PHYSICS

BOOKS - CAREER POINT

MOCK TEST 4

Physics

1. The moon has a mass of $\frac{1}{81}$ that of the earth and radius of $\frac{1}{4}$ that of the earth. The escape speed from the surface of the earth is 11.2 km/s. The escape speed from surface of the moon is-

A. $1.25 km/s$

B. $2.49km/s$

C. $3.7km/s$

D. $5.6km/s$

Answer: B

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2. The displacement of a particle executing SHM is given by

$Y = 5 \sin\left(4t + \frac{\pi}{3}\right)$

If T is the time period and the mass of the particle is 2g, the kinetic energy of the particle When t=$\frac{T}{4}$ is given by-

A. 0.4J

B. 0.5J

C. 3J

D. 0.3J

Answer: D

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3. A wooden block of mass 8kg is tied to a string attached to the bottom of a tank. The block is completely inside the water. Relative density of wood is 0.8. Taking g=$10m/s^2$, What is the tension in the string ?

A. 100N

B. 80N

C. 50N

D. 20N

Answer: D

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4. Two long parallel wires carry currents i_1 and i_2 such that $i_1 > i_2$. When the currents are in the same direction, the magnetic field at a point midway between the wires is $6 \times 10^{-6} T$. If the direction of i_2 is reversed, the field becomes $3 \times 10^{-5} T$. The ratio $\frac{i_1}{i_2}$ is

A. $1/2$

B. 2

C. $2/3$

D. $3/2$

Answer: D

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5. A copper disc of radius 0.1 m is rotated about its centre with 20 revolution per second in a uniform magnetic field of 0.1 T with its plane perpendicular to the field. The emf induced across the radius of the disc is-

A. $\frac{\pi}{20}$ volt

B. $\frac{\pi}{10}$ volt

C. 20π millivolt

D. 100π millivolt

Answer: C

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6. A bulb is rated at $100V$, $100W$. It can be treated as a resistor. Find out the inductance of an inductor (called choke coil) that should be connected in series with the bulb at its rated power with the help of an ac source of $200V$ and $50Hz$.

A. $\frac{\pi}{\sqrt{3}}H$

B. $100H$

C. $\frac{\sqrt{2}}{\pi}H$

D. $\frac{\sqrt{3}}{\pi}H$

Answer: D

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7. Bulk modules of elasticity for isobaric process is

A. equal to that of isochoric process.

B. equal to that of isothermal process.

C. zero

D. infinite

Answer: C

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8. Equal temperature difference exists between the ends of two metallic rods 1 and 2of equal length. Their thermal conduetivities are K_1 and K_2 and cross sectional areas are respectively A_1 and A_2. The condition for equal rate of heat transfer will be-

A. $K_1A_2 = K_2A_1$

B. $k_1^2A_2 = k_2^2A_1$

C. $K_1A_1 = K_2A_2$

D. $K_1A_1^2 = K_2A_2$

Answer: C

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9. Two wires of copper are given . Write A: length e and radius r, wire B: length e and radius 2r. If Young's modulus for wire A is Y_A and for wire B is Y_B. Then-

A. $Y_A = 4Y_B$

B. $4Y_A = Y_B$

C. $Y_A = Y_B$

D. $Y_A = 2Y_B$

Answer: C

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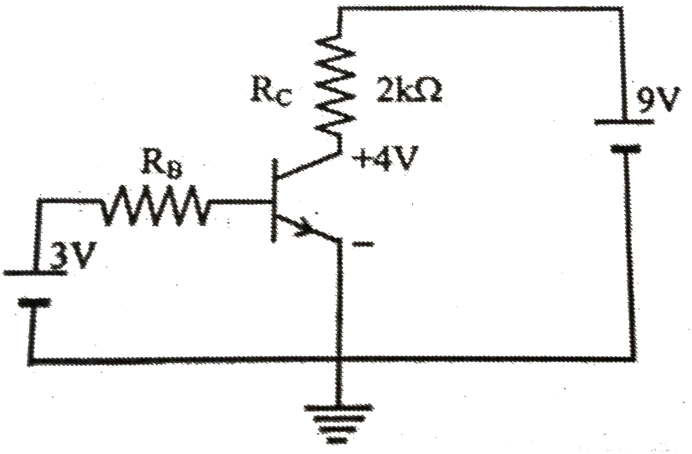
10. What is the base resistance R_B in the circuit as shown in figure , if $\beta_{d.c.} = 90, V_{BE} = 0.7V, V_{CE} = 4V$?



A. $29K\Omega$

B. $82K\Omega$

C. $108K\Omega$

D. $55K\Omega$

Answer: B

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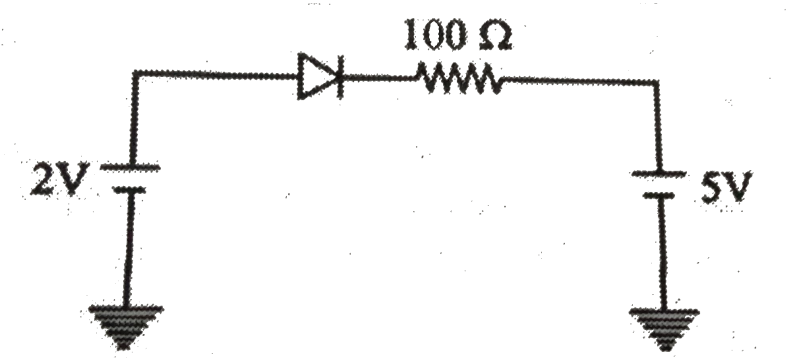
11. Current through the ideal diode is -



A. 0

B. 0.03 Amp

C. 0.07 amp

D. None of these

Answer: A

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12. Two waves $Y_1 = A \cos (0.5\pi x - 100\pi t)$ and Y_2= Acos $(0.46\pi x - 92\pi t)$ are treavelling in a pipe along x-axis. (y and x are in metre). How many times in a second does a stationary any observer hear loud sound (maximum intensity) ?

A. 4

B. 8

C. 10

D. 12

Answer: A

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13. Two boys stand close to a long straight metal pipe and at some distance from each other. One boy fires a gun and the other hears two explosions , with a time interval of one second between them. If the velocity of sound in metal is 3630 m s^{-1} and in air is 330 ms^{-1}, the distance between the two boys is

A. 36.3 m

B. 726 m

C. 363 m

D. 3630 m

Answer: C

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14. A gas mixture consists of molecules of type 1,2 and 3, with molar masses $m_1 > m_2 > m_3$. V_{rms} and $\bar{K}$ are the r.m.s. speed and average kinetic energy of the gases. Which of the following is true-

A.

$$(V_{rms})_1 < (V_{rms})_2 < (V_{rms})_3 \& (\overline{K})_1 = (\overline{K})_2 = (\overline{K})_3$$

B.

$$(V_{rms})_1 = (V_{rms})_2 = (V_{rms})_3 \& (\overline{K})_1 = (\overline{K})_2 > (\overline{K})_3$$

C.

$$(V_{rms})_1 > (V_{rms})_2 > (V_{rms})_3 \& (\overline{K})_1 < (\overline{K})_2 > (\overline{K})_3$$

D.

$$(V_{rms})_1 > (V_{rms})_2 > (V_{rms})_3 \& (\overline{K})_1 < (\overline{K})_2 < (\overline{K})_3$$

Answer: A

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15. A He-atom is de-excited from and energy level "n" to ground state to emit two consecutive photons of wavelength 1085Å. Then n will be-

A. 3

B. 4

C. 5

D. 6

Answer: C

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16. A radioactive decay chain starts from $._{93}Np^{237}$ and produces $._{90}Th^{229}$ by successive emissions. The emitted particles can be

A. Two $\alpha-$ particles and one $\beta-$ particles

B. Three β^+ particles

C. One $\alpha-$ particle and two β^+ particles

D. One $\alpha-$ particle and two β^- particles

Answer: A

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17. A potential difference of 10^3 V is applied across an X-ray tube. The ratio of the de-Broglie wavelength of the incident electrons to the shortest wavelength of X-rays products is - $\left(e/m = 1.8 \times 10^{14} C/kg$ for an electron)

A. $1/20$

B. $1/100$

C. 1

D. None of these

Answer: C

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18. A charge q is placed at (1,2,1) and another charge -q is placed at (0,1,0) such that they form an electric dipole . There exists a uniform electric field $\vec{E} = \left(2\hat{i} + 3\hat{j}\right)$. the torque experienced by the dipole is -

A. $q(-3\hat{i} + 2\hat{j} + \hat{k})$

B. $q(\hat{i} + \hat{j} + \hat{k})$

C. $q(3\hat{i} + \hat{j} + \hat{k})$

D. None of these

Answer: A

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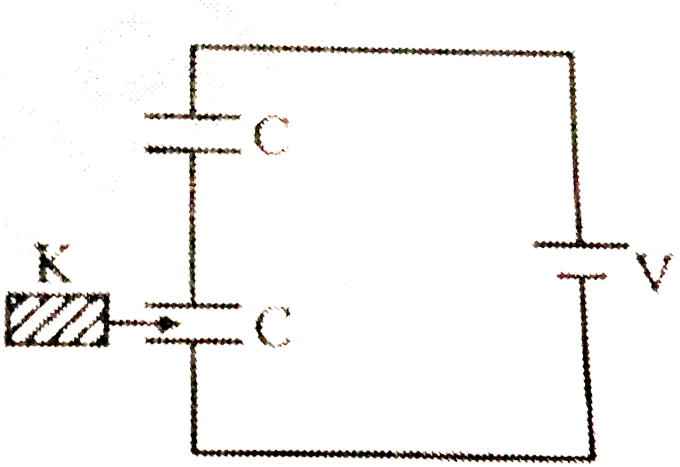
19. The work done in placing the dielectric slab inside one of the capacitors as shown in diagram



A. $\frac{CV^2}{2}\left(\frac{K-1}{K+1}\right)$

B. $\frac{CV^2}{4}\left(\frac{K-1}{k+1}\right)$

C. $\frac{CV^2}{4}\left(\frac{K+1}{K-1}\right)$

D. $\frac{CV^2}{2}\left(\frac{K+1}{k-1}\right)$

Answer: B

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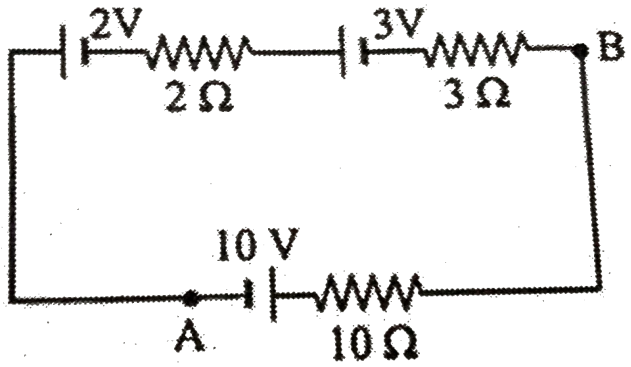
20. The potential difference between A and B in the circuit shown is -



A. 10V

B. 5 V

C. 15 V

D. zero

Answer: D

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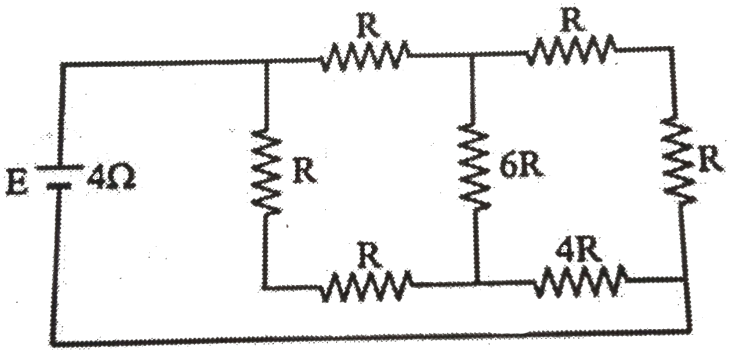
21. A battery of internal resistance 4Ω is connected to the network of resistance as shown. In order to give the maximum power to the network, the value of R should be-



A. $\frac{4}{9}\Omega$

B. $\frac{8}{9}\Omega$

C. 2Ω

D. $\frac{11}{7}\Omega$

Answer: C

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22. A coin, placed on a rotating turntable slips, when it is placed at a distance of $9cm$ from the center. If the angular velocity of the turnable is tripled, it will just slip, If its distance from the center is

A. 27 cm

B. 9 cm

C. 3 cm

D. 1 cm

Answer: D

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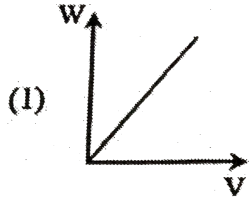
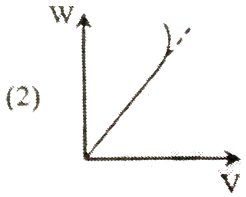
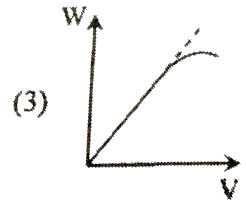
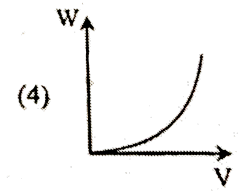
23. A particle initially at rest on a frictionless horizontal surface, is acted upon by a horizontal force which is constant is size and direction. A graph is plotted between the work done (W) on the particle, against the speed of the particle, (v). If there are no other horizontal forces acting on the particle the graph would look like

A.



B. 

C. 

D. 

Answer: D

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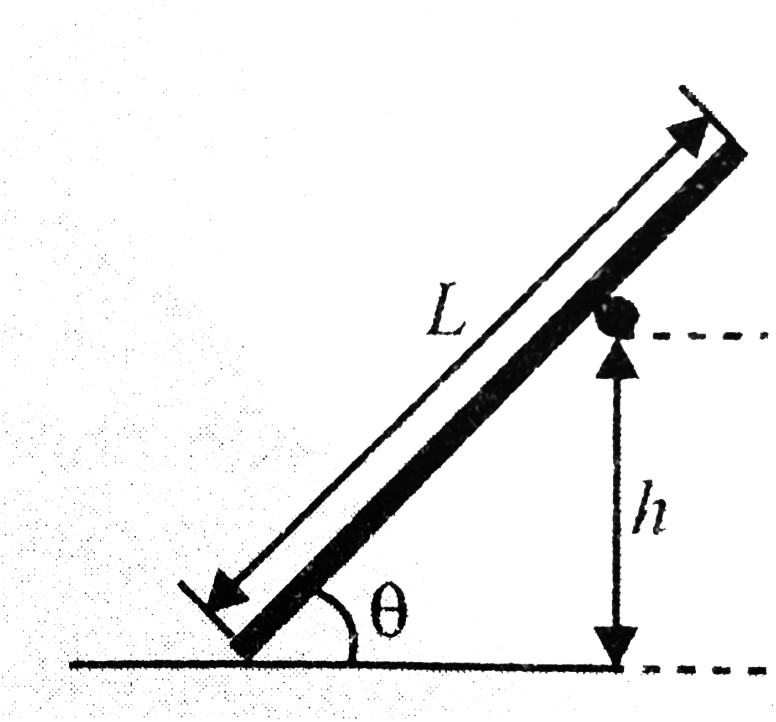
24. A uniform rod of length L rests against a smooth roller as shown in Fig. Find the friction coefficient between the

ground and the lower end if the minimum angle that the rod can make with the horizontal is θ.



A. $\mu = \dfrac{l \ \cos \ 0 \ \sin^2 0}{2h - l\cos^2 0 \sin 0}$

B. $\mu = \dfrac{l \sin 0 \cos^2 0}{2h - l\cos 0 \sin^2 0}$

C. $\mu = \dfrac{l \sin 0 \cos^2 0}{2h - l\cos 0 \sin 0}$

D. None of these

Answer: A

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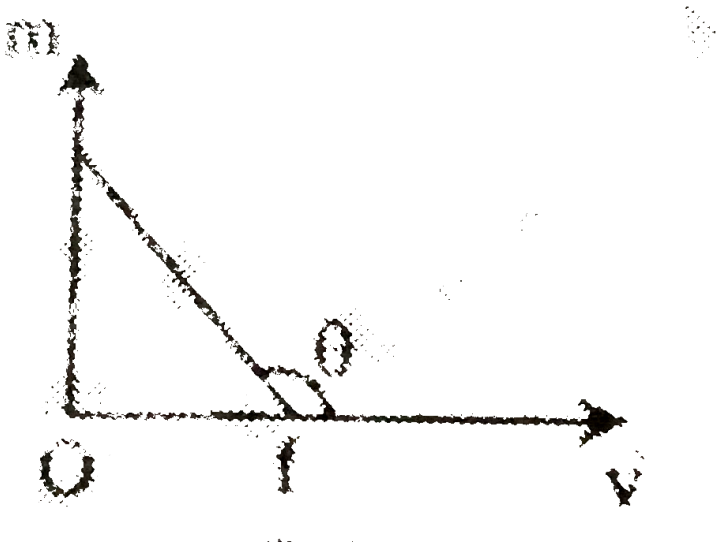
25. Variation of magnification(m) produced by a thin convex lens versus distance (v) of image from pole of the lens is shown in the graph. Which of the following statements is not correct ?



A. Focal length of the lens is equal to intercept on v-axis

B. Focal length of the lens is equal to inverse of the slope of the line (in magnitude)

C. Magnitude of intercept on m-axis is equal to unity

D. Magnitude of intercept on v-axis is equal to unity

Answer: D

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26. In a double slit experiment , the coherent sources are spaced 2d apart and the screen is placed a distance D from the slits. If n^{th} bright fringe is formed on the screen exactly opposite to a slit , the value of n must be -

A. $\frac{d^2}{2\lambda D}$

B. $\frac{2d^2}{\lambda D}$

C. $\frac{d^2}{\lambda D}$

D. $\frac{d^2}{4\lambda D}$

Answer: B

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27. The equation of the stationary wave is

$$y = 2A \sin\left(\frac{2\pi ct}{\lambda}\right)\cos\left(\frac{2\pi x}{\lambda}\right)$$

Which of the following statements is wrong?

A. The unit of ct is same as that of λ

B. the unit of x is same as that of λ

C. the unit of $2\pi c/\lambda$ is same as that of $2\pi x/\lambda t$

D. the unit of c/λ is same as that of x/λ

Answer: D

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28. A projectile is thrown with a velocity of 20 m/s, at an angle of 60° with the horizontal. After how much time the velocity vector will make an angle of 45° with the horizontal (in upward direction) is (take g=$10m/s^2$) $-$

A. $\sqrt{3}\sec$

B. $1/\sqrt{3}\sec$

C. $(\sqrt{3-1}\sec$

D. None of these

Answer: C

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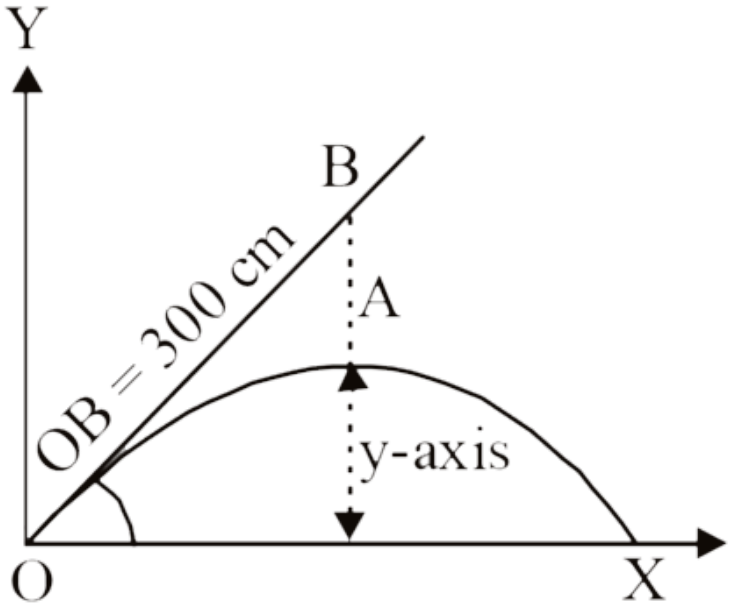
29. A ball 'A' is projected from origin with an initial velocity v_0 = 700 cm/sec in a direction 37° above the horizontal as shown in fig .Another ball 'B' 300 cm from origin on a line 37° above the horizontal is released from rest at the instant A starts. How far will B have fallen when it is hit by

A ?



A. 90 cm

B. 80 cm

C. 70 cm

D. 60 cm

Answer: A

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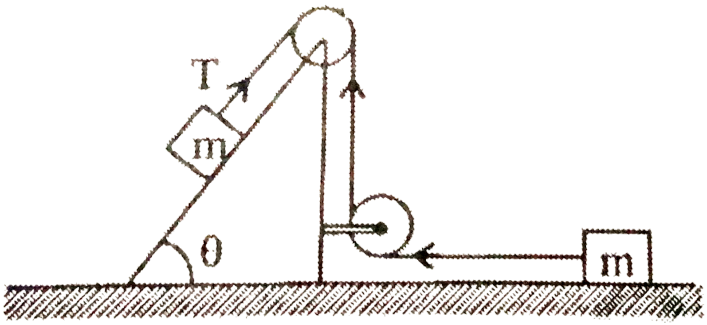
30. For the system shown in the figure, the pulleys are light and frictionless. The tension in the string will be-



A. $\frac{2}{3}$mg sin θ

B. $\frac{3}{2}$ mg sin θ

C. $\frac{1}{2}$ mg sinθ

D. 2mg sin θ

Answer: C

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Chemistry

1. Which is in the decreasing order of boiling points of V group hydrides ?

A. $NH_3 > PH_3 > AsH_3 > SbH_3$

B. $SbH_3 > AsH_3 > PH_3 > NH_3$

C. $PH_3 > NH_3 > AsH_3 > SbH_3$

D. $SbH_3 > NH_3 > AsH_3 > PH_3$

Answer: D

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2. The process used for the removal of hardness of water is

A. Calgon

B. Baeyer

C. Serpeck

D. Hoope

Answer: A

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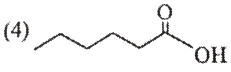
3. The product of the reaction is -

A. 

B. 

C. 

D. 

Answer: B

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4. Which one of the following compounds undergoes predominantly S_N^2 reaction with aqueous NaOH in a polar aprotic solvent ?

A. 

B. 

C. 

D. 

Answer: B

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5. Which of the compounds HCHO (I),CH_3CH_2CHO (II), CH_3COCH_3 (III) and $HCOOC_2H_5$ (IV) will give a secondary alcohol on reaction with excess Grignard reagent, followed by hydrolysis ? Select the correct answer using the codes given below:

A. II only

B. III only

C. I and IV

D. II and IV

Answer: D

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6. The oxidation state of S-atoms in Caro's and Marshall's acids are:

A. $+6, \ +6$

B. $+6, \ +4$

C. $+6, \ -6$

D. $+4, \ +6$

Answer: A

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7. 25mL of $2NHCl, 50mLof4NHNO_3$ and $xmLH_2SO_4$ are mixed together and the total volume is made up to 1L after dilution. 50mL if this acid ixture completely reacteed with 25mL of a $1NNa_2CO_3$ solution. The value of x is:

A. 250 ml

B. 62.5 ml

C. 100 ml

D. None of these

Answer: B

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8. An aqueous solution containing $1M$ each of $Au^{3+}, Cu^{2+}, Ag^{+}, Li^{+}$ is being electrolysed by using inert electrodes. The value of standard potentials are :

$E^{\circ}_{Ag^{+}/Ag} = 0.80V, E^{\circ}_{Cu^{+}/Cu} = 0.34V$ and

$E^{\circ}_{Au^{+3}/Au} = 1.50, E^{\circ}_{Li^{+}/Li} = -3.03V$

will increasing voltage, the sequence of deposition of metals on the cathode will be :

A. Li, Cu, Ag, Au

B. Cu, Ag, Au

C. Au, Ag, Cu

D. Au, Ag, Cu, Li

Answer: C

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9. Which of the following statement is not correct?

A. $[Ni(CN)_4]^{-2}$ and $[PtCI_4]^2$ have the same magnetic moment +

B. $[NiCI_4]^{-2}$ and $[PtCI_4]^{-2}$ have different shape.

C. Hybrid state of Co in $[Co(Ox)_3]^{-3}$ is sp^3d^2

D. In brown-ring complex $[Fe(H_2O)_5NO]SO_4$ oxidation state of Fe is +1

Answer: C

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10. In which transformation the change of hydridization and shape about underlined atom take place?

A. $\underline{C}H_3CH_3 \rightarrow \underline{C}H_3^- + CH_3^+$

B. $NH_3 + BF_3 \rightarrow [H_3N \rightarrow BF_3]$

C. $H_2\underline{O} + H^+ \rightarrow H_3\underline{O}^+$

D. $\underline{N}H_3 \rightarrow \underline{N}H_3^- + H^+$

Answer: B

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11. The correct order of second ionization energy of C,N,O and F are in the order:

A. $F > O > N > C$

B. $C > N > O > F$

C. $O > N > F > C$

D. $O > F > N > C$

Answer: D

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12. The ionization energy of the electron in the lowest orbit of hydrogen atom is 13.6 eV. The energies required in eV to

remove an electron from three lowest energy orbits of hydrogen atom respectively are

A. 13.6,6.8,8.4 eV

B. 13.6, 10.2, 3.4 eV

C. 13.6, 27.2 40.8 eV

D. 13.6,3.4,1.5 eV

Answer: D

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13. A binary solid $\left(A^{+}B^{-}\right)$ has a zinc blende stracture with B ions constituting the lattice and A^{+} inos occupying $25\ \%$ of the terahedral holes. The formula of the solid is

A. AB

B. A_2B

C. AB_2

D. AB_4

Answer: C

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14. Given:

(i) $Cu^{2+} + 2e^- \rightarrow Cu, E^\circ = 0.337V$

(ii) $Cu^{2+} + e^- \rightarrow Cu^+, E^\circ = 0.153V$

Electrode potential, E° for the reaction, $Cu^+ + e^- \rightarrow Cu$, will be

A. $0.90V$

B. $0.30V$

C. $0.38V$

D. $0.52V$

Answer: D

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15. When heated , ammonium carbamate decomate decompoes as follows :

NH_(4)COOH_(2)(s) hArr2NH_(3)(g)+CO_(2)(g)At a certain temperature , the equilibrium pressure of the system is 0.318atm K_p for the reaction is:

A. 0.128

B. 0.426

C. 4.76×10^{-3}

D. 2.24×10^{-2}

Answer: C

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16. Calculate elevation in boiling point for 2 molal aqueous solution of glucose.

(Given $K_b(H_2O) = 0.5 kgmol^{-1}$)

A. 1

B. 4

C. 3

D. 2

Answer: A

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17. Given that for a reaction of order n. the intergrated form of the rate equation is $k = \frac{1}{t(n-1)}\left[\frac{1}{C^{n-1}} - \frac{1}{C_0^{n-1}}\right]$ where C_0 and C are the values after time t. What is the relationship between $t_{3/4}$ and $t_{1/2}$ where $t_{3/4}$ is the time required for C to become $1/4C_0$ –

A. $t_{3/4} = t_{1/2}\left[2^{n-1} + 1\right]$

B. $t_{3/4} = t_{1/2}\left[2^{n-1} - 1\right]$

C. $t_{3/4} = t_{1/2}\left[2^{n+1} - 1\right]$

D. $t_{3/4} = t_{1/2}\left[2^{n+1} + 1\right]$

Answer: A

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18. Solubility of calcium phosphate (molecular mass, M) in water is Wg per $100mL$ at $25^\circ C$. Its solubility product at $25^\circ C$ will be approximately

A. $10^9\left(\frac{W}{M}\right)^5$

B. $10^7\left(\frac{W}{M}\right)^5$

C. $10^5\left(\frac{W}{M}\right)^5$

D. $10^3\left(\frac{W}{M}\right)^5$

Answer: B

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19. When 1 L of CO_2 is heated with graphite , the volume of the gases collected is 1.5 L. Calculate the number of moles of CO produced at STP

A. $\frac{1}{11.2}$

B. $\frac{28}{22.4}$

C. $\frac{1}{22.4}$

D. $\frac{14}{22.4}$

Answer: C

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20. Periodic acid splits glucose and fructose into formaldehyde and formic acid, Ratio of moles of formic acid in glucose and fructose is

A. $1:2$

B. $5:3$

C. $1:1$

D. $2:3$

Answer: B

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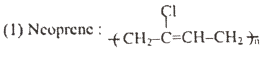
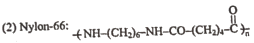
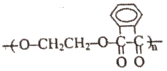
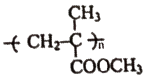
21. Which of the following in not correctly matched ?

A. (1) Neoprene : 

B. (2) Nylon-66: 

C. (3) Terylene : 

D. (4) PMMA : 

Answer: C

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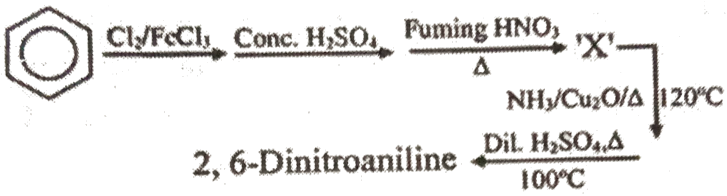
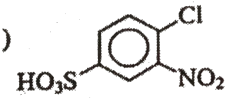
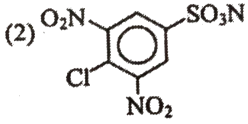
22. The intermediate product 'X' of following synthesis is identified as:



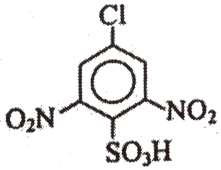
A. (1)



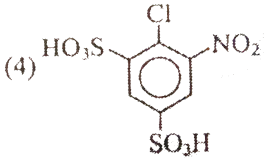
B. (2)



C. (3)



D. (4)



Answer: B

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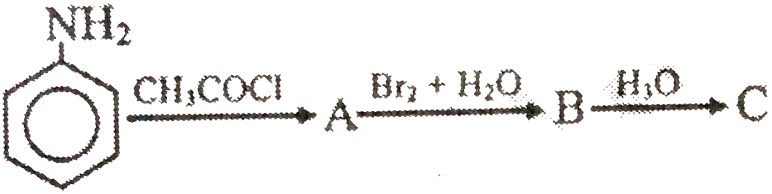
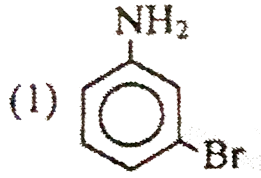
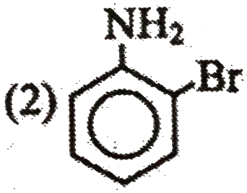
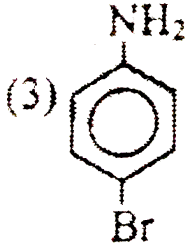
23. 

A. 

B. 

C. 

D. None of these

Answer: C

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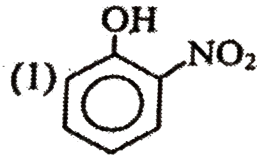
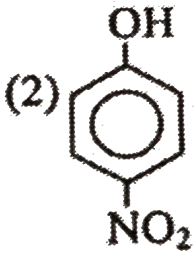
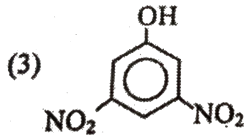
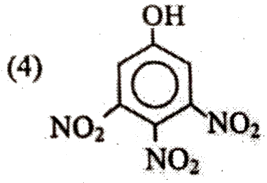
24. The most steam volatile compoud is

A. 

B. 

C. 

D. 

Answer: A

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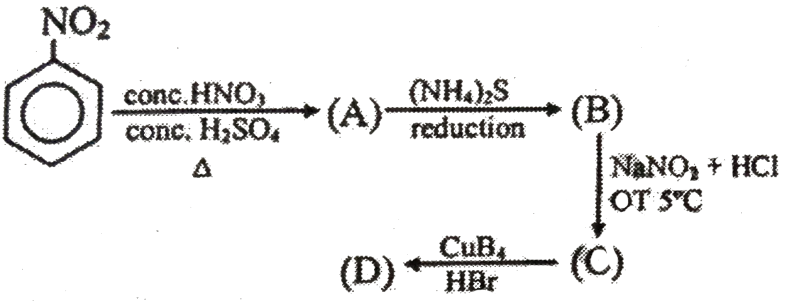
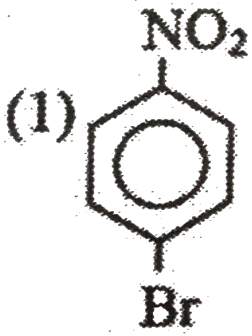
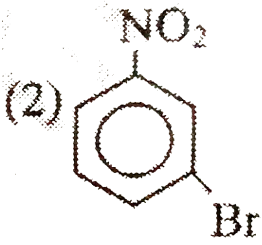
25.



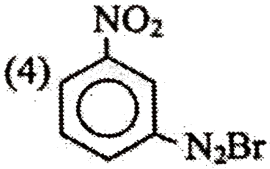
A.



B.



C. 

D. 

Answer: B

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26. Tranquilizers are used for the treatment of

A. Cancer

B. AIDS

C. Mental diseases

D. Physical disorders

Answer: C

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27. When dihydroxy acetone reacts with HIO_4, the product is /are

A. $HCHO$

B. $HCHO \text{ and } HCOOH$

C. $HChO \text{ and } CO_2$

D. $HCOOH$

Answer: C

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28. Ethylamine is heated with CS_2 in the presence of $HgCI_2$ The product formed is .

A. ethanethiol

B. diethyl sulphide

C. ethyl thiocyanate

D. ethyl isothiocyanate

Answer: D

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29.

$CH_3 - CH_2 - CH_2 - C \equiv N$, $CH_3 - \underset{\underset{CN}{|}}{C}H - CH_3$

(A) (B)

Relation between (A) and (B) is -

A. Chain isomer

B. Positional isomer

C. Functional isomer

D. Metamers

Answer: A

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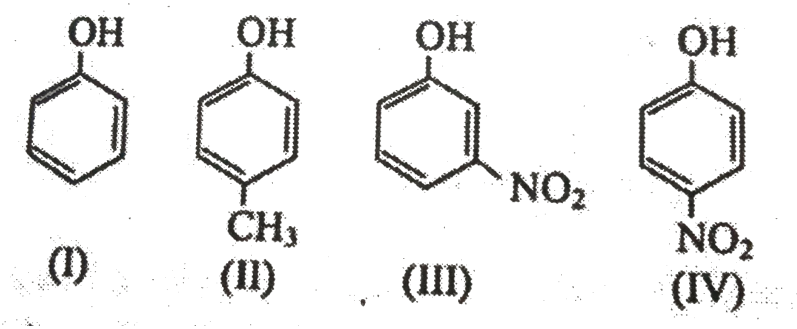
30. In the following compounds



the order of acidity is-

A. $III > IV > I > II$

B. $I > IV > III > II$

C. $II > I > III > IV$

D. $IV > III > I > II$

Answer: D

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