PHYSICS

BOOKS - CAREER POINT

MOCK TEST 7

Part A Physics

1. Two balls, each of radius R, equal mass and density are placed in contact, then the force of gravitation between them is proportional to

A. $F \propto \frac{1}{R^2}$

B. $F \propto R$

C. $F \propto R^4$

D. $F \propto \frac{1}{R}$

Answer: 3

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2. A mass is suspended separately by two springs of spring constants k_1 and k_2 in successive order. The time periods of oscillations in the two cases are T_1 and T_2 respectively. If the same mass be suspended by connecting the two springs in parallel, (as shown in figure) then the time period of oscillations is T. The

correct relations is

A. $T^2 = T_1^2 + T_2^2$

B. $T^{-2} = T_1^{-2} + T_2^{-2}$

C. $T^{-1} = T_1^{-1} + T_2^{-1}$

D. $T = T_1 + T_2$

Answer: 2

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3. A stone of relative density K is released from rest on

the stone sinks in water with an accleration of -

A. $g(1-k)$

B. $g(1+k)$

C. $g\left(1-\frac{1}{k}\right)$

D. $g\left(1+\frac{1}{k}\right)$

Answer: 3

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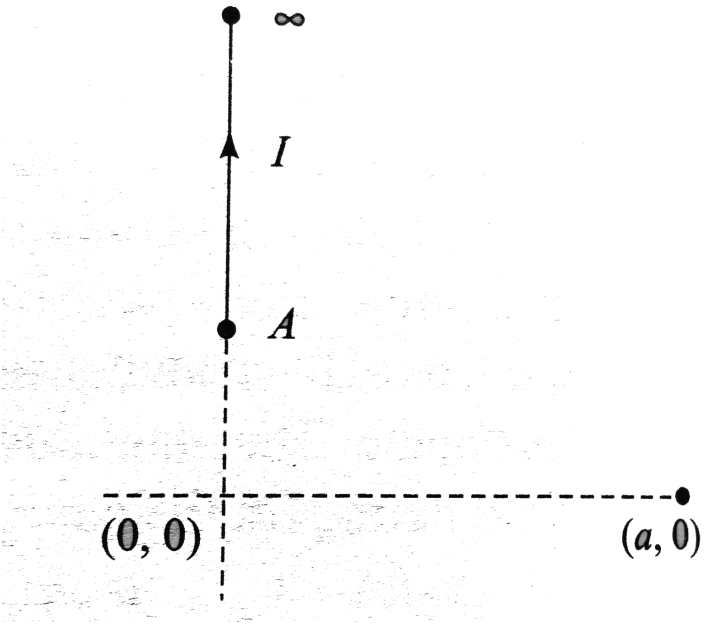
4. An infinitely long wire carrying current I is along Y-axis such taht its one end is at point A(0,b) while the wire extends upto $+\infty$. The magnitude of magnetic

field strength at point (a,0) is



A. $\frac{\mu_0 I}{4\pi a}\left(1+\frac{b}{\sqrt{a^2+b^2}}\right)$

B. $\frac{\mu_0 I}{4\pi a}\left(1-\frac{b}{\sqrt{a^2+b^2}}\right)$

C. $\frac{\mu_0 I}{4\pi a}\left(\frac{b}{\sqrt{a^2+b^2}}\right)$

D. None of these

Answer: 2

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5. The magnetic flux (ϕ) linked with the coil depends on time t as $\phi = at^n$, where a and n are constants. The emf induced in the coil is e

A. If $0 < n < 1$, $e \neq 0$ and |e| decrease with time

B. If $n = 1$, e is constant

C. If $n > 1$, $|e|$ increase with time

D. None of these

Answer: 4

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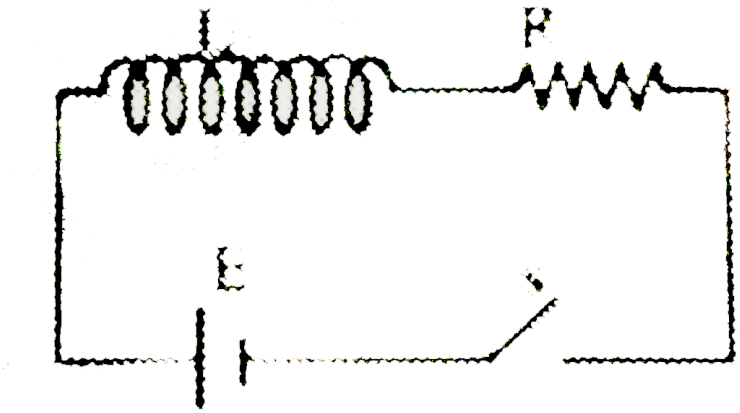
6. A cricuite contains an inductance L, a resistance R and a battery of emf E. The circulit is switched on at $t = 0$. The change flows through the battery in one time constant (τ) is-



A. $\frac{2E\tau}{Re}$

B. $\frac{E\tau}{2Re}$

C. $\frac{E\tau}{Re}$

D. zero

Answer: 3

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7. An e.m.f. $E = 4\cos(1000t)$volt is applied to an LR circuit of inductance $3mH$ and resistance $4ohm$. The amplitude of current in the circuit is

A. $4\sqrt{7}A$

B. $1.0A$

C. $\frac{4}{7}A$

D. $0.8A$

Answer: 4

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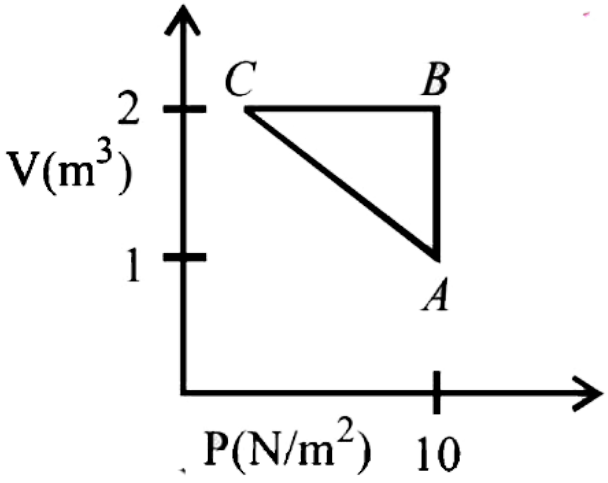
8. An ideal gas is taken through the cycle $A \to B \to C \to A$, as shown in the figure, If the net heat supplied to the gas in the cycle is 5J, the work done by the gas in the process CtoA is



A. $5J$

B. $-10J$

C. $-15J$

D. $-20J$

Answer: 1

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9. A small metal ball of diameter $4mm$ and density $10.5g/cm^3$ in dropped in glycerine of density $1.5g/cm^3$. The ball attains a terminal velocity of $8cms^{-1}$. The coefficient of viscosity of glycerine is

A. 4.9 poise

B. 9.8 poise

C. 98 posie

D. 980 posie

Answer: 2

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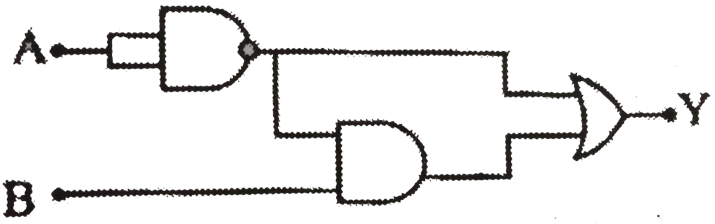
10.



The out put Y is

A. $A + \overline{A}B$

B. $\overline{A} + AB$

C. $\overline{A}$

D. None of these

Answer: 3

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11. An FM transmission has a frequency deviation of $18.75KHz$. Calcualte present present modulation if it is broadcast in 88- 108 MHz band.

A. $37.5\ \%$

B. $12.5\ \%$

C. $50\ \%$

D. $25\ \%$

Answer: 4

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12. The two interfering waves have intensities in the ratio $9:4$. The ratio of intensities of maxima and minima in the interference pattern will be

A. $1:25$

B. $25:1$

C. $9:4$

D. $4:9$

Answer: 2

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13. An organ pipe P_1 closed at one end vibrating in its first overtone and another pipe P_2 open at both ends vibrating in third overtone are in resonance with a given tuning fork . The ratio of the length of P_1 to that of P_2 is

A. $1:2$

B. $1:3$

C. $3:8$

D. $3:4$

Answer: 3

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14. A stationary objected at $0^\circ C$ and weighing 3.5 kg falls from a height of 2000m on a snow mounation at $0^\circ C$. If the temperature of the object just before hitting the snow is $0^\circ C$ and the object comes to rest immediately $\left(g = 10m/s^2\right)$ and (latent heat of ice = $3.5 \times 10^5 \text{joule}/s\big)$ then the mass of ice that will melt is -

A. 2 kg

B. 200 gram

C. 20 gram

D. 2 gram

Answer: 2

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15. Magnetic field at the center (at nucleus) of the hydrogen like atom $(\text{atomic number} = z)$ due to the motion of electron in nth orbit is proporional to

A. $\frac{n^2}{z^3}$

B. $\frac{n^4}{Z}$

C. $\frac{z^2}{n^3}$

D. $\frac{z^3}{n^5}$

Answer: 4

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16. A light of wavelengt 1240Å falls on a metallic sphere of radius 1 m and work function $W_0 = 3eV$. The maximum number of electron left from the sphere till photoelectric effest stops will be- (approximately)

A. 5×10^6

B. 5×10^7

C. 5×10^9

D. 5×10^{12}

Answer: 3

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17. Let $p = \frac{Qr^3}{\pi R^5}$ be the volume charge density at distance r from the centre for a a soild sphere of radius R and charge Q. The electric field at $r = \frac{R}{2}$ from the centre will be

A. $\frac{Q}{4\pi\varepsilon_0 R^2}$

B. $\frac{Q}{40\pi\varepsilon_0 R^2}$

C. $\frac{Q}{8\pi\varepsilon_0 R^2}$

D. None

Answer: 2

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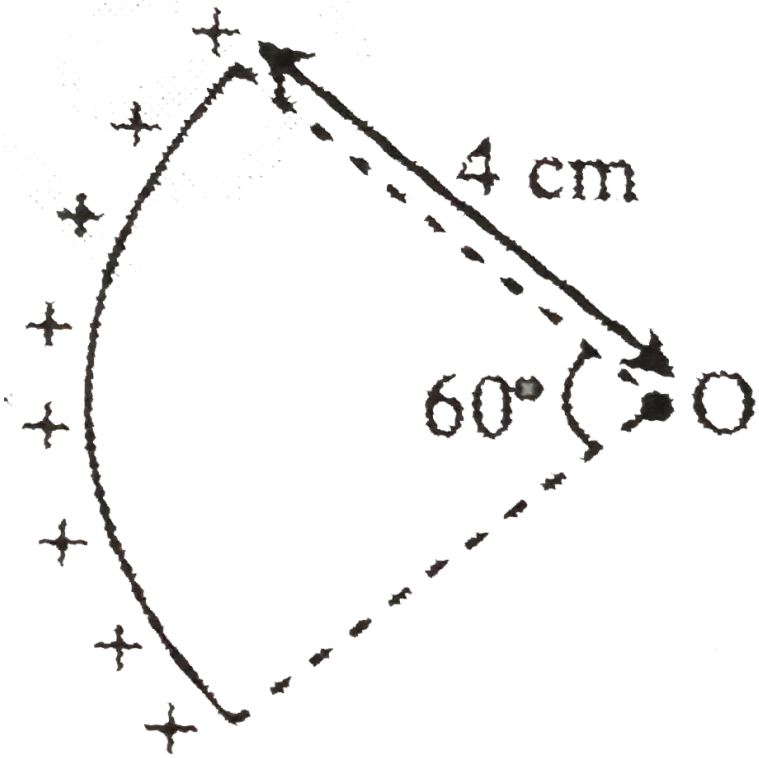
18. The electric field at centre O, due to the segment of a ring of liner change density $8C/cm$ is -



A. $9 \times 10^{13} V/m$

B. $16 \times 10^{13} V/m$

C. $8 \times 10^{13} V/m$

D. $18 \times 10^{13} V/m$

Answer: 4

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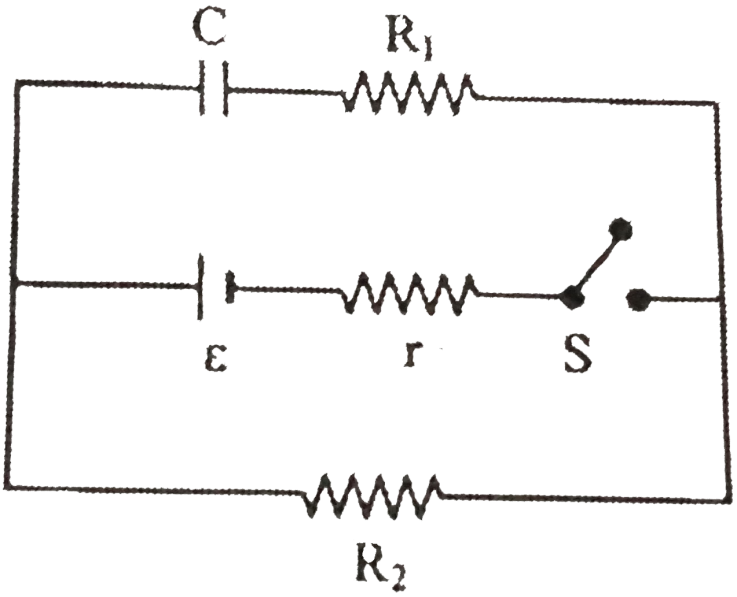
19. In given circuit, switch S is closed at t=0 . The charge on the capacitor ar steady state will be



A. $\frac{C\varepsilon R_1}{r+R_1}$

B. $\frac{C\varepsilon R_2}{r+R_2}$

C. $\frac{C\varepsilon R_2}{r+R_1}$

D. $\frac{C\varepsilon R_1}{r+R_2}$

Answer: 2

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20. If a_r and a_t represent radial and tangential accelerations, the motion of a particle will be uniformly circular if

A. $a_r = 0$ and $a_t = 0$

B. $a_r = 0$ and $a_t \neq 0$

C. $a_r \neq 0$ and $a_t = 0$

D. $a_r \neq 0$ and $a_t \neq 0$

Answer: 3

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21. A block of mass m is placed on a rough floor of a lift . The coefficient of friction between the block and the floor is μ. When the lift falls freely, the block is pulled horizontally on the floor. What is the force of friction -

A. μmg

B. $\mu mg/2$

C. $2\mu mg$

D. None of these

Answer: 4

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22. The potential energy U(in J) of a particle is given by $(ax + by)$, where a and b are constants. The mass of the particle is $1kg$ and x and y are the coordinates of the particle in metre. The particle is at rest at $(4a, 2b)$ at time $t = 0$.

Find the speed of the particle when it crosses x-axis

A. $2\sqrt{a^2 + b^2}$

B. $\sqrt{a^2 + b^2}$

C. $\frac{1}{2}\sqrt{a^2+b^2}$

D. $\sqrt{\frac{(a^2+b^2)}{2}}$

Answer: 1

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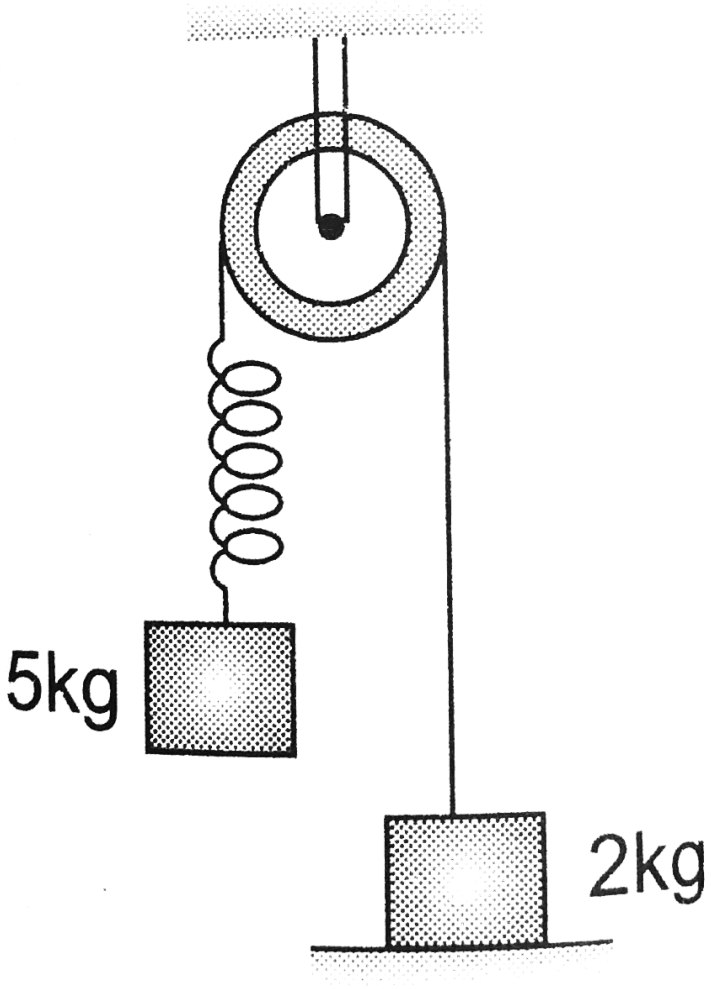
23. System shown in figure is released from rest . Pulley and spring is mass less and friction is absent everywhere. The speed of $5kg$ block when $2kg$ block leaves the constant of with ground is (force constant

of spring $k = 40N/m$ and $g = 10m/s^2$)



A. $\sqrt{2}m/s$

B. $2\sqrt{2}m/s$

C. $2m/s$

D. None of these

Answer: 2

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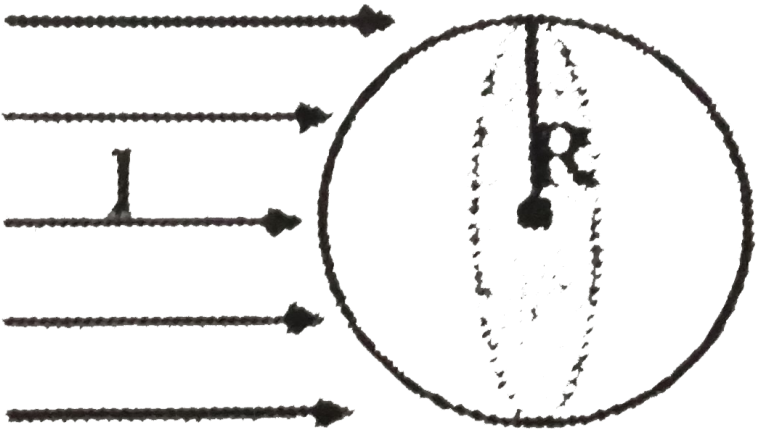
24. Consider a sphere of radius R exposed to radition of instensity I as shown in figure . If surface of sphere is partially reflection and reflection coefficient is 0.3, then

radiation force experienced is :



A. $\frac{\pi R^2 I}{c}$

B. $\frac{1.7\pi R^2 I}{c}$

C. $\frac{0.3\pi R^2 I}{c}$

D. None of these

Answer: 4

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25. A ring of radius R is first rotated with an angular velocity ω and then carefully placed on a rough horizontal surface. The coefficient of friction between the surface and the ring is μ. Time after which its angular speed is reduced to half is

A. $\frac{\omega_0 \mu R}{2g}$

B. $\frac{2\omega_0 R}{\mu g}$

C. $\frac{\omega_0 R}{2\mu g}$

D. $\frac{\omega_0 g}{2\mu g}$

Answer: 3

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26. A real object is placed in front of a convex mirror (fixed).The object is moving toward the mirror. If v_0 is the speed of object and v_i is the speed of image, then

A. $V_O > V_I$, always

B. $V_O > V_I$ always

C. $V_I > V_O$ initially and then $V_O > V_I$

D. $V_I < V_O$ initially and then $V_I > V_O$

Answer: 1

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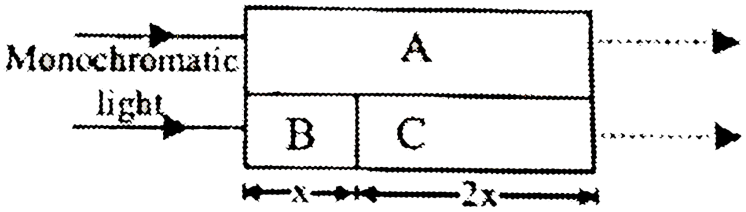
27. Consider slabs of three media A,B, and C. Arragned as shown inn figure . R.I of A is 1.5 and that of C is 1.4. If the number of waves in the combination B and C then refractive index of B is



A. 1.4

B. 1.5

C. 1.6

D. 1.7

Answer: 4

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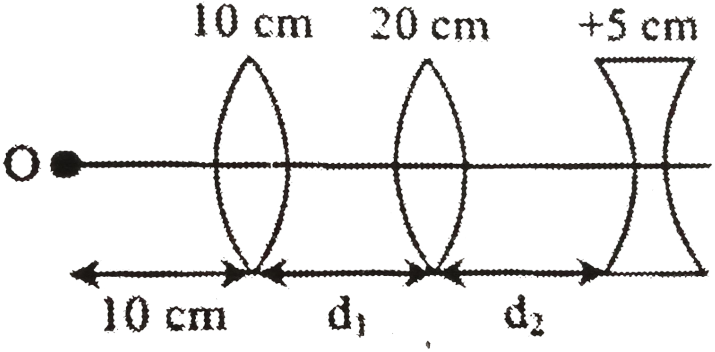
28. The value of the of d_1 and d_2 for final rays to be parallel to the principle axis are (focal lengths of the lenses are written on the lenses).



A. $d_1 = 10cm, d_2 = 15cm$

B. $d_1 = 20cm, d_2 = 15cm$

C. $d_1 = 30cm, d_2 = 15cm$

D. All of these

Answer: 4

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29. A mixture of plane polarised and unpolarised light falls normally on a polarising sheet. On rotating the polarising sheet about the direction of the incident beam, the transmitted intensity varies by a factor 4. Find the ratio of the intensities I_P and I_0 respectively of the polarized and unpolarised components in the incident beam. Next the axis of polarising sheet is fixed at an angle of 45° with the direction when the transmitted intensity is maximum. Then obtain the

total intensity of the transmitted beam in terms of I_0.

$\left[\frac{3}{2}, \frac{5I_0}{4}\right]$

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

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

C. $\frac{4}{3}$

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

Answer: 2

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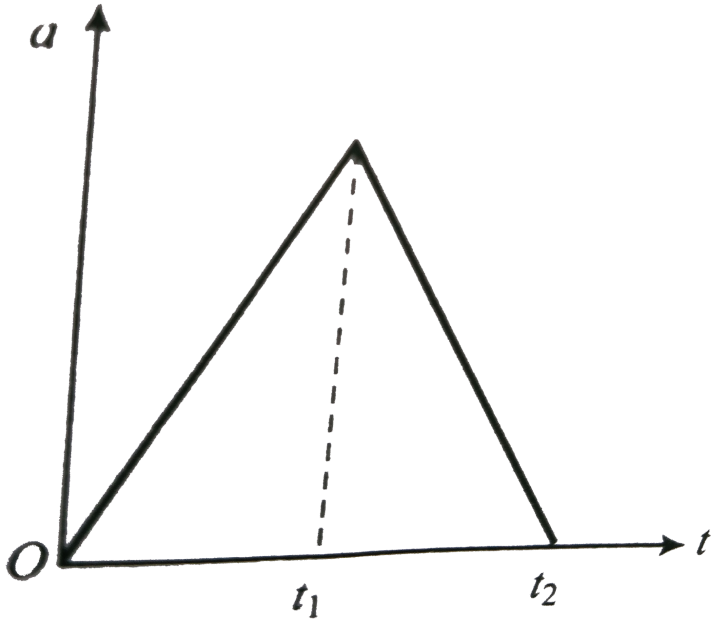
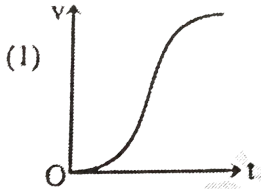
30. The acceleration versus time graph of a particle is shown in. The respective $v - t$ graph of the particle is .



A.



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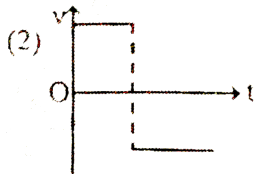

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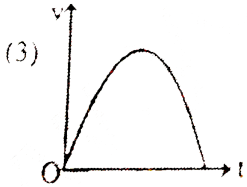
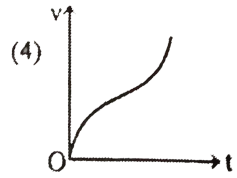


D. 

Answer: 1

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Part B Chemistry

1. $Ag_2S + NaCN \rightarrow (a)$

(a) $+ Zn \rightarrow (d)$

(b) is a metal. Hence (a) and (b) are

A. $Na_2\left[Zn(CN)_4\right], Zn$

B. $Na\left[Ag(CN)_2\right], Ag$

C. $Na_2\left[Ag(CN)_4\right], Ag$

D. $Na_3\left[Ag(CN)_4\right], Ag$

Answer: 2

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2. $[SiO_4]^{4-}$ has tetrahedral structure, the silicate formed by using the three oxygen has

A. Linear polymeric structure

B. Three dimensional structure

C. Pyrosilicate structure

D. Two dimensional sheet structure

Answer: 4

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3. The correct order of the acidic nature of oxides is in the order

A. $N_2O_5 < N_2O_3 < NO_2 < N_2O$

B. $N_2O < NO < N_2O_3 < NO_2 < N_2O_5$

C. $N_2O_5 < N_2O < N_2O_3 < NO < NO_2$

D. $NO < N_2O < N_2O_3 < NO_2 < N_2O_5$

Answer: 2

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4. Which of the following carbides gives propyne on hydrolysis?

A. CaC_2

B. Be_2C

C. MgC_2

D. Mg_2C_3

Answer: 3

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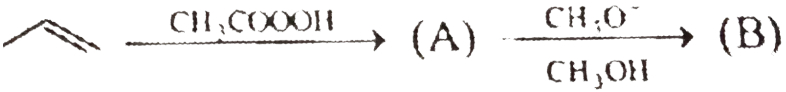
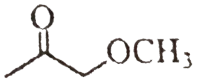
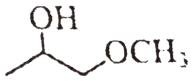
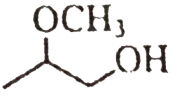
5. Consider the following sequence of reactions.



The product (B) is

A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer: 2

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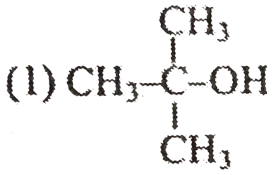
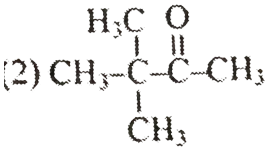
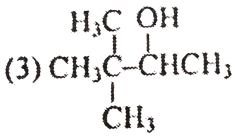
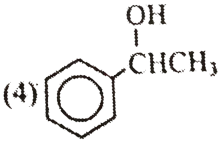
6. Which of the following compounds will not yield iodoform on heating with iodine and dilute NaOH?

A. 

B. 

C. 

D. 

Answer: 1

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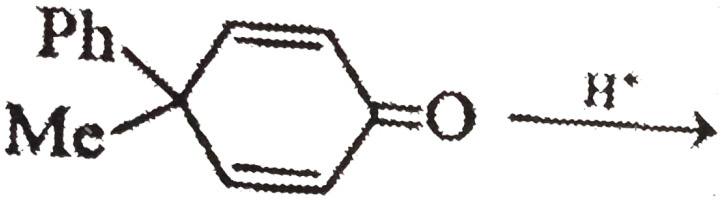
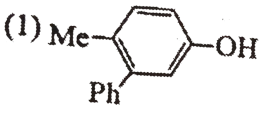
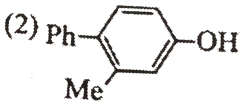
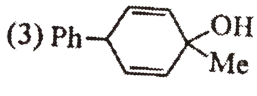
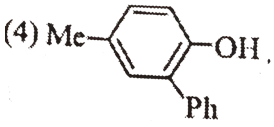
7. Identify the major product in the following reaction.



A. 

B. 

C. 

D. 

Answer: 1

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8. Cadmium amalgam is prepared by electrolysis of a solution of $CdCI_2$ using of 4A be passed in order to perpare $10\,\%$ by weight Cd in the Cd -Hg amalgamon cathode of 4.5 g Hg ?

A. 400 sec

B. 215.40 sec

C. 861.6 sec

D. 430.8 sec

Answer: 2

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9. 4 gm of sulphur dioxide gas diffuses from a container in 8 min. Mass of helium gas diffusing from the same container over the same time interval is :

A. 0.5 gm

B. 1 gm

C. 2 gm

D. None of these

Answer: 2

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10. The oxidation number of nitrogen atoms in NH_4NO_3 are:

A. $+3, \ +3$

B. $+3, \ -3,$

C. $-3, \ +5,$

D. $-5, \ +3$

Answer: 3

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11. Select incorrect statement :

A. Central metal in Vitamine B_{12} is Co^{+3}

B. The donor sites of $EDTA^{-4}$ are two N- atoms and four O- atoms

C. Hybrid state of Cu in $\left[Cu(NH_3)_4\right]^{+2}$ is sp^3

D. $CuSO_{4(aq)}$ froms $K_3\left[Cu(CN)_4\right]$ with excess KCN

Answer: 3

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12. Which of the following salt on heating with solid $K_2Cr_2O_7$ and Conc. H_2SO_4 , orange red vapours are

evolved which turn NaOH solution yellow.

A. $NaBr$

B. NaCl

C. $NaNO_2$

D. NaI

Answer: 2

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13. Which substance has the highest melting point?

A. NaCl

B. CO

C. SiO_2

D. P_4O_{10}

Answer: 3

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14. which of the following oxides is amphoteric ?

A. Na_2O

B. Cao

C. ZnO

D. CO_2

Answer: 3

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15. Ionisation energy of He^+ is $19.6 \times 10^{-18} J \text{atom}^{-1}$. The energy of the first stationary state $(n = 1)$ of Li^{2+} is

A. $4.41 \times 10^{-19} J \text{atom}^{-1}$

B. $-4.41 \times 10^{-17} J \text{atom}^{-1}$

C. $-2.2 \times 10^{-15} J \text{atom}^{-1}$

D. $8.82 \times 10^{\widehat{u}17} J \text{atom}^{-1}$

Answer: 2

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16. The ionic radii of Rb^+ and I^- are 1.46 and 2.16Å.

The most probable type of structure exhibited by it is:

A. CsCl type

B. NaCl type

C. ZnS type

D. $CaF_2 type$

Answer: 2

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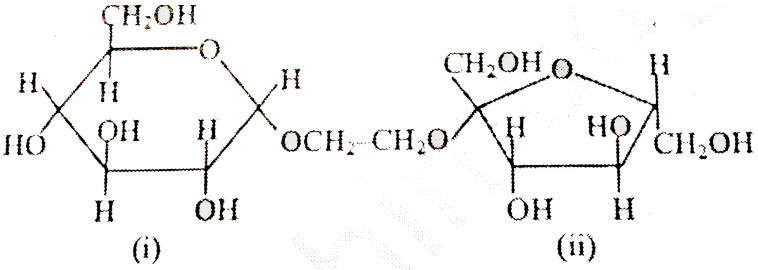
17. The correct statement about the following disaccharide is :



A. 

B. 

C. 

D. 

Answer: 1

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18. Cummen

is

prepeared by :

A. (1) + Cl $\xrightarrow[\text{Anhydrous}]{AlCl_3}$

B. (2) + Cl $\xrightarrow[\text{Anhydrous}]{AlCl_3}$

C. (3) + $\xrightarrow{H^+}$

D. 

Answer: 4

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19. In Reimer-Tiemann reaction molecular weight of phenol increases by:

A. 28

B. 29

C. 30

D. 31

Answer: 1

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20. Chloroform has $\Delta H_{\text{vaporization}} = 29.2kJ/\text{mol}$ and boils at $61.2^\circ C$. What is the value of $\Delta H_{\text{vaporization}} = 29.2kJ/\text{mol}$ for chloroform ?

A. $87.3J/mol - K$

B. $477.1J/mol - K$

C. $-87.3J/mol - K$

D. $-477.1J/mol - K$

Answer: 1

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21. For which of the following reaction is product formation favoured by law pressure and high temperature?

A. $CO_2(g) + C(s) \Leftrightarrow 2CO(g), \Delta H^\circ = 172.5KJ$

B.

$$CO_2(g) + 2H_2(g) \Leftrightarrow CH_3OH, \Delta H^\circ = -21.7KJ$$

C. $2O_3(g) \Leftrightarrow 3O_2(g), \Delta H^\circ = -285kJ$

D. $H_2(g) + F_2(g) \Leftrightarrow 2HF(g), \Delta H^\circ = -541kJ$

Answer: 3

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22. Which dilute solution have the higher vapours presure ?

A. 0.002 M NaCl at $50^\circ C$

B. 0.003 M sucrose at $15^\circ C$

C. 0.005 M $CaCl_2 at 50^\circ C$

D. 0.005M $CaCl_2 at 25^\circ C$

Answer: 3

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23. The rate constant at $25^{\circ}C$ for the reaction of NH_4^+ and OH^- to form NH_4OH is $4 \times 10^{10} M^{-1} \sec^{-1}$ and ionisation constant of aq. NH_3 is 1.8×10^{-5}. The rate constant of proton transfer to NH_3 is

A. 1.8×10^{-5}

B. $7.2 \times 10^{+5}$

C. 3.6×10^{5}

D. 4.2×10^{-5}

Answer: 2

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24. Polyethylene can be produced from calcium carbide according to the following sequence of reactions

$CaC_2 + H_2$ or $arrCaO + HC \equiv CH$

$nHC \equiv CH + nH_2 \rightarrow (-CH_2 - CH_2-)_n$

The mass of polyethylene which can be produced from $40.0kg$ of CaC_2 is

A. 6.75 kg

B. 7.75 kg

C. 8.75 kg

D. 9.75 kg

Answer: 3

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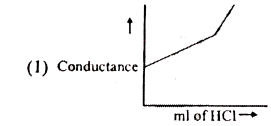
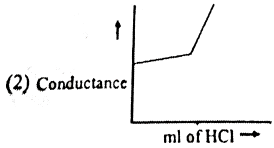
25. Which of the following respresent the variation of conducatnes of solution if weak base NH_4OH is titrated with dilute HCl?

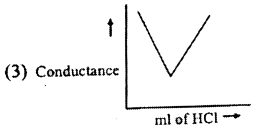
A.



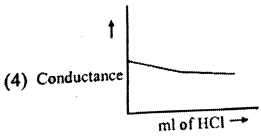
B.



C.



D.



Answer: 2

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26. The formation of cyanohydrin from ketone is an example of :

A. electrophilic addition

B. nucleophilic addition

C. nuclecophilic substituion

D. electrophilic substitrution

Answer: 2

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27. Aniline on being heated with CS_2 in the presence of $HgCl_2$ gives-

A. Phenyl thiocyanate

B. Phenyl cyanate

C. Phenyl isothiocyante

D. N-phenyldithicarbamic acid

Answer: 3

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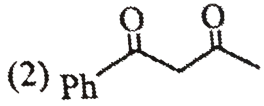
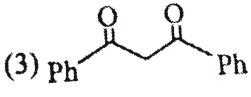
28. Which of the following compound has highest enol content ?

A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer: 3

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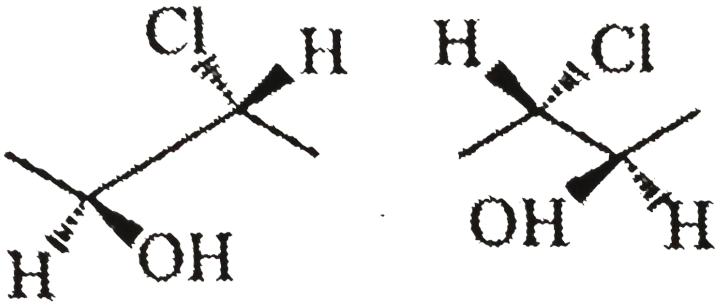
29. Relation between gives pair is -



A. Enantiomer

B. Diastereomers

C. Identical

D. Structural isomer

Answer: 1

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30. The stability order of following carbocation is

A. $i > ii > iii$

B. $iii > ii > i$

C. $iii > i > ii$

D. $i > iii > ii$

Answer: 1

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