PHYSICS

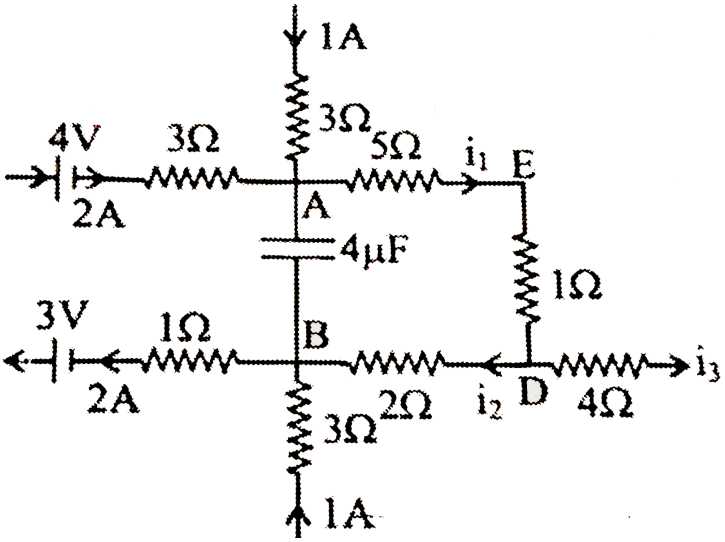
BOOKS - CAREER POINT

MOCK TEST 10

Part A Physics

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

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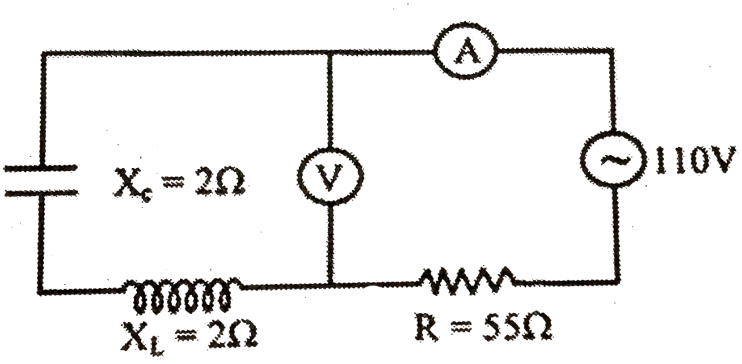
2. The reading of the ammeter and voltmeters are (Both the instruments are ac meters and measures rms value)-



A. 2A, 110 V

B. 2A, 0V

C. 2A, 55V

D. 1A, 0V

Answer: 2

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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. $\frac{Av^2\varepsilon_0}{d}$

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

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

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

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

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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

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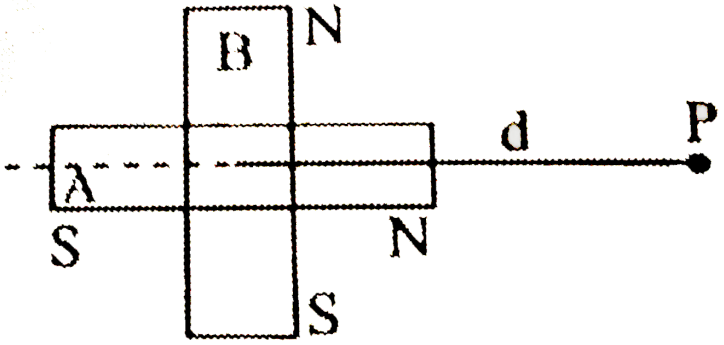
6. Calculate the magnetic induction at P, for the arrangement shown in figure, when two similar short magnets of magnetic moment M are joined at the middle. So that they are mutually perpendicular -



A. $\frac{\mu_0 M\sqrt{3}}{4\pi \quad d^3}$

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

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

D. None of these

Answer: 3

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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. ∞

Answer: 4

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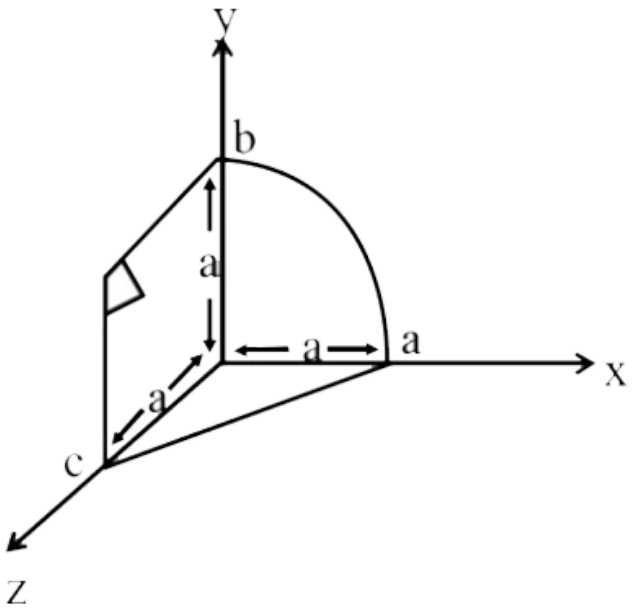
8. In given figure, a wire loop has been bent so that it has three segments ab (a quarter circle), bc (a square corner) & ca (straight line). Here are three choices for a magnetic field through the loop -



(1) $\overrightarrow{\quad}(B_1) = 3\hat{i} + 7\hat{j} - 5t\hat{k}$

(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

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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

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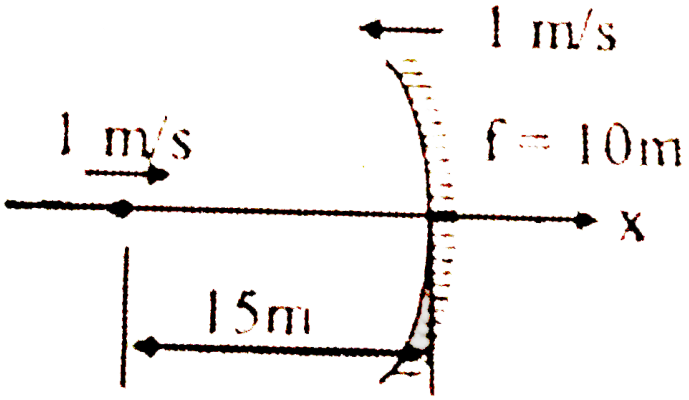
10. A point object moves in + x-direction with v= 1 m/s along the principal axis of the concave mirror of focal length f=10 m. When the mirror moves with a velocity $V_m = -\hat{i}$ m/s and the object is at a distance of p=15 m, the speed of the image is -



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

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

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

D. None of these

Answer: 2

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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. $\frac{2r}{3}$

B. 3r

C. 2r

D. r

Answer: 3

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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

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

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

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

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

Answer: 1

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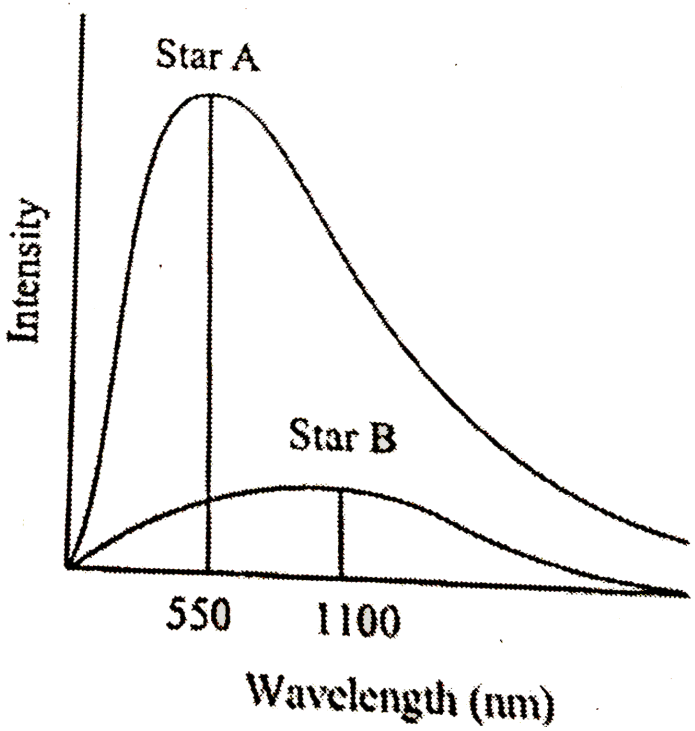
14. The spectra of radiation emitted by two distant stars are shown below.



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

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

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

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

D. None of these

Answer: 1

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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. $\frac{90}{92}$

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

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

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

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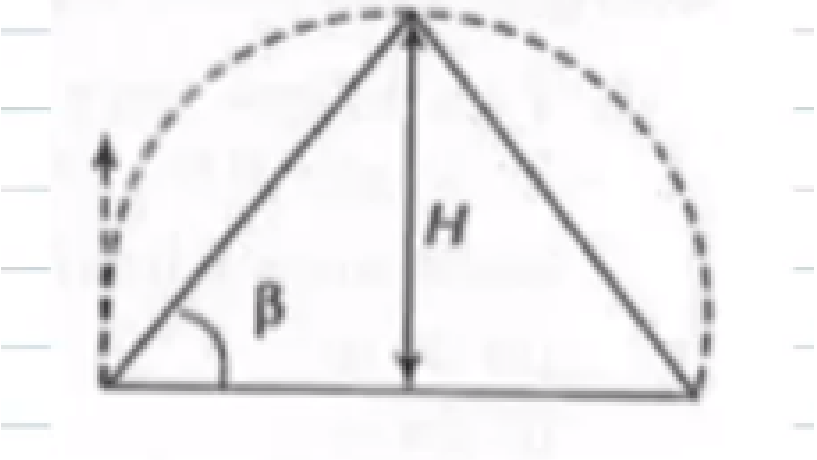
19. A shell fired from the base of a mountain just clears it. If α is the angle of projection, then the angular elevation of the summit β is



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

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

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

D. $\tan^{-1}(2\tan\alpha)$

Answer: 3

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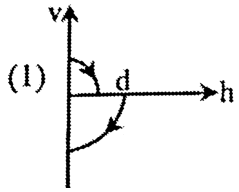
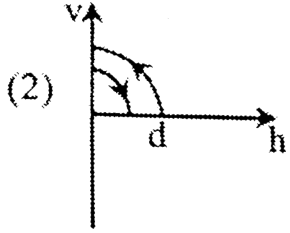
20. A ball is dropped vertically from a height d above the ground . It hits the ground and bounces up vertically to a height $(d)/(2).Neg \leq ct \in g \subset sequentmotion$ and $airresis\tan ce, itsvelocity$ v$varieswiththeheight$h` above the ground as

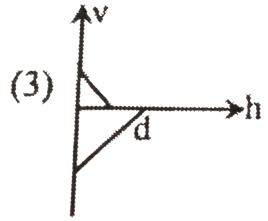
A.



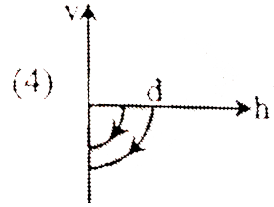
B.



C.



D.



Answer: 1

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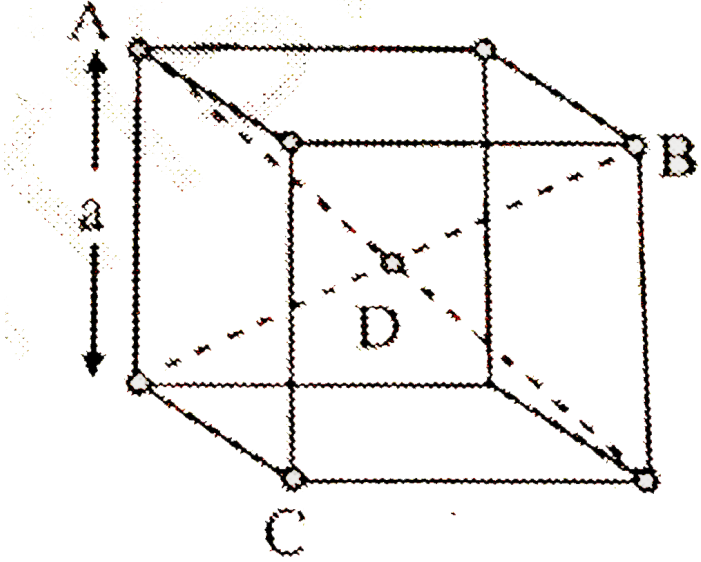
21. Four identical masses m each are kept at points A, B, C & D shown in figure. Gravitational force on mass at point D (body centre) is -



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

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

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

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

Answer: 4

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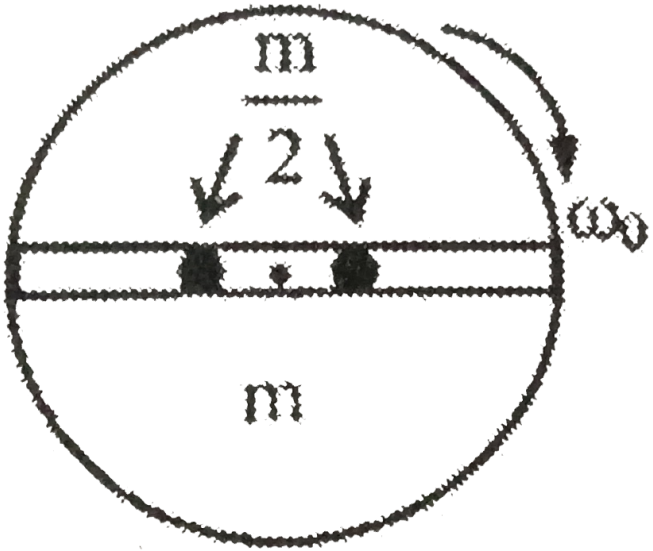
22. A disc of mass 'm' and radius R is free to rotate in horizontal plane about a vetical smooth fixed axis passing through is centre. There is a smooth groove along the diameter of the disc and two small balls of mass m/2 each are placed in it on either side of the centre of the disc as shown in fig. 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. $\frac{\omega_0}{2}$

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

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

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

Answer: 2

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

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

B. $\frac{R\omega_0}{\sqrt{2}}$

C. $\frac{2R\omega_0}{3}$

D. None of these

Answer: 3

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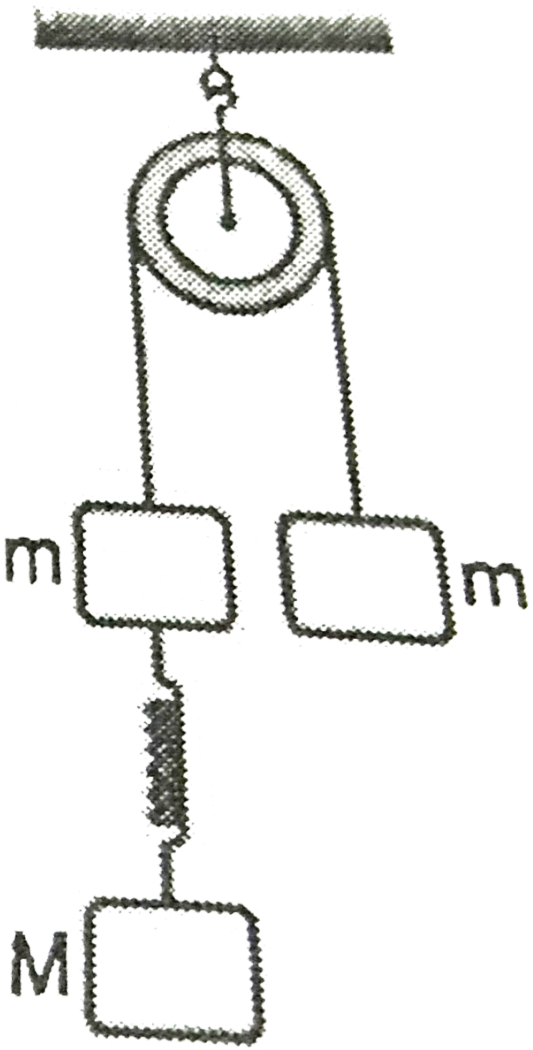
24. The system shown in th fig is released from rest. (Neglecting friction and mass of the pulley, string and spring). The spring can be elongated:



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

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

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

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. $\frac{1}{7}$

B. $\frac{1}{6}$

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

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

Answer: 4

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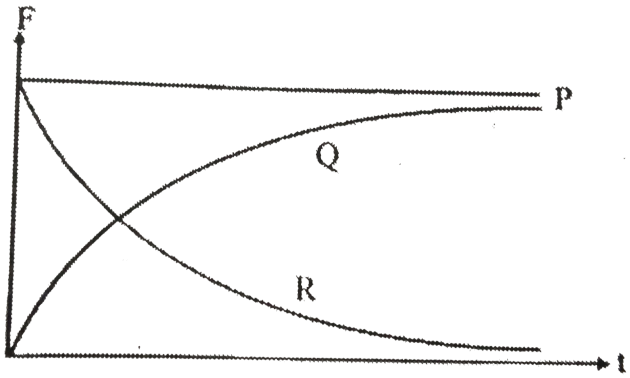
27. A spherical ball is dropped in a long column of viscous liquid. Which of the following graphs represent the variation of



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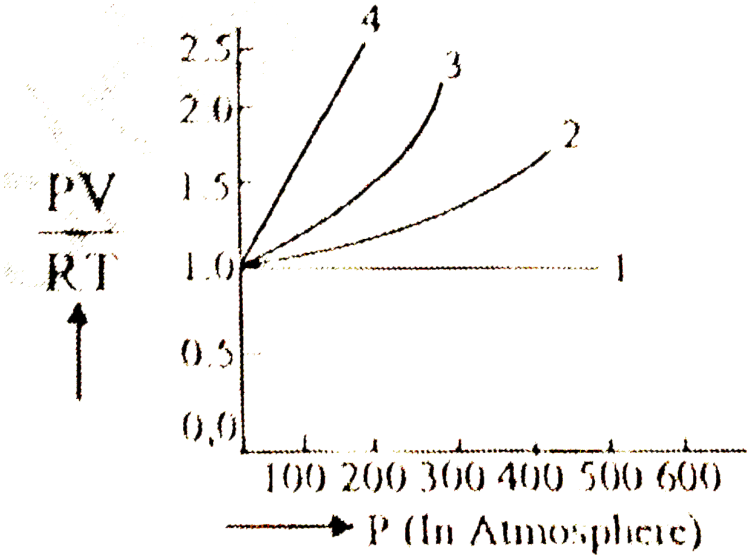
28. A fixed amount of ideal gas (1 mole) is taken and is subjected to pressure and temperature variation. The experiment is performed at low pressures as well as at high temperatures. The results obtained are shown in the Fig. The correct variation of $\frac{PV}{RT}$ with P will be exhibited by



A. Curve (4)

B. Curve (3)

C. Curve (2)

D. Curve (1)

Answer: 4

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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

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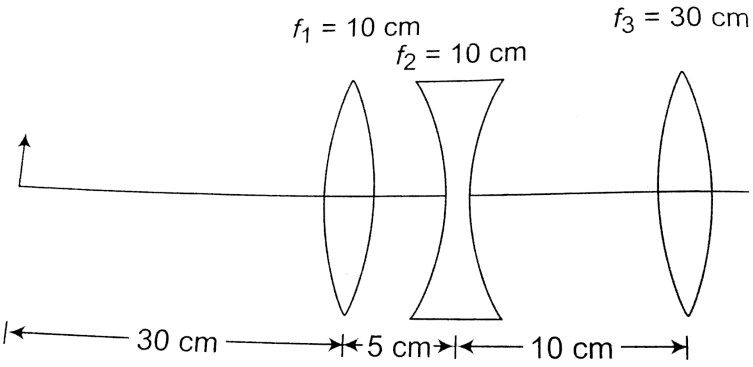
30.



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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Part B Chemistry

1. Borate form green colour flame when burunt With (Conc. H_(2)S0_(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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2. 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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3. 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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4. 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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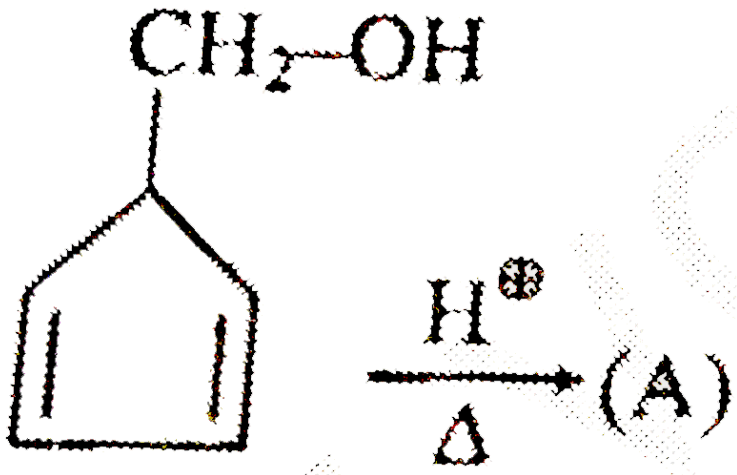
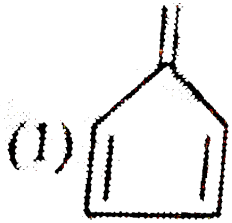
5. 

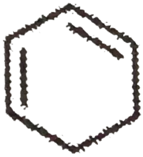


A.

B.

(3) 

C.

(4) 

D.

Answer: 2

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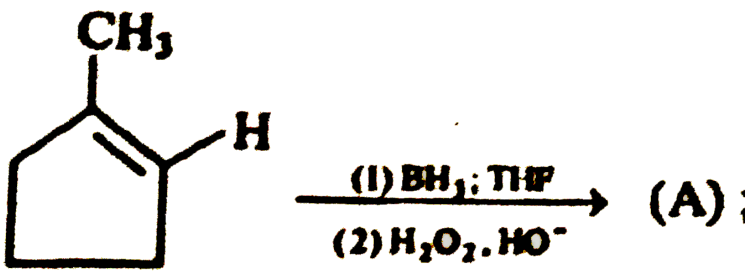
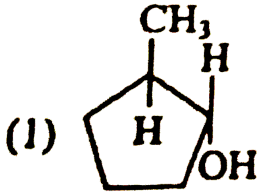
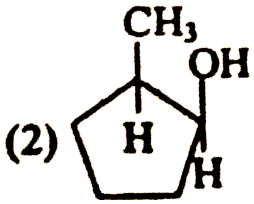
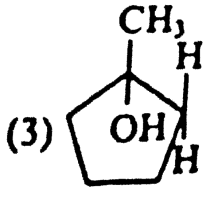
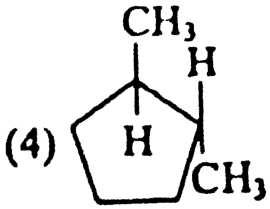
6. 

A. 

B. 

C. 

D. 

Answer: 1

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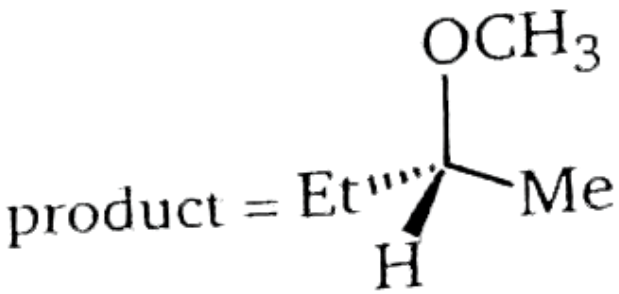
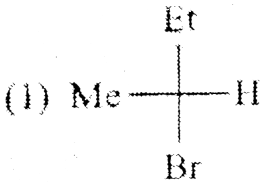
7. The back side attack on -- bromobutan by methoxide $\left(CH_3O^-\right)$ gives the product shown below j. which fischer projeaction represents 2-

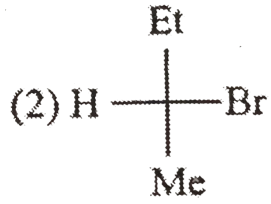
bromobutane used a sthe reactant in this raction ?



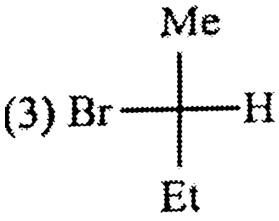
A.



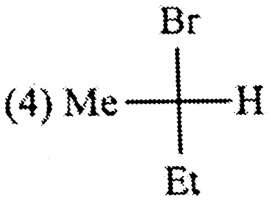
B.



C.



D.



Answer: 4

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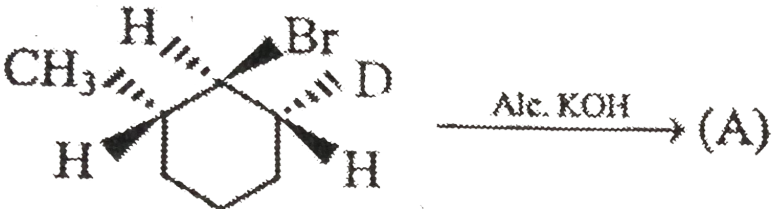
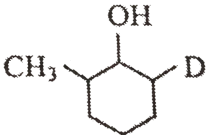
8.



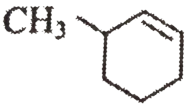
Major product of this reaction is :

A. (1)

B. (2)



C. (3)



D. (4)

Answer: 3

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9. 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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10. 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

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11. 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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12. Which of the following solid has maximum melting points?

A. Ice

B. dry ice

C. SiO_2

D. KCl

Answer: 3

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13. 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

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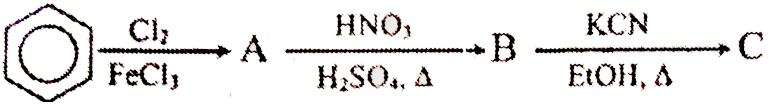
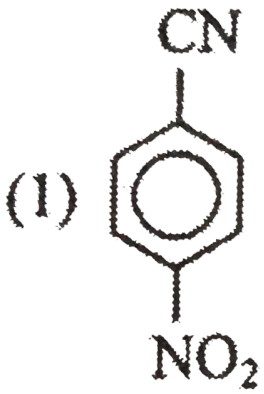
14. 

The product C is -

A. 

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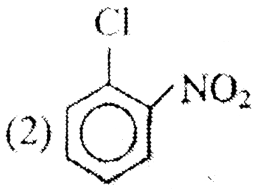

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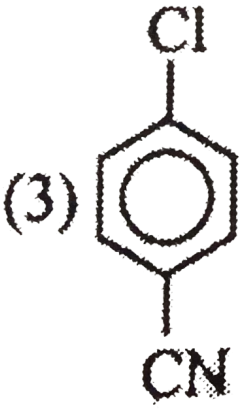
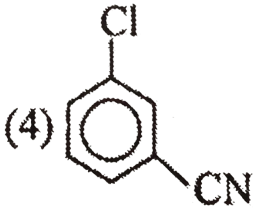


D.



Answer: 1

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15. 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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16. 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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17. 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

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

A. $0.4 \times N_A$

B. $0.1 \times N_A$

C. $4 \times N_A$

D. None of these

Answer: 4

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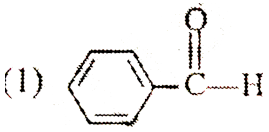
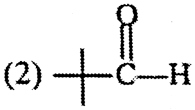
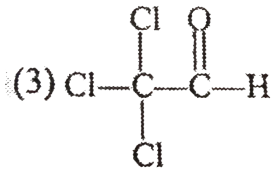
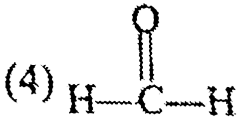
19. Which of the following donot give Cannizzaro reaction ?

A. 

B. 

C. 

D. 

Answer: 3

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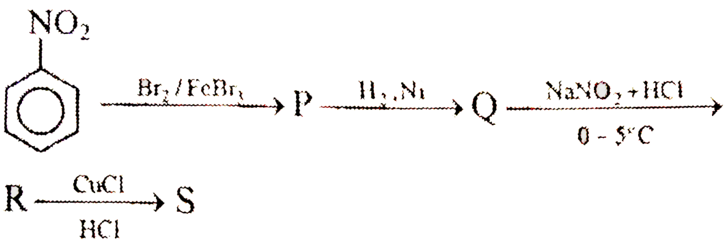
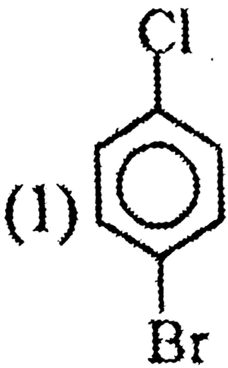
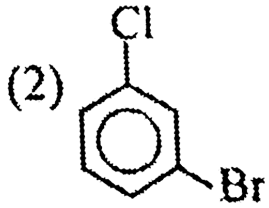
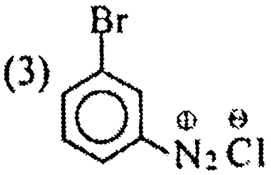
20. Consider the following reactions,

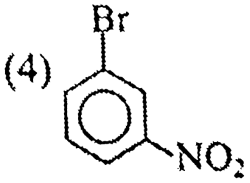


The end product 'S' is -

A. 

B. 

C. 

D. 

Answer: 2

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21. 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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22. The order of leaving group ability is

. $\underset{(I)}{OAc.}^{-}$ $\underset{(II)}{OMe.}^{-}$ $\underset{(III)}{SO_3Me.}^{-}$ $\underset{(IV)}{SO_3CF_3}$ The order of leaving group 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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23. 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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24. 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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25. Calculate partial pressure of B at equilibrium in the following equilibrium

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

A. 2

B. 3

C. 17

D. 5.8

Answer: 1

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

A. $278.7^\circ C$

B. $278.7K$

C. 300 K

D. 298 K

Answer: 1

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

A. Freczing point

B. Density

C. ionic product of water

D. its reaction with sodium

Answer: 2

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28. Carborundum is -

A. BN

B. SiO_4

C. SiC

D. CS_2

Answer: 3

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

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

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

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

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

Answer: 2

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