipe of length

0.48 m is 320 Hz. Speed of sound is 320 m/sec. Frequency of fundamental

tone in closed organ pipe will be

A. 153.8 Hz

B. 160.0 Hz

C. 320.0 Hz

D. 143. 2 Hz

Answer: B

12. A box contains N molecules of a perfect gas at temperature T_1 and

temperature P_1. The number of molecule in the box is double keeping

the total kinetic energy of the gas same as before. If the new pressure is

P_2 and temperature T_2, then

A. $P_2 = P_1, T_2 = T_1$

B. $P_2 = P_1, T_2 = \dfrac{T_1}{2}$

C. $P_2 = 2P_1, T_2 = T_1$

D. $P_2 = 2P_1, T_2 = \dfrac{T_1}{2}$

Answer: B

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13. A fraction f_1 of a radioactive sample decays in one mean lie and a

fraction f_2 decays in one half-life

A. $f_1 = f_2$

B. $f_1 = \dfrac{f_2}{2}$

C. $f_1 < f_2$

D. $f_1 > f_2$

Answer: C

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14. The binding enrgy of $._{17}^{35} Cl$ nucleus is 298 MeV. Find the atomic mass. Given, mass of a proton $(m_P) = 1.007825$ amu, mass of a neutron $(m_n) = 1.008665$ amu.

A. 24.9 amu

B. 34.9 amu

C. 54.9 amu

D. 35. 289 amu

Answer: B

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15. The threshold frequency for a certain metal is v_0 when light of frequency $v = 2v_0$ is incident on it . The maximum velocity of photoelectrons is 4×10^6 m/s . If the frequency of incident radiation is increase to $5v_0$, the maximum velocity of photo electrons in m/s will be .

A. $\dfrac{4}{5} \times 10^6$

B. 2×10^6

C. 8×10^6

D. 2×10^7

Answer: C

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16. An α-particle and a proton are fired through the same magnetic field which is perpendicular to their velocity vectors. The α-partcles and the proton move such that radius of curvature of their paths is same. Find the ratio of their de Broglie wavelengths.

A. $\dfrac{1}{2}$

B. $\dfrac{2}{1}$

C. $\dfrac{1}{4}$

D. $\dfrac{4}{1}$

Answer: A

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17. If the electric potential on the surface of inner most sphere is zero , then the relation between r_1, r_2 and r_3 is (here σ is surface charge

density)
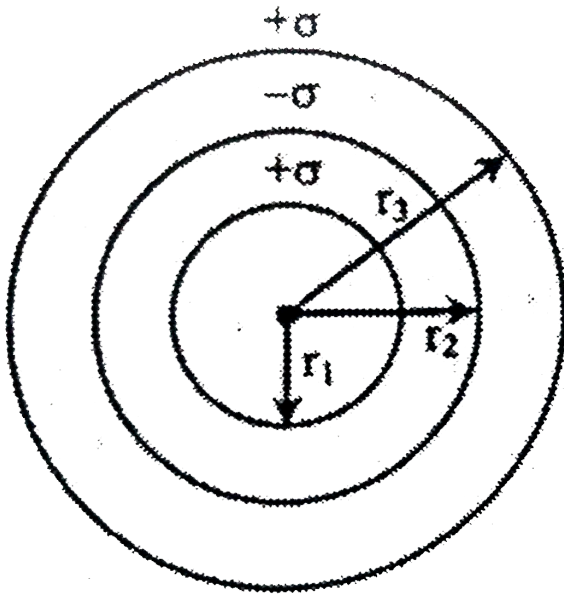
A. $r_3 = r_1 + r_2$

B. $r_2 = \sqrt{r_1 r_3}$

C. $r_2 = r_1 + r_3$

D. $r_2 = r_3 - r_1$

Answer: C

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18. A small sphere of mass m and carrying a charge q is attached to one end of an insulating thread of length a , the other end of which is fixed at (0,0) as shown in figure . There exists a uniform electric field $\vec{E} = -E_0\hat{j}$ in the region . The minimum velocity which should be given to the sphere at (a , 0) in the direction shown so that it is able to complete the circle around the origin is (There is no gravity)
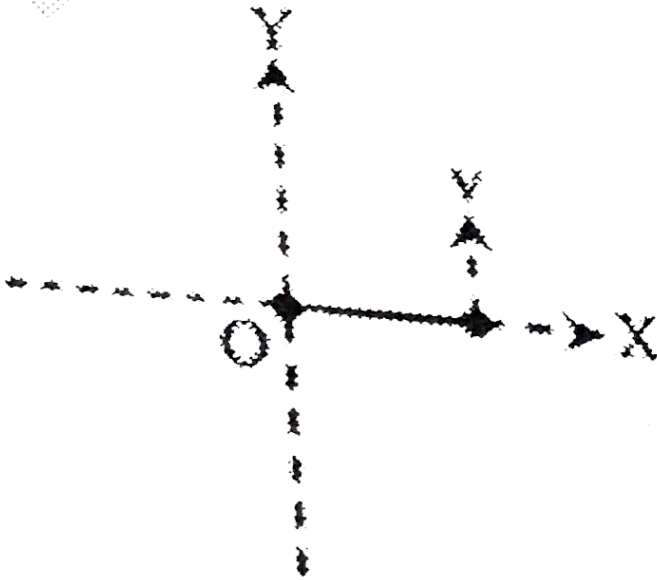
A. $\sqrt{\dfrac{5qE_0a}{m}}$

B. $\sqrt{\dfrac{3qE_0a}{m}}$

C. $\sqrt{\dfrac{qE_0a}{m}}$

D. $2\sqrt{\dfrac{qE_0 a}{m}}$

Answer: B

19. In the ciruit shown , the charges on the capacitors A and B are respectively -
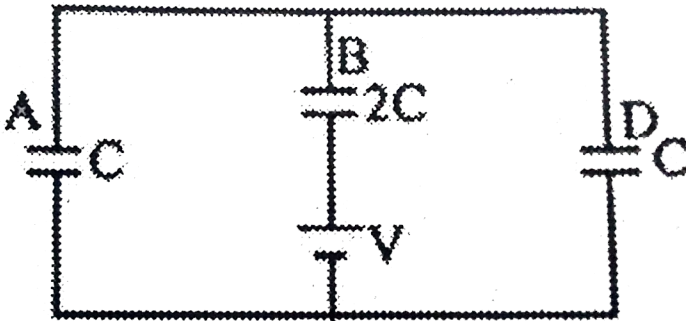
A. CV , CV

B. $\dfrac{CV}{2}$, $\dfrac{CV}{2}$

C. CV , $\dfrac{CV}{2}$

D. $\dfrac{CV}{2}$, CV

Answer: D

20. For a cell, a graph is plotted between the potential difference V across the terminals of the cell and the current I drawn the cell. The emf and the internal resistance of the cell are E and r, respectively. Then
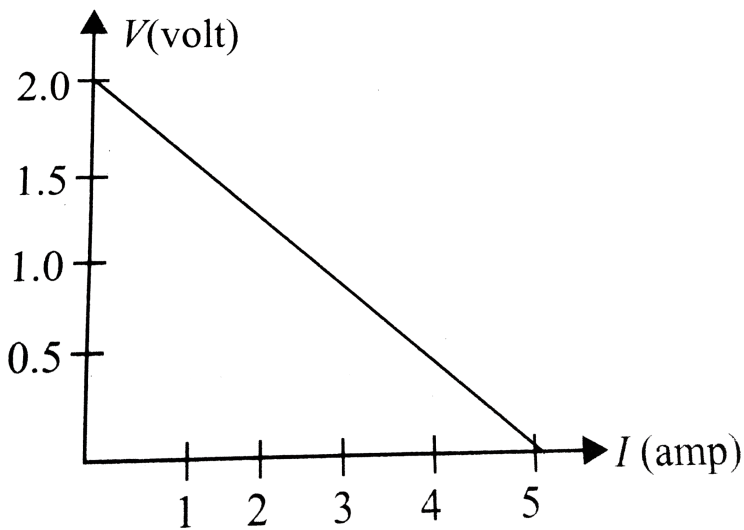
A. 2V , 0.5Ω

B. 2V , 0.4Ω

C. $>$ 2V , 0.5Ω

D. $> 2\,\mathrm{V}\,,0.4\Omega$

Answer: B

21. A solid cylinder of length l and cross-sectional area A is made of a material whose resistivity depends on the distance r from the axis of the cylinder as $\rho = k/r^2$ where k is constant . The resistance of the cylinder is -

A. $\dfrac{\pi kl}{A^2}$

B. $\dfrac{2\pi kl}{A^2}$

C. $\dfrac{\pi kl}{A}$

D. None

Answer: B

22. Which of the following is correct about principle of conservation of momentum ?

A.

(1) ─o─ ─ ─ ─o M₁ ⟋ α β M₂
M   M

B.

(2) ─o─ →─o M₁ ⟋ α 90°
M   M M₂ ↓

C.

(3) ─o─ →─o M₁ 90° β M₂
M   M

D.

(4) ─o─ →─o M₁ 90° M₂→
M   M
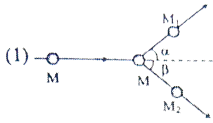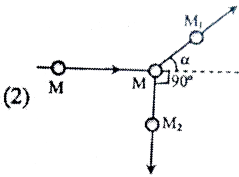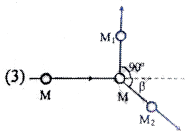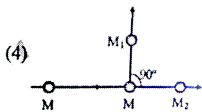
Answer: D

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23. Two identical billiard balls are in contact on a table. A third identical ball strikes them symmetrically and comes to rest after impact. The

coefficient of restitution is :

A. $\dfrac{2}{3}$

B. $\dfrac{1}{3}$

C. $\dfrac{1}{6}$

D. $\dfrac{\sqrt{3}}{2}$

Answer: A

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24. A uniform cube of side and mass m rests on a rough horizontal surface. A horizontal force F is applied normal to one face at point that is directly above the centre of the face at a height $\dfrac{a}{4}$ above the centre. The minimum value of F for which the cube begins to topple above an edge without sliding is

A. $\dfrac{1}{4}$ mg

B. 2 mg

C. $\dfrac{1}{2}$ mg

D. $\dfrac{2}{3}$ mg

Answer: D

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25. The focal length of a convex lens of $R.\,I.\,1.5$ is f when it is placed in air. When it is immersed in a liquid is behaves as a converging lens its focal length becomes $x\,f(x > 1)$. The refractive index of the liquid

A. $> \dfrac{3}{2}$

B. $< \dfrac{3}{2}$ and > 1

C. $< \dfrac{3}{2}$

D. All of these

Answer: B

26. A double-slit experiment is immersed in a liquid of refractive index 1.33. It has slit separation of 1 mm and distance between the plane of slits and screen is 1.33 m. The slits are illuminated by a parallel bam of light whose wavelength in air is 6830Å. Then the fringe width is

A. $6.3 \times 10^{-4} m$

B. $8.3 \times 10^{-4} m$

C. $6.3 \times 10^{-2} m$

D. $6.3 \times 10^{-5} m$

Answer: A

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27. A beam of light strikes a surface at angle of incidence of $60°$ and reflected beam becomes completely polarised . The refractive index of glass surface is -

A. 1.5

B. $\sqrt{3}$

C. 2

D. $\dfrac{1}{\sqrt{3}}$

Answer: B

28. If P represents radiation pressure , C represents the speed of light ,

and Q represents radiation energy striking a unit area per second , then

non - zero integers x, y, z such that $P^x Q^y C^z$ is dimensionless , find the

values of $x, y,$ and z.

A. x =1 , y =1 , z = -1

B. x = 1 , y = -1 , z = 1

C. x = -1 , y = 1 , z=1

D. x = 1 , y = 1 , z =1

Answer: B

29. A particle is confined to move along the x-axis between reflecting walls at x = 0 and x = a . Between these two limits it moves freely at constant velocity v . If the walls are perfectly reflecting , then its displacement time graph is -

A.

B.

C.

D.
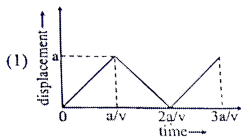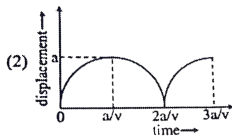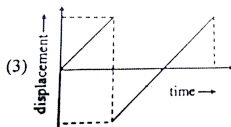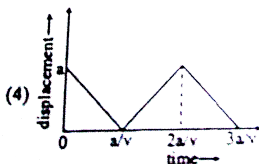
Answer: A

30. A particle is on a smooth horizontal plane. A force F is applied whose F-t graph is given. Then,
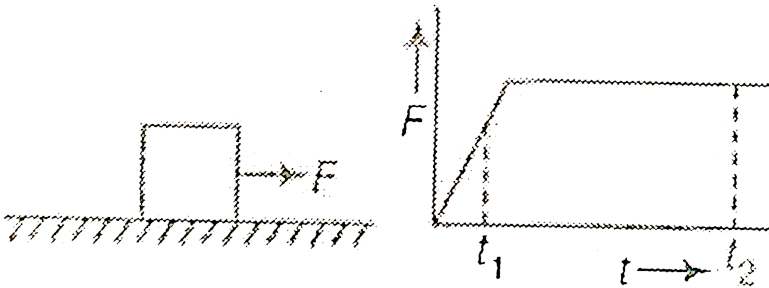
A. between 0 & t_1 acceleration is constant

B. initally body must be in rest

C. after t_1 acceleration is constant

D. Finally acceleration is zero

Answer: C

1. Which method of purificationis represented by the following equations

$$Ti + 2I_2 \xrightarrow{523K} TiI_4 \xrightarrow{1700K} Ti + 2I_2$$
$$(\text{Impure}) \qquad\qquad\qquad (\text{pure})$$
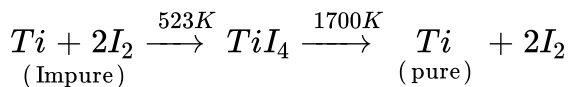
A. Cupellation

B. Poling

C. Van Arkel method

D. Zone refining

Answer: C

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2. A fire work gave brick red colour . It probably contained a salt of -

A. Ca

B. K

C. Ba

D. Mg

Answer: A

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3. About H_2SO_4 , which of the following statements is incorrect ?

A. It acts as a reducing agent

B. It acts as an oxidizing agent

C. It acts as dehydrating agent

D. It is highly viscous

Answer: B

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4. The property of halogen acids , that indicated incorrect is -

A. $HF > HCl > HBr > HI.....$ acidic strength

B. $HI > HBr > HClHF.......$ reducing strength

C. $HI > HBr > HCl > HF......$ bond length

D. $HF > HCl > HBr > HI.....$ thermal stability

Answer: A

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5. Which of the following will be the major product when 3 - phenylpropene reacts with HBr?

A. $C_6H_5CH_2CHBrCH_3$

B. $C_6H_5CHBrCHCH_2$

C. $C_6H_5CH_2CH_2Br$

D. $C_6H_5CHBrCH_2CH_3$

Answer: D

6. The major product formed in the reaction is -

$$CH_3CHClCH_2CH_2OH \underset{\text{heat}}{KOH/H_2O}(\rightarrow)$$

A. $CH_3CH = CHCH_2OH$

B. $CH_2 = CHCH_2CH_2OH$

(3)

C.

D. $CH_3 \overset{\overset{\displaystyle OH}{|}}{C} HCH_2CH_2OH$
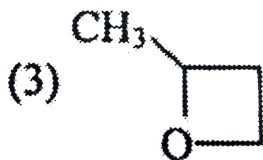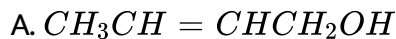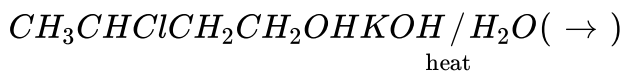
Answer: C

7. Consider the following sequence of reactions .

$$CH_3 \quad OC_2H_5 \xrightarrow[H_2O]{CH_3MgI(excess)} A \xrightarrow{Na} B \xrightarrow{CH_3CH_2Br} C$$
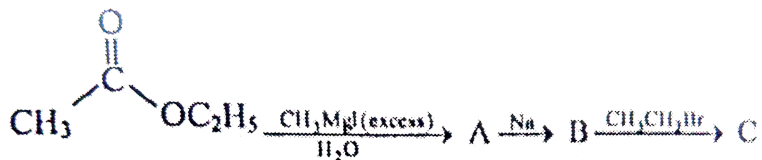
The final product (C) is -

A. (1)

B. (2)

C. (3)

D. (4)
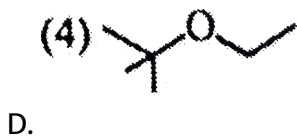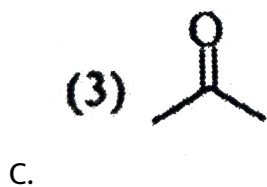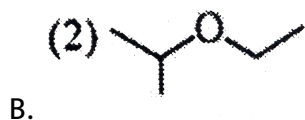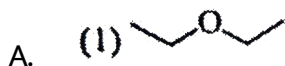
Answer: D

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8. For the redox reaction ,

$$MnO_4^- + C_2O_4^{-2} + H^+ \rightarrow Mn^{+2} + CO_2 + H_2O \qquad \text{the} \qquad \text{correct}$$
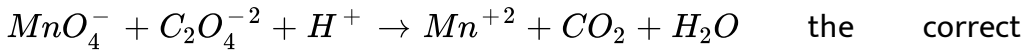
coefficient of reactants MnO_4^- , $C_2O_4^{-2}$

H^+ for the balanced reaction are respectively :

   A. 2, 5, 16

   B. 16 , 3, 12

   C. 15 , 16 , 12

   D. 2 , 16 , 5

Answer: A

9. The density of gas A is twice that of B at the same temperature the molecular weight of gas B is twice that of A. The ratio of pressure of gas A and B will be :

   A. $1 : 6$

B. 1:1

C. 4:1

D. 1:4

Answer: C

10. $I_2(s) \mid I^-$ (0.1M) half cell is connected to a H^+ (aq)$|H_2$(1 bar)|Pt half celland e.m.f. is found to be 0.7714 V. If $E^\circ_{I_2|I^-}$ =0.535 V, find the pH of $H^+ \mid H_2$ half cell.

A. 1

B. 3

C. 5

D. 7

Answer: B

11. Which of the following statement is/are correct ?

I. The ligand thiosulphate , $S_2O_3^{2-}$ can give rise to linkage isomers .

II. In metallic carbonyls the ligand CO molecule acts both as donor and acceptor .

III. The complex $[Pt(Py)(NH_3)(NO_2)ClBrI]$ exists in eight different geometrical isomeric forms .

IV. The complex ferricyanide ion does not follow effective atomic number (EAN) rule .

    A. I and II only

    B. II and IV only

    C. I , II and III

    D. I , II and IV

Answer: D

12. A six coordination complex of formula $CrCl_3 \cdot 6H_2O$ has green colour. A 0.1 M solution of the complex when treated with excess of $AgNO_3$ gave 28.7g of white precipitate. The formula of the complex would be:

A. $[Cr(H_2O)_6]Cl_3$

B. $[CrCl(H_2O)_5]Cl_2 \cdot H_2O$

C. $[CrCl_2(H_2O)_4]Cl.2H_2O$

D. $[Cr(H_2O)_3Cl_3]$

Answer: B

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13. Which one of the following ions exhibit highest magnetic moment ?

A. Cu^{+2}

B. Ti^{+3}

C. Ni^{+2}

D. Mn^{+2}
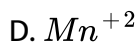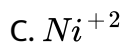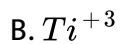
Answer: D

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14. Which of the following gaseous molecule is non-linear ?

A. XeF_2

B. HCN

C. H_2O

D. BeF_2
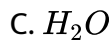
Answer: C

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15. Select incorrect order

A. $NH_3 > PH_3 > AsH_3 > SbH_3$ (order of acidic strength)

B. $S > Se > Te > O$ (order of electron affinity)

C. $Si < S < P < Cl$ (order of IE)

D. $S^{-2} > Cl^- > K^1 > Ca^{+2}$ (order of radius)

Answer: A

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16. In ψ_{321}, the sum of angular momentum, spherical nodes and angular node is

A. $\dfrac{\sqrt{6}h + 4\pi}{2\pi}$

B. $\dfrac{\sqrt{6}h}{2\pi} + 3$

C. $\dfrac{\sqrt{6}h + 2\pi}{2\pi}$

D. $\dfrac{\sqrt{6}h + 8\pi}{2\pi}$

Answer: A

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17. A solid is formed and it has three types of atoms X, Y and Z, X forms a fcc lattice with Y atoms occupying all tetrahedral voids and Z atoms occupying half of octahedral voids. The formula of solid is :-

A. X_4YZ_2

B. X_4Y_2Z

C. XY_2Z_4

D. X_2Y_4Z
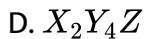
Answer: D

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18. The heat of formation of $NH_3(g)$ is -46 kJ mol^{-1}. The ΔH (in kJ mol^{-1}) of the reaction, $2NH_3(g) \rightarrow N_2(g) + 3H_2(g)$ is

A. 46

B. -46

C. 92

D. -92

Answer: C

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19. $NH_4HS(s) \Leftrightarrow NH_3(g) + H_2S(g)$

$The 3 equilibrium pressure at 25^{\wedge}(@)C is 0.660 atm. \hat{Wis}K\_(p)$ for the reaction ?

A. 0.109

B. 0.218

C. 1.89

D. 2.18

Answer: A

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20. Calculate depression of freezing point for 0.56 molal aq. Solution of

KCl.

(Given : $K_{f(H_2O)} = 1.8 kgmol^{-1}$).

A. 2

B. 3

C. 4

D. 5

Answer: A

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21. A graph plotted between $\log t_{50\%}$ vs log concentration is a straight line. What conclusion can you draw from this graph?

log a
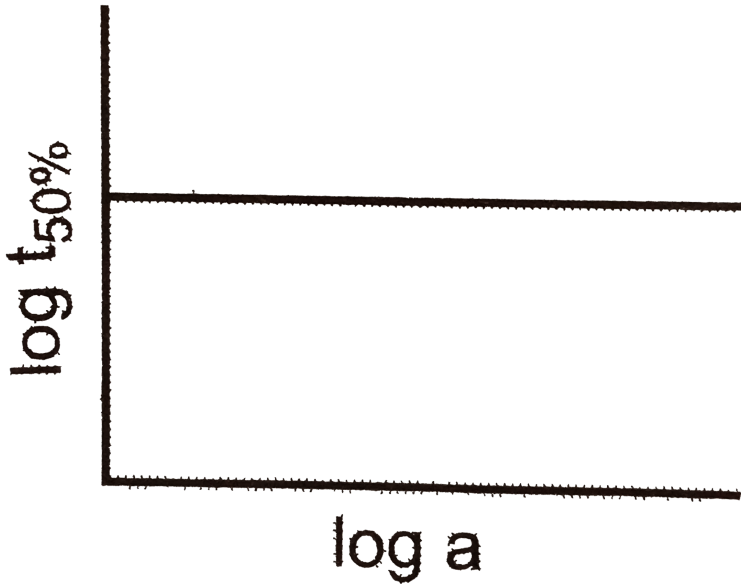
A. n = 1, $t_{1/2} = \dfrac{1}{Ka}$

B. n = 2, $t_{1/2} = 1/a$

C. $n = 1, t_{1/2} = \dfrac{0.693}{K}$

D. None of these

Answer: C

22. Identify Bronsted -Lowry acids in the reactions given .

$$\left[Al(H_2O)_6\right]^{+3} + HCO_3^- \Leftrightarrow$$

$$\underset{C}{\left[Al(H_2O)_5(OH^-)\right]^{2+}} + \underset{D}{H_2CO_3}$$
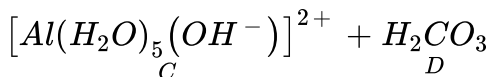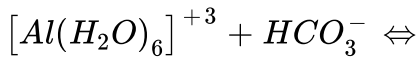
The correct Answer

A. (a) , (d)

B. (b) , (c)

C. (b) , (d)

D. (a) , (c)

Answer: A

23. 2.4 g of pure Mg (at. Mass = 24) is dropped in 100 mL of 1 M HCl .

Which of the following statement is wrong ?

A. 1.12 L of hydrogen is produce as S.T.P.

B. 0.05 mol of magnesium is left behind

C. HCl is the limiting reagent .

D. None of these

Answer: D

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24. Among the following which Statement is incorrect ?

A. $CH_3 - \overset{\overset{\displaystyle O}{\displaystyle \|}}{C} - OH \xrightarrow{X_3/OH^-}$ will not respond to haloform test

B. $CH_2 = CH - CH = O \xrightarrow{\overset{\ominus}{O}H / \Delta}$ gives cannizaro reaction
cannizaro reaction

C. $Cl - \overset{\overset{\displaystyle Cl}{\displaystyle |}}{\underset{\underset{\displaystyle Cl}{\displaystyle |}}{C}} - CH - O \xrightarrow{\overset{\ominus}{O}H / \Delta}$ does not give cannizzaro reaction

D. (4) ⬡—CH₂-Br $\xrightarrow{M\ KOH}$ ⬡—CH₂ (Major)
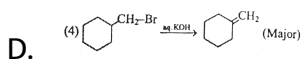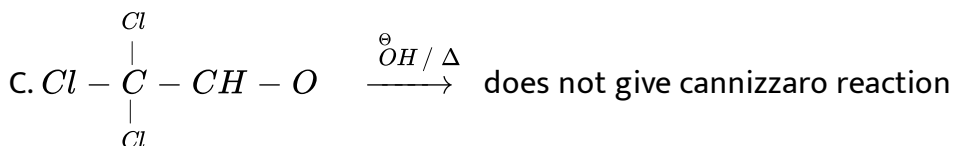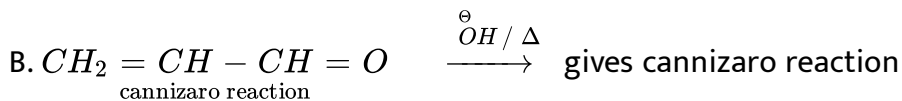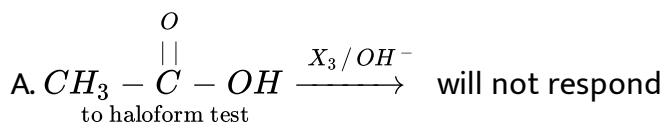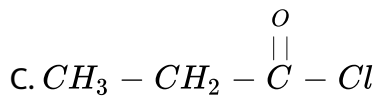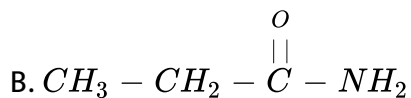
Answer: D

25. Identify 'Z' in the given sequence of reaction .

OH ⟶ [1.NaOH / 2.Cl–CH₂–COOH] → X ⟶ [SOCl₂] → Y ⟶ [AlCl₃] → Z

A. (1)

B. (2)

C. (3)

D. (4)

Answer: C

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26. $(X) \xrightarrow{KOH + CHCl_3} (Y) \xrightarrow{LiAlH_4} CH_3CH_2NHCH_3$

Identify compound X

A. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - OH$

B. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - NH_2$

C. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - Cl$

D. $CH_3 - CH_2 - NH_2$
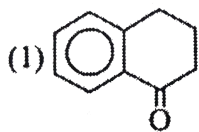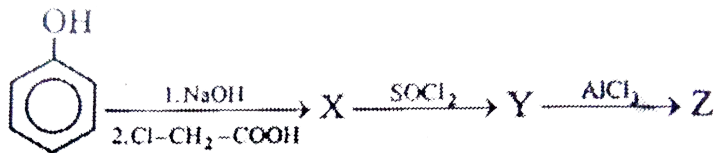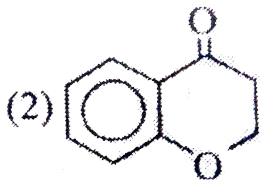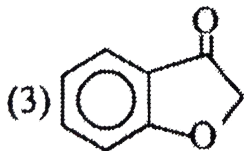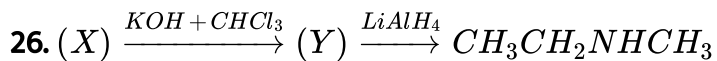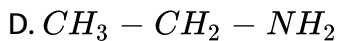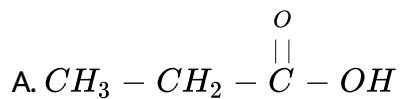
Answer: D

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27. The IUPAC name of is -
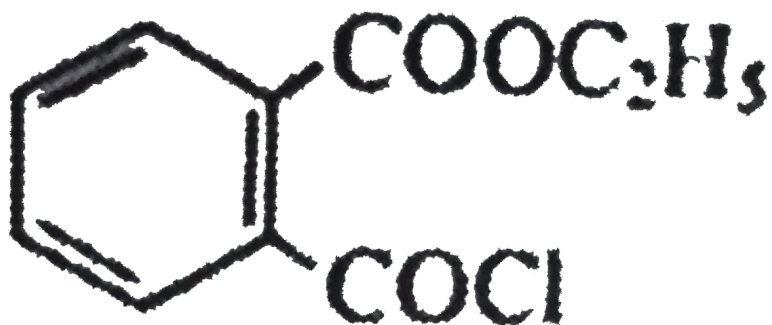
A. 2-Chlorocarbonyl ethylbenzoate

B. 2-Carboxyethyl bezoyl chloride

C. Ethyl-2- (chlorocarbonyl) benzoate

D. Ethyl - 1- (chlorocarbonyl) benzoate

Answer: C

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(A)   (B)
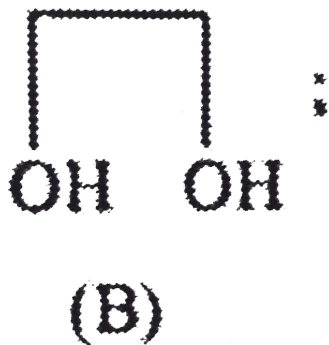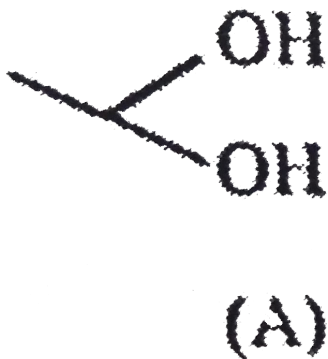
28.

, (A) and (B) are -

A. Chain isomer

B. Position isomer

C. Metamers

D. Functional group isomer

Answer: B

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29. Arrang the anions (p) $\bar{C}H_3$, $(q)\bar{N}H_2$, $(r)OH^-$, $(s)F^-$, in decreasing order of their basic strength .
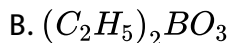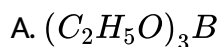
A. $p > q > r > s$

B. $q > p > r > s$

C. $r > q > p > s$

D. $r > p > q > s$

Answer: A

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30. Borate form green colour flame when burunt With (Conc. H_(2)SO_(4) + Ethanol). Green colour flame is obtained due to formation of -

A. $(C_2H_5O)_3B$

B. $(C_2H_5)_2BO_3$

C. $(C_2H_5)_3BO_3$
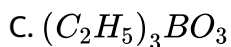
D. 1 and 3 are correct

Answer: 3

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31. At STP, a container has 1 mole of Ar, 2 mole of CO_2, 3 moles of O_2 and 4 moles of N_2. Without changing the total pressure if one mole of O_2 is removed, the partial pressure of O_2

    A. is changed by about 26 %

    B. is halved

    C. is unchanged

    D. changes by 33 %

Answer: 1

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32. The oxidation potential of a hydrogne electrode at $pH = 10$ and $p_{H_2} = 1atm$ is

A. 0.059 V

B. 0.59 V

C. 0.00 V

D. 0.51 V

Answer: 3

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33. On reduction with hydrogen , 3.6 g of an oxide of metal left 3.2 g of metal . If the simplest atomic weight of metal is 64, the simplest formula of the oxide is
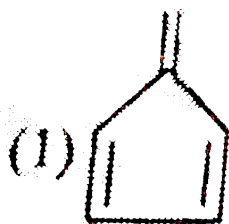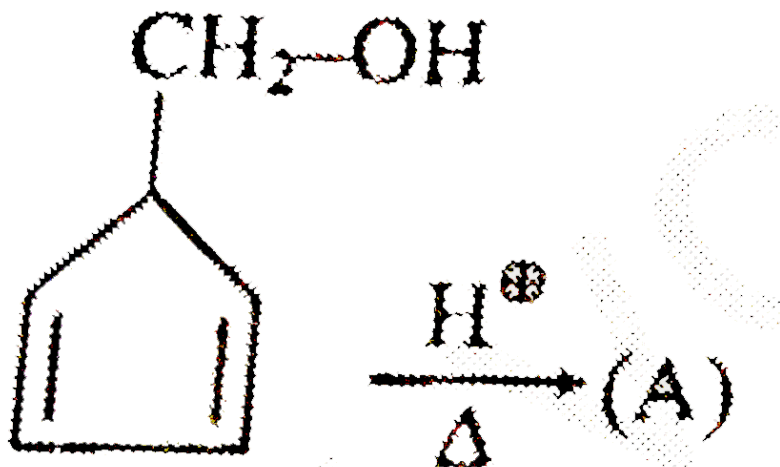
A. MO

B. M_2O_3

C. M_2O

D. M_2O_5

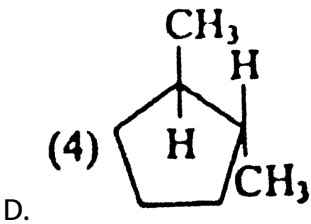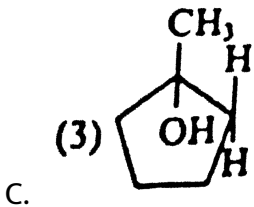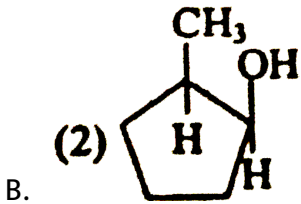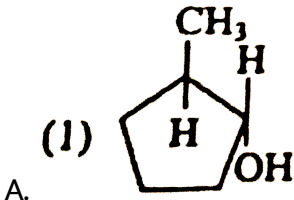Answer: 3

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34.

A.

2)

B.

(3)

C.

(4)

D.

Answer: 2

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CH₃

$$\xrightarrow[\text{(2) }H_2O_2. HO^-]{\text{(1) }BH_3; THF}} \quad (A) :$$

35.

A. (1)

B. (2)

C. (3)

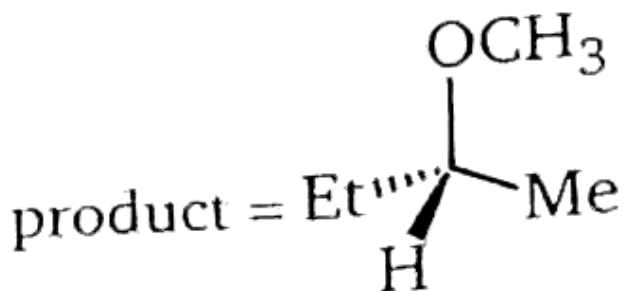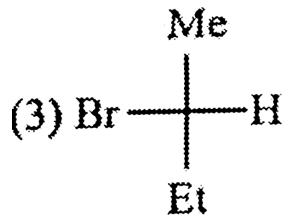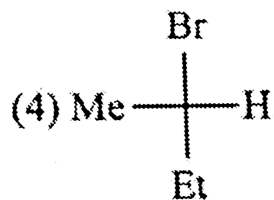D. (4)
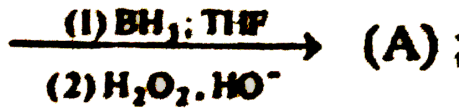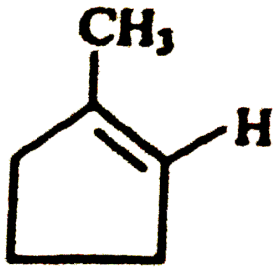
Answer: 1

36. The back side attack on -- bromobutan by methoxide (CH_3O^-) gives the product shown below j. which fischer projeaction represents 2-bromobutane used a sthe reactant in this raction ?

$$\text{product} = \text{Et}^{\text{''''}}\underset{H}{\overset{OCH_3}{\diagup}}\text{Me}$$

A.

(1) Me ─┼─ H

Et
│
Me ─── H
│
Br

B.

(2) H ─┼─ Br

Et
│
H ─── Br
│
Me

(3) Br—|—H with Me on top and Et on bottom

C.

(4) Me—|—H with Br on top and Et on bottom
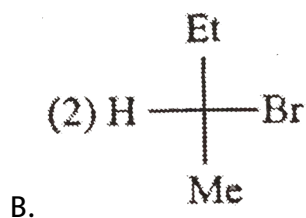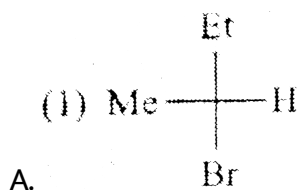
D.

Answer: 4

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$$\text{CH}_3 \underset{H}{\overset{H}{\diagup}} \underset{H}{\overset{Br}{\diagdown}} D \xrightarrow{\text{Alc. KOH}} (A)$$

37.

Major product of this reaction is :

(1) cyclohexene with D and H substituents

A.

B. (2)

C. (3)

D. (4)
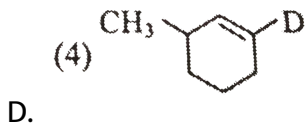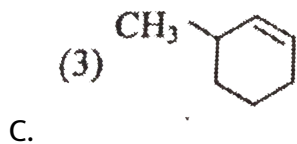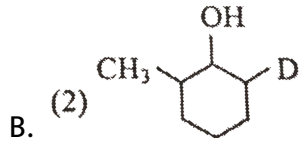
Answer: 3

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38. The species having tetrahedral shape is

A. $[PdCl_4]^{-2}$

B. $[Ni(CN)_4]^{-2}$

C. $[Pd(CN)_4]^{-2}$

D. $[NiCl_4]^{-2}$

Answer: 2

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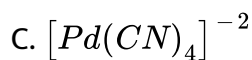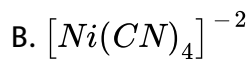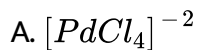
39. Electronic configuration of some elements are given:

A: $1s^2 2s^2$

B: $1s^2 2s^2 2p^6$ C: $1s^2 2s^2 2p^6 3s^2$ D: $1s^2 2s^2 2p^3$ E: $1s^2 2s^2 2p^5$
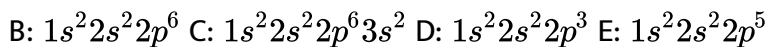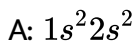
The most ionic compound will be formed between -

A. A and D

B. A and E

C. C and E

D. C and D

Answer: 3

40. Which of the following can react with both HCl and NaOH ?

A. ss

B. BeO

C. Al_2O_3

D. All of these

Answer: 4

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41. Which of the following solid has maximum melting points?

A. Ice

B. dry ice

C. SiO_2

D. KCl

Answer: 3

42. The catalyst used in the manufacture of polyethylene Zeigler method is -

    A. titanium tetrachloride and tripbenyl aluminium

    B. titanium tetrachloride and triethylaluminium

    C. titanium dioxide

    D. titanium isopropoxide

Answer: 2

43.

$$\text{benzene} \xrightarrow[\text{FeCl}_3]{\text{Cl}_2} A \xrightarrow[\text{H}_2\text{SO}_4, \Delta]{\text{HNO}_3} B \xrightarrow[\text{EtOH}, \Delta]{\text{KCN}} C$$

The product C is -

A.

(1)

B.

(2)

C.

(3)

(4)

D.
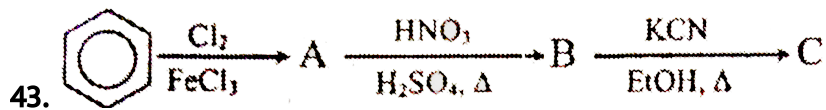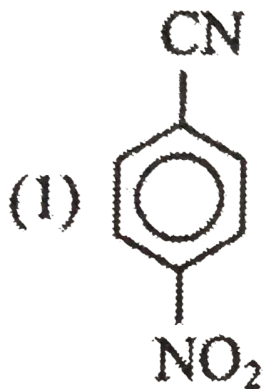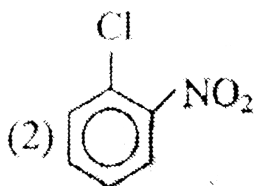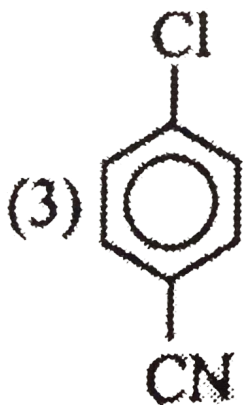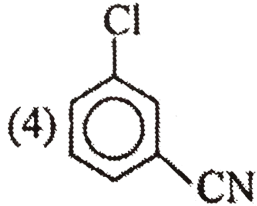
Answer: 1

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44. Iodine is powerful antiseptic. It is used as a tincture of iodine which is X% iodine solution of Alcohol/water. What is (X)

A. 3-7%

B. 2-3%

C. 5-7%

D. 7-9%

Answer: 2

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45. Two elemets X(atomic weight $= 75$) and Y(atomic weight $= 16$) combine to give a compound having 75.8 % X.` The formula of the compound is

A. XY

B. X_2Y

C. X_2Y_2

D. X_2Y_3

Answer: 4

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46. The value of the spin only magnetic moment for one of the following configurations is 2.84 BM. The correct one is -

A. d^5(in strong field Ligand)

B. d^3 (in weak as well as strong. field)

C. d^4 (in weak field Ligand)

D. d^4 (in strorig Ligand field)

Answer: 4

47. An element $X(At, wt = 80g/mol)$ having fcc structure, calculate the number of unit cells in $8g of X$

A. $0.4 \times N_A$

B. $0.1 \times N_A$

C. $4 \times N_A$

D. None of these

Answer: 4

48. Which of the following donot give Cannizzaro reaction ?

A. (1)

B. (2)

C. (3) $Cl-\underset{\underset{Cl}{|}}{\overset{\overset{Cl}{|}}{C}}-\overset{\overset{O}{||}}{C}-H$

D. (4) $H-\overset{\overset{O}{||}}{C}-H$
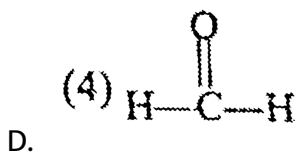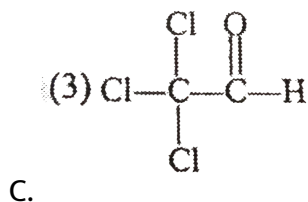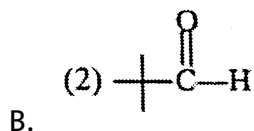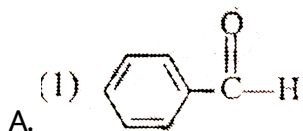
Answer: 3

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49. Consider the following reactions,
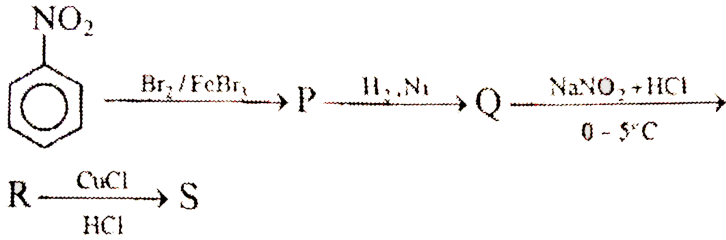
The end product 'S' is -

A. (1)

B. (2)

C. (3)

D.

Answer: 2

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50. The IUPAC name of $CH_3 - \underset{\underset{COOC_2H_5}{|}}{C} = CH - CH_2 - \overset{\overset{O}{||}}{\underset{\underset{OH}{|}}{C}}$ is
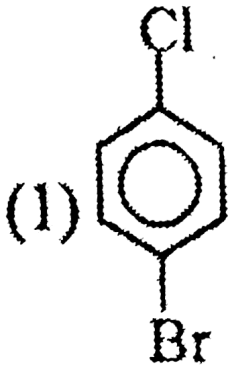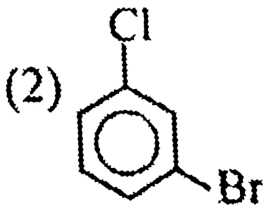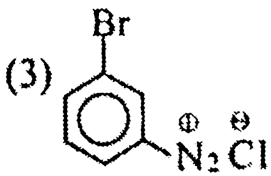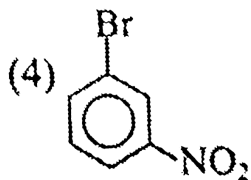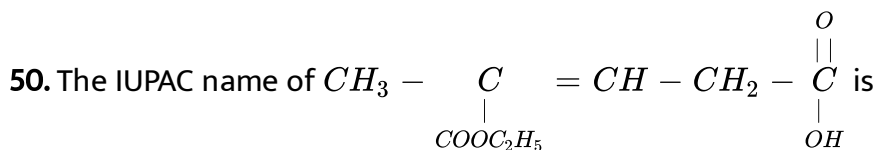
A. 4-ethoxycarbonylpent-3-enoic acid

B. 4-ethanoyloxypent-3-enoic acid

C. 3-ethoxycarbonylbut-2-enecarboxylic acid

D. 3-ethoxycarbonylpent-3-enoic acid

Answer: 1

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51. The order of leaving group ability is

$.^{-}OAc.^{-}OMe.^{-}SO_3Me.^{-}SO_3CF_3$ The order of leaving group
  (I) (II) (III) (IV)

ability is

A. $I > II > III > IV$

B. $IV > III > II > I$

C. $I > III > IV > II$

D. $IV > III > I > II$

Answer: 4

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52. Often in water bodies subjected to sewage pollution, fishes die because of the:

A. Foul smell

B. Reduction in dissolved oxygen caused by microbial activity

C. clotting of their giltes by solid substances

D. pathogens released by the sewage

Answer: 2

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53. A solution containing 500 g of a protein per liter is isotonic with a solution containing 3.42 g sucrose per liter. The molecular mass of protein in 5 x 10^x, hence x is.

A. 2

B. 3

C. 4

D. 5

Answer: 3

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54. Calculate partial pressure of B at equilibrium in the following equilibrium

$$A(s) \Leftrightarrow B(g) + 2C(g), \qquad K_P = 32atm^3.$$
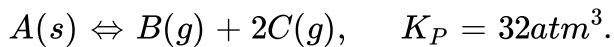
A. 2

B. 3

C. 17

D. 5.8

Answer: 1

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55. What is the melting point of benzene if $\Delta H_{fusion} = 9.95kJ/mol$ and $\Delta S_{fusion} = 35.7J/K - mol$

A. $278.7°C$

B. $278.7K$

C. 300 K

D. 298 K

Answer: 1

56. $D_2O(Heavywater)$ and H_2O differ in following except -

A. Freczing point

B. Density

C. ionic product of water

D. its reaction with sodium

Answer: 2

57. Carborundum is -

A. BN

B. SiO_4

C. SiC

D. CS_2

Answer: 3

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58. If degree of dissociation of 2M CH_3COOH is 10% then degree of dissociation of this acetic 4cid in 3 Molar CH_3COONa solution will be -

A. $= 10\%$

B. $< 10\%$

C. $> 10\%$

D. Can't be determine

Answer: 2

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59. The solubility in terms of K_{sp} for $A_3B_{(aq)}$ is

A. $\left(\dfrac{K_{SP}}{3}\right)^{\frac{1}{4}}$

B. $\left(\dfrac{K_{SP}}{27}\right)^{\frac{1}{4}}$

C. $(27K_{SP})^{\frac{1}{4}}$

D. $(3K_{SP})^{\frac{1}{4}}$

Answer: 2

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1. The figure shows a part of the circuit in the steady state. The currents, the valuces of resistances and emfs of the cells are shown in the figure. The circuit also contains a capacitor of capacitance $C = \mu F$. The value of i_1 is-
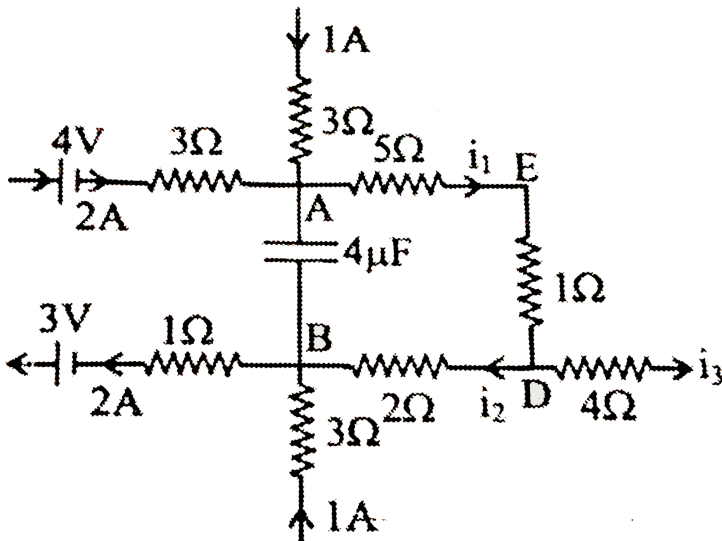
A. 1A

B. 2A

C. 3A

D. 4A

Answer: 3

2. The reading of the ammeter and voltmeters are (Both the instruments are ac meters and measures rms value)-
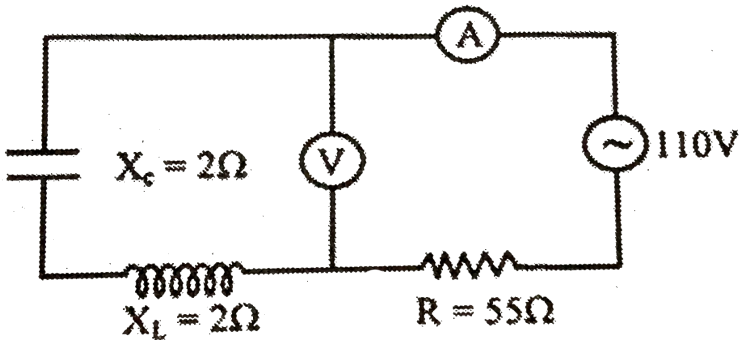
A. 2A, 110 V

B. 2A, 0V

C. 2A, 55V

D. 1A, 0V

Answer: 2

3. A parallel plate capacitor of plate are A and plate separation d is charged by a battery of voltage V. The battery is then disconnected. The work needed to pull the plates to a separation 2d is

A. $\dfrac{Av^2\varepsilon_0}{d}$

B. $\dfrac{2Av^2\varepsilon_0}{d}$

C. $\dfrac{Av^2\varepsilon_0}{2d}$

D. $\dfrac{3Av^2\varepsilon_0}{2d}$

Answer: 3

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4. A wire having a linear mass density 5×10^{-3} kg/m is stretched between two rigid supports with a tension of 450 N. The wire resibate at a frequency of 420 Hz. The next higher frequency at which the same wire resonates is 490 Hz. Find the length of wire -

A. 2.1 m

B. 1.05 m

C. 4.2 m

D. None of these

Answer: 1

5. When the listener moves towards a stationary source with a velocity v_1 m the apparent freqency of a note emitted by the source is f' When the listener moves away from the source with the same velocity, the apparent frequency of the note f/f'=3. If v the velocity of sound in air, the value of v/v_1 is -

A. 3

B. $1/2$

C. 2

D. 1

Answer: 3

6. Calculate the magnetic induction at P, for the arrangement shown in figure, when two similar short magnets of magnetic moment M are joined at the middle. So that they are mutually perpendicular -
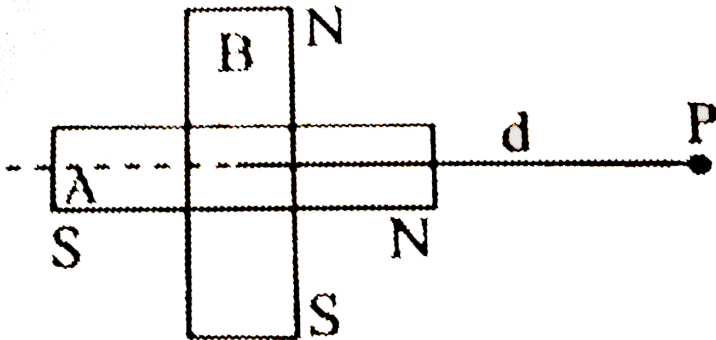
A. $\dfrac{\mu_0 M \sqrt{3}}{4\pi} \dfrac{}{d^3}$

B. $\dfrac{\mu_0 2M}{4\pi} \dfrac{}{d^3}$

C. $\dfrac{\mu_0 M \sqrt{5}}{4\pi d^3}$

D. None of these

Answer: 3

7. The ratio of magnetic potentials due to magnetic dipole in the end-on position to that in the broad side on position for the same distance from it is -

A. zero

B. 1

C. 2

D. 00

Answer: 4

8. In given figure, a wire loop has been bent so that it has three segments ab (a quarter circle), bc (a square corner) & ca (straight line). Here are three choices for a magnetic field through the loop -
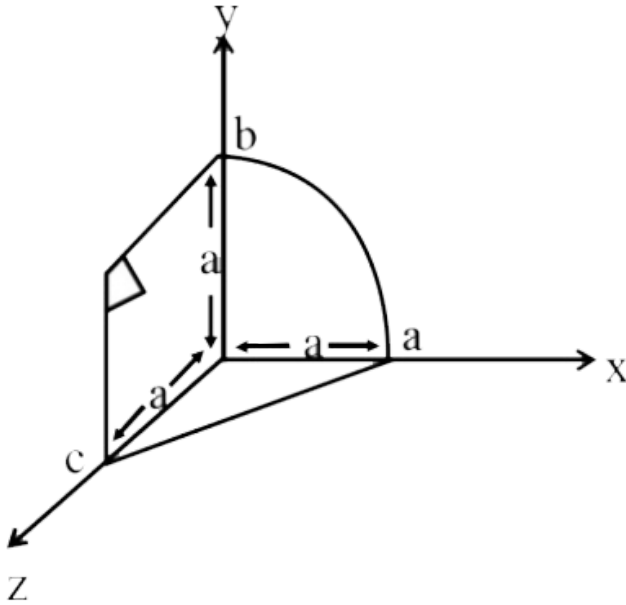
(1) $\Rightarrow (B_1) = 3\hat{i} + 7\hat{j} - 5t\hat{k}$

(2) $\overrightarrow{B_2} = 5t\hat{i} - 4\hat{j} - 15\hat{k}$

(3) $\overrightarrow{B_3} = 2\hat{i} - 5t\hat{j} - 12\hat{k}$

where B is in milli tesla and t is in second. If the induced current in the loop due to $\overrightarrow{B_1}, \overrightarrow{B_2}, \overrightarrow{B_3}$ are i_1, i_2, i_3 respectively then

A. $i_1 > i_2 > i_3$

B. $i_2 > i_1 > i_3$

C. $i_3 > i_2 > i_1$

D. $i_1 = i_2 = i_3$

Answer: 2

9. An object is put at a distance of 5cm from the first focus of a convex lens of focal length 10cm. If a real image is formed, its distance from the lens will be

A. 15 cm
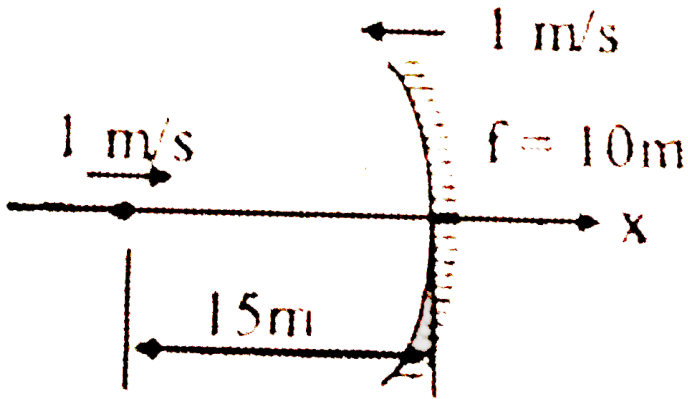
B. 20 cm

C. 25 cm

D. 30 cm

Answer: 4

10. A point object moves in + x-direction with v= 1 m/s along the principal axis of the concave mirror of focal length f=10 m. When the mirror moves with a velocity $V_m = -\hat{i}$ m/s and the object is at a distance of p=15 m, the speed of the image is -

A. $-8\hat{i}m/s$

B. $-9\hat{i}m/s$

C. $-6\hat{i}m/s$

D. None of these

Answer: 2

11. A soap bubble of radius r is placed on another bubble of radius $2r$. The radius of the surface common to both the bubbles is

A. $\dfrac{2r}{3}$

B. 3r

C. 2r

D. r

Answer: 3

12. A particle moves according to the law, $x = a\cos(\pi t/2)$. . What is the distance covered by it in time interval $t = 0$ to $t = 3$ second.

A. 2a

B. 3a

C. 4a

D. a

Answer: 2

13. The pressure of an ideal gas varies according to the law $P = P_0 - AV^2$, where P_0 and A are positive constants. Find the highest temperature that can be attained by the gas

A. $\dfrac{2P_0}{3R} \left(\dfrac{P_0}{3\alpha} \right)^{1/2}$

B. $\dfrac{2P_0}{2R} \left(\dfrac{P_0}{3\alpha} \right)^{1/2}$
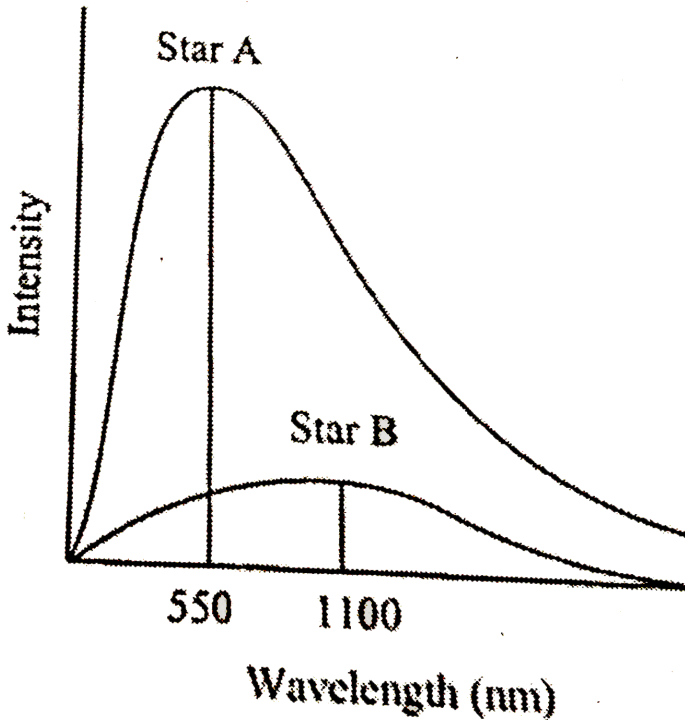
C. $\dfrac{P_0}{R} \left(\dfrac{P_0}{3\alpha} \right)^{1/2}$

D. $\dfrac{P_0}{R} \left(\dfrac{P_0}{\alpha} \right)^{1/2}$

Answer: 1

14. The spectra of radiation emitted by two distant stars are shown below.

The ratio of the surface temperature of star A to that of star B, $T_A : T_B$, is approximately-

A. $2 : 1$

B. $4 : 1$

C. $1 : 2$

D. $1 : 1$

Answer: 1

15. Two radioactive samples of different elements (half-lives t_1 and t_2 respectively) have same number of nuclei at $t = 0$. The time after which their activities are same is

A. $\dfrac{t_1 t_2}{0.693(t_2 - t_1)} In \dfrac{t_2}{t_1}$

B. $\dfrac{t_1 t_2}{0.693} In \dfrac{t_2}{t_1}$

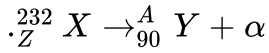C. $\dfrac{t_1 t_2}{0.693(t_2 + t_1)} In \dfrac{t_2}{t_1}$

D. None of these

Answer: 1

16. A nucleus X initially at rest, undergoes alpha decay according to the equation

$$._{Z}^{232} X \rightarrow _{90}^{A} Y + \alpha$$

What fraction of the total energy released in the decay will be the kinetic energy of the alpha particle?

A. $\dfrac{90}{92}$

B. $\dfrac{228}{232}$

C. $\sqrt{\dfrac{228}{232}}$

D. $\dfrac{1}{2}$

Answer: 2

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17. A moving hydrogen atom makes a head on collision with a stationary hydrogen atom. Before collision both atoms are in in ground state and

after collision they move together. What is the minimum value of the kinetic energy of the moving hydrogen atom, such that one of the atoms reaches one of the excited state?

A. 20.4 eV

B. 10.2 eV

C. 54.4 eV

D. 13.6 eV

Answer: 1

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18. In Milikan's oil drop experiment, an oil drop of radius r and charge q is held in equilibrium between the plates of as charged parallell plate capacitor when the potential difference is V. To keep as drop of radius $2r$ and with a charge $2q$ in equilibrium between the plates the potential difference V required is
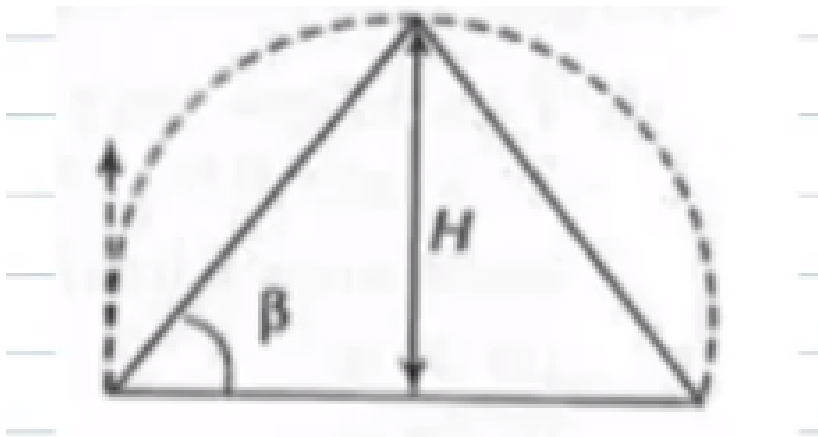
A. V

B. 2V

C. 4V

D. 8V

Answer: 3

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19. A shell fired from the base of a mountain just clears it. If α is the angle of projection, then the angular elevation of the summit β is

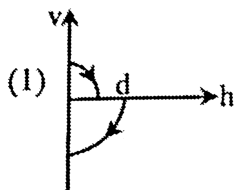A. $\dfrac{\alpha}{2}$

B. $\tan^{-1}\left(\dfrac{1}{2}\right)$

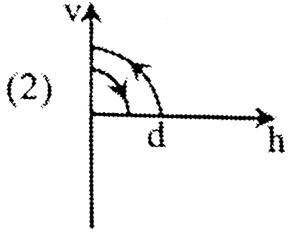C. $\tan^{-1}\left(\dfrac{\tan\alpha}{2}\right)$
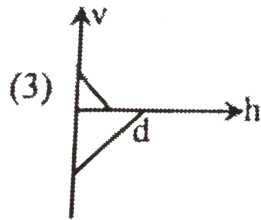
D. $\tan^{-1}(2\tan\alpha)$

Answer: 3

20. A ball is dropped vertically from a height d above the ground . It hits the ground and bounces up vertically to a height $(d)/(2)$. $Neg \le ct \in g \subset sequentmotion$ and $air resis\tan ce, its velocity$ $v varies with the heighth$ above the ground as
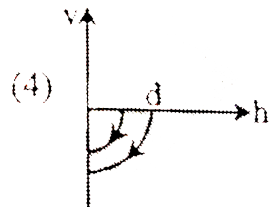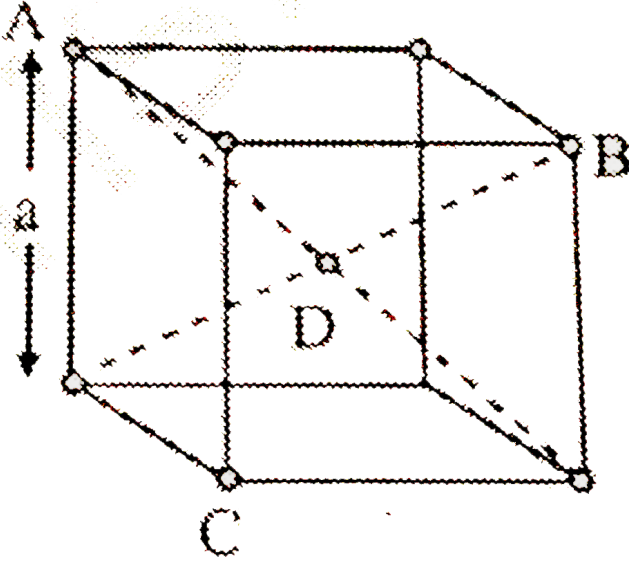
B.

C.

D.

Answer: 1

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21. Four identical masses m each are kept at points A, B, C & D shown in figure. Gravitational force on mass at point D (body centre) is -

A. $\dfrac{3Gm^2}{a^2}$

B. $\dfrac{12Gm^2}{a^2}$

C. $\dfrac{4Gm^2}{a^2}$

D. $\dfrac{4Gm^2}{3a^2}$

Answer: 4

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22. A disc of mass 'm' and radius R is free to rotate in horizontal plane about a vetical smooth fixed axis passing through is centre. There is a smooth groove along the diameter of the disc and two small balls of mass m/2 each are placed in it on either side of the centre of the disc as shown in fig. The disc is given initial angular velocity ω_0 and released. The angular speed of the disc when the balls reach the end of the disc is -
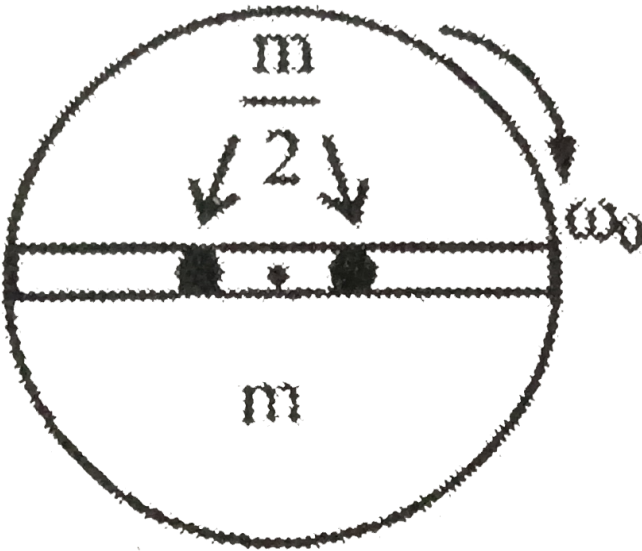
A. $\dfrac{\omega_0}{2}$

B. $\dfrac{\omega_0}{3}$

C. $\dfrac{2\omega_0}{3}$

D. $\dfrac{\omega_0}{4}$

Answer: 2

23. In the above question, the speed of each ball relative to ground just after they leave the disc is -

A. $\dfrac{R\omega_0}{\sqrt{3}}$

B. $\dfrac{R\omega_0}{\sqrt{2}}$
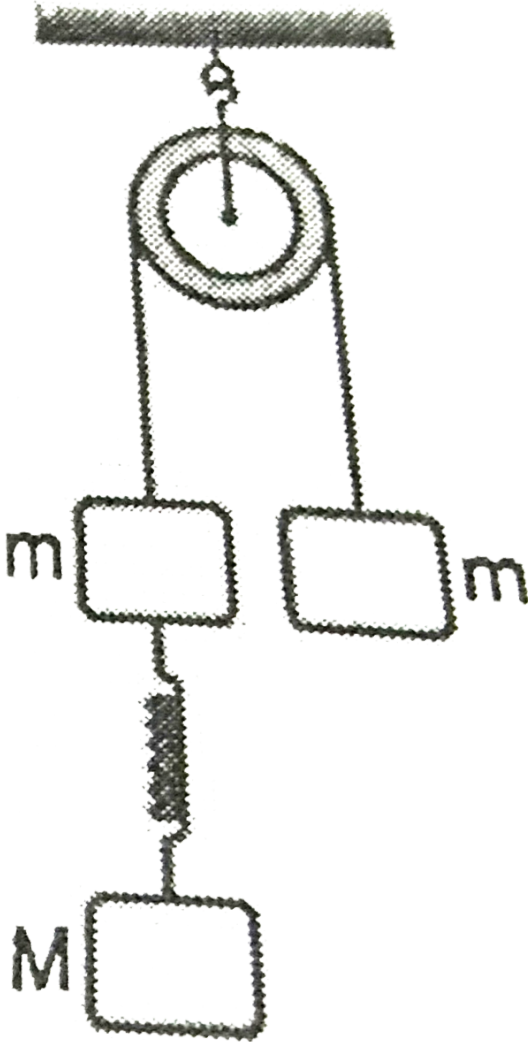
C. $\dfrac{2R\omega_0}{3}$

D. None of these

Answer: 3

24. The system shown in th fig is released from rest. (Neglecting friction

and mass of the pulley, string and spring). The spring can be elongated:

A. if $M > m$

B. if $M > 2m$

C. if $M > m/2$

D. for any value of M

Answer: 4

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25. A particle is dropped from height H. At a point its kinetic energy is x times of its potential energy. Find the speed of the particle at that point -

A. $[2gxH]^{1/2}$

B. $\left[\dfrac{2g(x+1)H}{x}\right]^{1/2}$

C. $\left[\dfrac{2gH}{(x+1)}\right]^{1/2}$

D. $\left[\dfrac{2gxH}{(x+1)}\right]^{1/2}$

Answer: 4

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26. A dubble under water oscillates with period T, which is proportional to $p^{-5/6}$, $d^{1/2}E^Y$, where p is pressure, d is density and E is energy. The value of γ is -

A. $\dfrac{1}{7}$
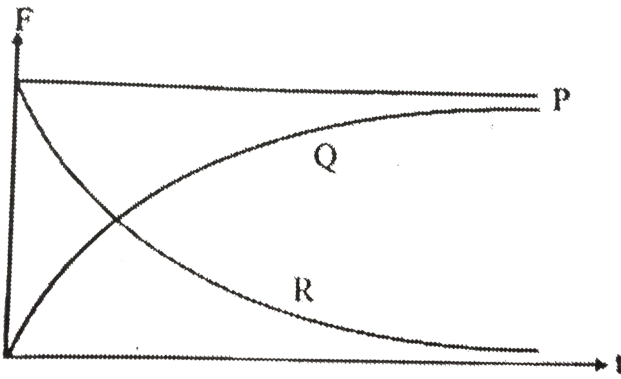
B. $\dfrac{1}{6}$

C. $\dfrac{1}{5}$

D. $\dfrac{1}{3}$

Answer: 4

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27. A spherical ball is dropped in a long column of viscous liquid. Which of the following graphs represent the variation of

(I) gravitational force with time

(ii) viscous force with time

(iii) net force acting on the ball with time

A. Q,R,P

B. R,QP

C. P,Q,R

D. R,P,Q

Answer: 3

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28. A fixed amount of ideal gas (1 mole) is taken and is subjected to pressure and temperature variation. The experiment is performed at low pressures as well as at high temperatures. The results obtained are shown in the Fig. The correct variation of $\dfrac{PV}{RT}$ with P will be exhibited by
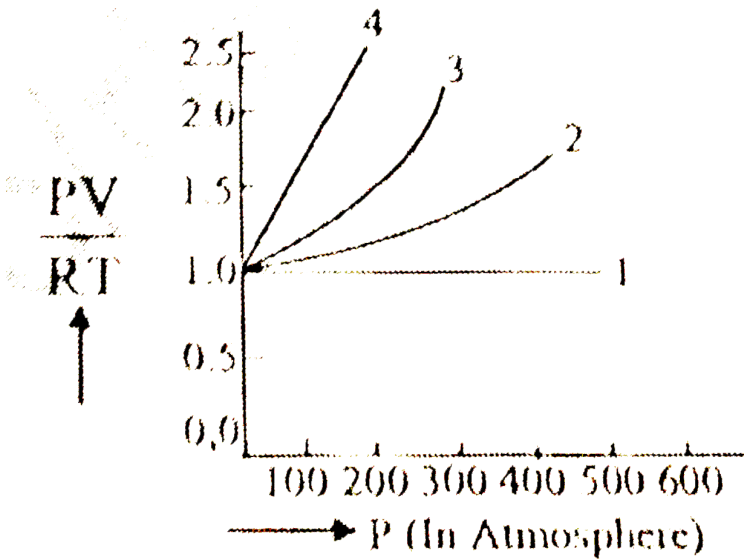
A. Curve (4)

B. Curve (3)

C. Curve (2)

D. Curve (1)

Answer: 4

29. In a transistor, the collector current is always · less then the emitter current because -

A. collector side is reverse biased and the emmiter side is forward biased

B. a few electrons are lost in the base and only remaining ones reach the collector

C. collector being reverse biased. attracts less electrons

D. collector side is forward biased and emitter side is reverse biased

Answer: 2

f_1 = 10 cm
f_2 = 10 cm
f_3 = 30 cm

30 cm ─────→|←5 cm→|←─ 10 cm ─→|
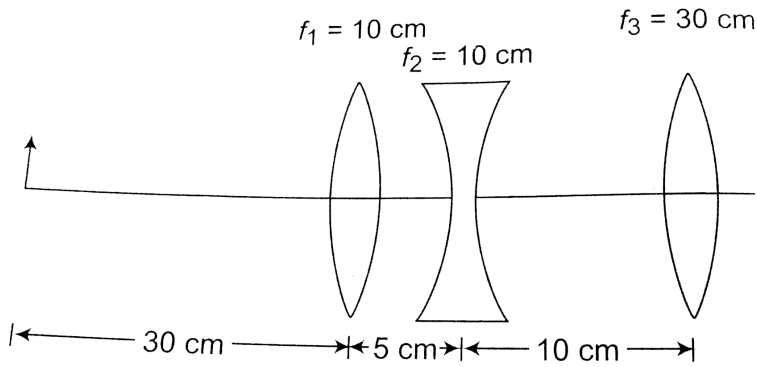
30.

The position of fical image formed by the given lens combination from the third lens will be at a distance of $f_1 = +10cm$, $f_2 = -10cm$, $f_3 = +30$

A. 15 cm

B. infinity

C. 45 cm

D. 30 cm

Answer: 4

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