PHYSICS

BOOKS - CAREER POINT

MOCK TEST 8

Part A Physics

1. The following values for a clastic material : Young's $= 7 \times 10^{10} Nm^{-2}$ and Bulk modulus $= 11 \times 10^{10} Nm^{-2}$. The poisson's ratio of the material is -

A. 0.12

B. 0.24

C. 0.31

D. 0.39

Answer: D

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2. Due to some force F_1 a body oscillates with period $4/5s$ and due to other force F_2 it oscillates with period $3/5s$. If both the forces acts simultaneously in same direction then new period is

A. $\frac{12}{25}$

B. $\frac{7}{5}$

C. $\frac{24}{25}$

D. $\frac{5}{7}$

Answer: A

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3. Two satellites of same mass are launched in the same orbit round the earth so as to rotate opposite to each other. They soon collide inelastically and stick together as wreckage. Obtain the total energy of the system before and just after the collision. Describe the subsequent motion of the wreckage.

A. $-\frac{2GMm}{2r}$

B. $-\frac{GMm}{r}$

C. $-\frac{GMm}{2r}$

D. $\frac{GMm}{4r}$

Answer: A

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4. A point charge is moving in clockwise direction in a circle with constant speed. Consider the magnetic field produced by the charge at a fiexed point P (not at the centre of circle) on the axis of the circle. Then,

A. it is constant in magnitude only

B. it is constant in direction only

C. it is constant in direction and magnitude both

D. it is not constant in magintude and direction both

Answer: A

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5. Relative permitivity and permeability of a material ε_r and μ_r, respectively . Which of the following values of these quantities are allowed for a diamagnetic material?

A. $\varepsilon_r = 0.5, \mu_r = 1.5$

B. $\varepsilon_r = 1.5, \mu_r = 0.5$

C. $\varepsilon_r = 0.5, \mu_r = 0.5$

D. $\varepsilon_r = 1.5, \mu_r = 1.5$

Answer: B

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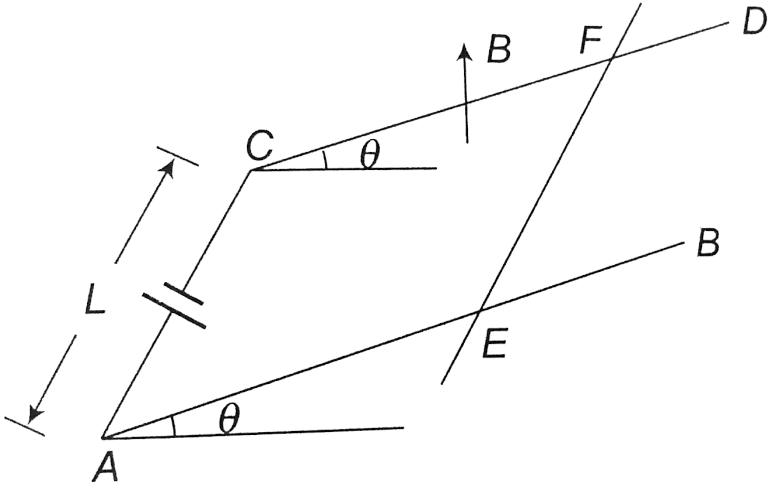
6. AB and CD are smooth, parallel rails, separated by a distance L and inclined to the horizontal at an angle θ. A uniform magnetic field of magnitude B, directed vertically upwards, exists in the region. EF is a conductor of mass m, carrying a current i. For EF to be in equilibrium



(i) i must flow from E to F

(ii) $BiL = mg\tan\theta$

(iii) $BiL = mg\sin\theta$

(iv) $BiL = mg$

A. 1 must flow from E to F

B. BIL =mg cos θ

C. BIL=mg sin θ

D. BIL =mg

Answer: A

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7. The radiation emitted by a star A is 10,000 times that of the sun. If the surface temperatures of the sun and the star

A are 6000 K and 2000 K respectively, the ratio of the radii of the star A and the sun is

A. $300:1$

B. $600:1$

C. $900:1$

D. $1200:1$

Answer: C

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8. in a screw gauge , there are 50 divisions on its cap and pitch of screw is 1 mm when is placed between studs then it

gives 3 divisons on main scale and 15 circular scale division soincides with base line ,Diameter of the wire is -

A. 1.80 mm

B. 3.30 mm

C. 3.15 mm

D. none of these

Answer: B

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9. pitch of screw gauge is 1 mm and it has 100 divisions on circular scale . There is no zero error. Thickness of a pile of 50 papers is to be found out . While measuring the

thinckness of a paper it is observed that linear scale does not give any reading but 25^{th} circular scale divsion coincides with reference line , thinkness of pile is -

A. 15.2 mm

B. 23.5mm

C. 21.5mm

D. 12.5 mm

Answer: D

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10. A vernier scale is used in a fortin barometer 10 VSD coincides with 19 MSD and 1 MSD =1 mm and VSD is further

divided in two .Least count is -

A. 0.1 cm

B. .05 mm

C. 1 mm

D. 0.02mm

Answer: B

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11. Let n_e and n_b are the number density of electrons and holes in extrinsic semiconductor then-

A. $n_e > n_b$

B. $n_e < n_h$

C. $n_e = n_h$

D. $n_e \neq n_h$

Answer: D

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12. Which two of the given transverse waves will give stationary waves when get superimposed

$z_1 = a\cos(kx - \omega t) \quad \ldots..(A)$

$z_2 = a\cos(kx + \omega t) \quad \ldots..(B)$

$z_3 = a\cos(ky - \omega t) \quad \ldots..(C)$

A. A and B

B. A and C

C. B and C

D. Any two

Answer: A

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13. 1 g of ice at $0^\circ C$ is mixed with 1 g of steam at $100^\circ C$. After thermal equilibrium is achieved, the temperature of the mixture is

A. $0^\circ C$

B. $100^\circ C$

C. $55^\circ C$

D. $80^\circ C$

Answer: B

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14. A radiaocatice isotope is being produced at a constant rate X. Half-life of the radioactive substance is Y. After some time, the number of radioactive nuceli become constant. The value of this constant is .

A. XY/ln2

B. XY

C. XYln2

D. $\frac{X}{Y}$

Answer: A

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15. In the nuclear raction $._1H^2 + ._1H^2 \rightarrow ._2He^3 + ._0n^1$ if the mass of the deuterium atom $= 2.014741amu$, mass of $._2He^3$ atom $= 3.016977amu$, and mass of neutron $= 1.008987amu$, then the Q value of the reaction is nearly .

A. 0.000352MeV

B. 3.27 MeV

C. 0.82 MeV

D. 2.45 Me V

Answer: B

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16. if the surface of a metal is successfully exposed to rediation of $\lambda_1 = 350nm$ and $\lambda_2 = 450$ nm th miximum velocity velocity of protoelectrons will differ by a factor 2 . The work function of this metal is :

A. $2.84 \times 10^{-19} J$

B. $1.6 \times 10^{-19} J$

C. $3.93 \times 10^{-19} J$

D. $2.4 \times 10^{-19} J$

Answer: C

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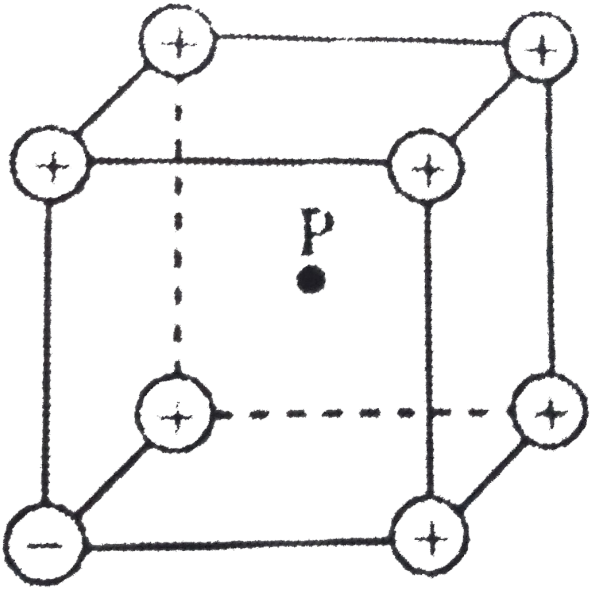
17. Cosider a regular cube with positive point charge + Q in all corners except for one which has a negative point chnarge -Q .Let the distance from any corner to the centre of the cube be r. what is the magitude of elelctric field at point P the centre of the cude ? $\left(K = \frac{1}{4\pi\varepsilon_0}\right)$



A. $E = 7KQ/r^2$

B. $E = KQ/r^2$

C. $E = 2KQ/r^2$

D. $E = 6KQ/r^2$

Answer: C

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18. two similar point charge + q are kept on x- axis at (-a,0)& (a,0) and another charge -Q of mass m Is kept at origin .If -Q si slightly displaced along y- axis & released them its time period of oscillation is -

A. $2\pi\sqrt{\frac{\pi\varepsilon_0 ma^3}{2Qq}}$

B. $2\pi\sqrt{\frac{\pi\varepsilon_0 ma^3}{Qq}}$

C. $2\pi\sqrt{\frac{2\pi\varepsilon_0 ma^3}{Qq}}$

D. none of these

Answer: C

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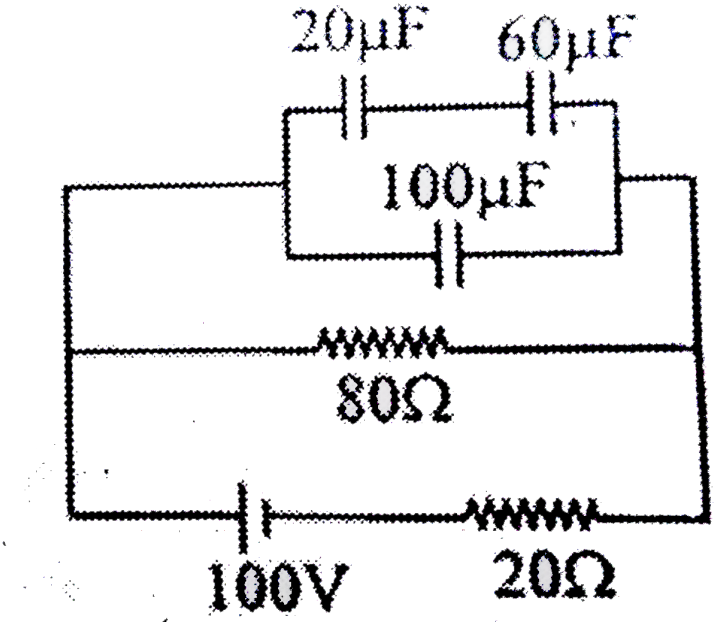
19. Charge on the plates of 20 μF Capacitor at steady state in the given circuit is -



A. 1.2 mC

B. 12 mC

C. 24 mC

D. .04 mC

Answer: A

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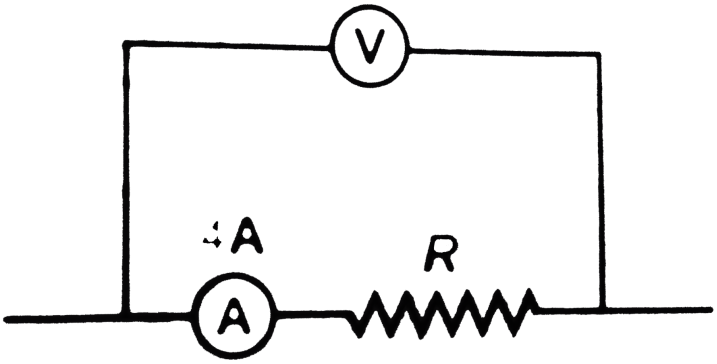
20. A students connects an ammeter $A$and a voltmeter V to measure a resistancer as shown in figure. If the voltmeter

reads $20V$ and the ammeter reads $4A$, then R is



A. equal to 5 ohm

B. greater than 5 ohm

C. Less than 5 ohm

D. Greater or less than 5 ohm depending upon its material

Answer: B

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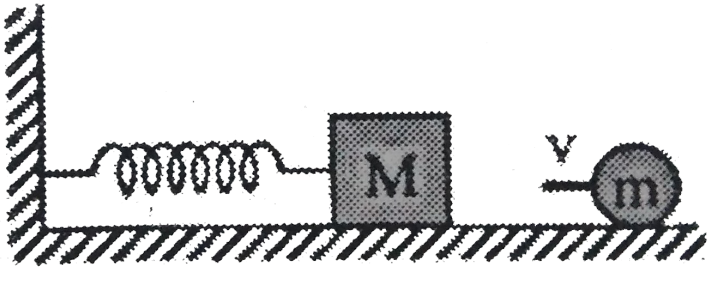
21. A body of mass 2 kg is placed on a horizontal frictionless surface . It is connected to one end of the a spring whose force constant is 250 N/m the other end of the spring is joining with the wall A particle fo mass 0.15 kg moving horizontally with speed V sticks to the body after collision if it compressess the spring by 10 cm the velocity of the pariticle is -



A. 3 m/s

B. 5 m/s

C. 10 m/s

D. 15 m/s

Answer: D

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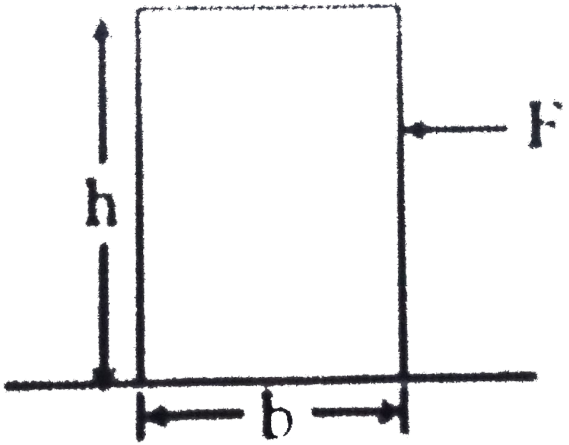
22. A homogenous block of mass m, width b and height h is resting on a rough horizontal surface A horizontal force F is applied to it , which makes it to move with a constant velocity . The coefficient of friction between block and surface is μ Find the greatest height at which force F may

be applied to slide the block with out tipping over



A. $\frac{b}{2\mu}$

B. $\frac{2b}{\mu}$

C. $\frac{b}{\mu}$

D. $\frac{2\sqrt{2b}}{\mu}$

Answer: A

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23. in the above questions ,F is applied at h/2 The disance x is the horizontal disance between a point on the bottom face of the block at which resultant of friction and normal force act C.G of the block find x-

A. $\frac{\mu h}{2}$

B. $\frac{\mu h}{6}$

C. $\frac{\mu h}{4}$

D. $\frac{\mu h}{3}$

Answer: A

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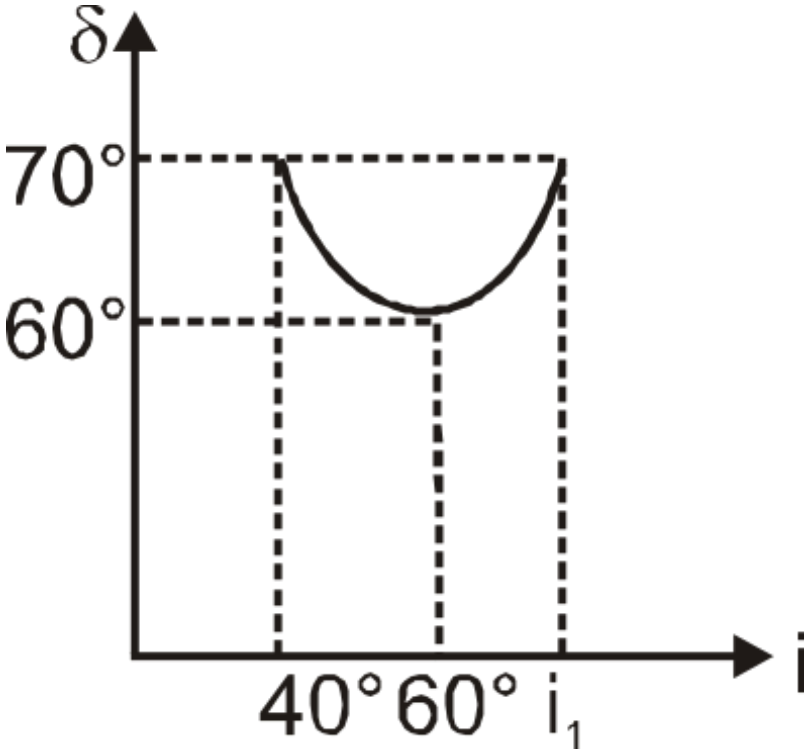

24.

The curve of angle of incidence versus angle of deviaton wshown has been plotted for prism.

Q. The value of refractive index of the prism used is

A. $\sqrt{3}$

B. $\sqrt{2}$

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

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

Answer: A

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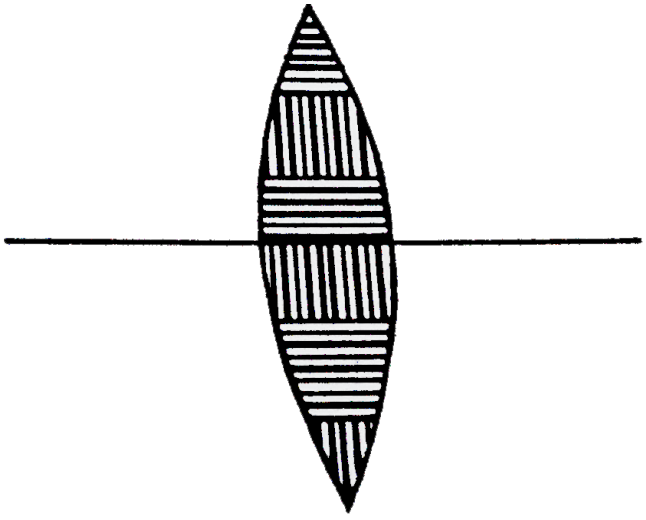
25. The layered lens as shown is made of two types of transparent materials-one indicated by horizontal lines and the other by vertical lines. The number of images formed of an object will be



A. 1 images

B. 2 images

C. 3 images

D. 9 images

Answer: B

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26. if light of wavelength 6000 Å is made to incident over a thin film of refractive index 1.5 then minimum thickness of film for constructive interence in reflected light is :

A. 1000 Å

B. 2000Å

C. 3000Å

D. 6000Å

Answer: A

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27. Let $\vec{A} = \hat{i}A\cos\theta + \hat{j}A\sin\theta$, be any vector. Another vector $\vec{B}$ which is normal to $\vec{A}$ is :-

A. $B\cos\theta\hat{i} + B\sin\theta\hat{j}$

B. $B\sin\theta\hat{i} + B\cos\theta\hat{j}$

C. $B\sin\theta\hat{i} - B\cos\theta\hat{j}$

D. $A\cos\theta\hat{i} - A\cos\theta\hat{j}$

Answer: C

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28. Three particles start from the origin at the same time, one with velocity u_1 along the x-axis, the second with velocity u_2 along the y-axis . Find the velocity of the third particles, along the x=y line so that the three particles may always lie on the same straight line.

A. $\frac{u_1 + u_2}{2}$

B. $\sqrt{u_1 u_2}$

C. $\frac{u_1 u_2}{u_1 + u_2}$

D. $\frac{\sqrt{2} u_1 u_2}{u_1 + u_2}$

Answer: D

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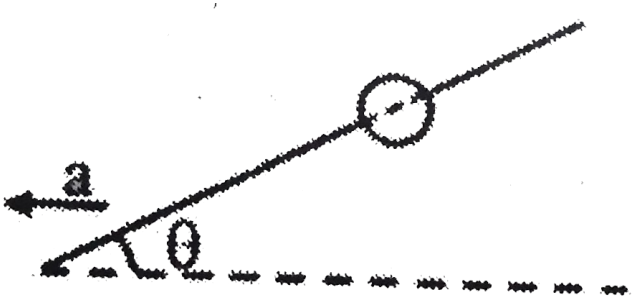
29. A pearl of mass m is in a position to slide over a smooth wire .At the intial instant the pearl is in the middle of the wire ,The wire moves linerly in a horizontal plane with an with the acceleration of the pearl Q.r.t wire is -



A. $g\sin\theta - a\cos\theta$

B. $g\sin\theta - g\cos\theta$

C. $g \sin \theta - a \cos \theta$

D. $g \cos \theta + a \sin \theta$

Answer: A

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30. A motor cycle starts from rest and accelerates along a straight path at $2m / s^2$. At the starting point of the motor cycle there is a stationary electric siren. How far has the motor cycle gone when the driver hears the frequency of the siren at 94% of its value when the motor cycle was at rest ? (Speed of sound = $330ms^{-2}$)

A. 49 m

B. 98 m

C. 147 m

D. 196 m

Answer: B

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Part B Chemistry

1. Reactivity of borazole is greater than that of benzene because

A. Borazole is a polar compound

B. Borazole is a polar compound

C. Borazole is elficient compound

D. none of these

Answer: A

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2. Blackened oil painting can be restored into original form by the action of

A. Chlorine

B. BaO_2

C. H_2o_2

D. Mno_2

Answer: C

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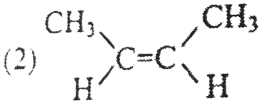
3. the major product of the reaction Is -

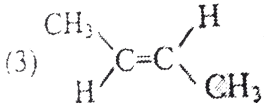
$$CH_3CH_2CHCH_3 \xrightarrow[\text{heat}]{AgOH}$$

$$|$$

$$(CH_3)_3N^{\oplus}I^{\ominus}$$

A. $CH_3CH_2CH = CH_2$

B. 

C. 

D. $CH_3CH_2\underset{\underset{OH}{|}}{C}HCH_3$

Answer: A

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4. the fernetion of starch into ethanol involes three stages .

The enzymes that catalyse these steps are respectively -

A. amylase , maltase , zymase

B. distase , maltase , zymase

C. amylase, invertas , zymase

D. amylase , zymase, maltase

Answer: B

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5. the following two reactions are carried out separately .

$CH_3CH_2 - o - CH_3 + HI(1mol) \xrightarrow{\text{heat}} \text{products}$

$(CH_3)_3C - O - CH_3 + HI(1mol) \xrightarrow{\text{heat}} \text{products}$

the pair of major products obtained in the first and second reactions are respectively -

A.

CH_3CH_2OH and $CH_3I, (CH_3)_3C - I$ and CH_3OH

B.

CH_3CH_2I and $CH_3OH, (CH_3)_3C - I$ and CH_3OH

C.

CH_3CH_2I and $CH_3OH, (CH_3)_3C - OH$ and CH_3I

D.

CH_3CH_2OH and $CH_3I, (CH_3)_3C - OH$ and CH_3I

Answer: A

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6. The conductance of a salt solution (AB) measured by two parallel electodes of area $100cm^2$ separated by 10cm was found to be $0.0001\Omega^{-1}$. If volume enclosed between two electrode contain 0.1 mole of salt, what is the molar conductivity $\left(Scm^2mol^{-1}\right)$ of salt at same concentration:

A. 10

B. 0.1

C. 0

D. none of these

Answer: B

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7. A jar contains a gas and a few drops of water at TK The pressure in the jar is $830mm$ of Hg The temperature of the jar is reduced by 1% The vapour pressure of water at two temperatures are 300 and 25 mm of Hg Calculate the new pressure in the jar .

A. 792 mm of Hg

B. 817 mm Hg Hg

C. 800 mm of Hg

D. 840 mm of Hg

Answer: B

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8. 0.12 mole H_3PO_x is compeltely neutralized by 5.6 g KOH then the true statement is :-

A. x= 3 and given acid is dibasic

B. x= 4 and given acid has no p-H inkage

C. x=2 and given acid does not from acidic salt

D. all of these

Answer: C

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9. which of the following complexes entities are squre planar in shape ?

$[Ni(CN)_4]^{-2}$ $[MnCl_4]^{-2}$ $[Zn(NH_3)_4]^{+2}$

(P) (Q) (R)

$[PdCl_4]^{-2}$ $[Ni(NH_3)_4]^{+2}$

(S) (T)

A. P,T

B. P,Q,T

C. R,S,T

D. P,S,T

Answer: D

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10. Select correct order :

A. $s-s>s-p>p-p$

(order of extent of overlapping)

B. $CO_3^{-2}>CO_2>CO$

(order of C-O bond length)

C. $PF_3<BF_3<CIF_3$(order of bond angle)

D. $HF<NH_3<H_2S$(order of boiling point)

Answer: B

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11. Select incorrect statement :

A. CO is a neutral oxide

B. The general outermost shell e^- configuration for d-block is $ns^{1-2}(n-1)d^{1-10}$

C. Due to inert pair effect ,+2 oxidation state of Pb is more stable than '+4' oxidation state

D. Atomic density of K is more than that of Na

Answer: D

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12. $M_{(g)} \rightarrow M_{(g)}^{+3} + 3e^-, \Delta H = 600eV$

$M_{(g)}^{+} \rightarrow M_{(g)}^{+3} + 2e^-, \Delta H = 500eV$

Calculate IE_1 of M:

A. 600eV

B. 100 eV

C. 500 eV

D. Con't be determined

Answer: B

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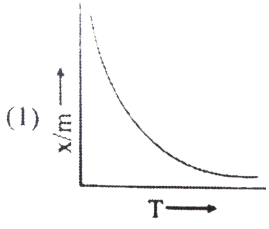
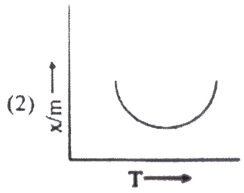
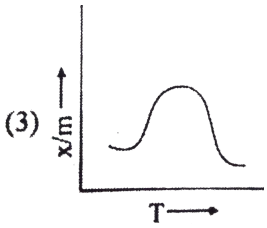
13. Which plot is the adsorption isobar for chemisorption where x is the amount of gas adsorbed on mass m (at constant pressure at temperature T ?

A.



B. 

C. 

D.

Answer: C

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14. Deomposition of urae into NH_3 and CO_2 is followed by the action of enzyme :

A. urease

B. pepsin

C. trypsin

D. none of these

Answer: A

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15. Among cellulose, poly (vinyl chloride), nylon and natural rubber, the polymer in which the intermolecular force of attraction is weakest is

A. Polyvinyl choride

B. natural rubber

C. nylon

D. cellulose

Answer: B

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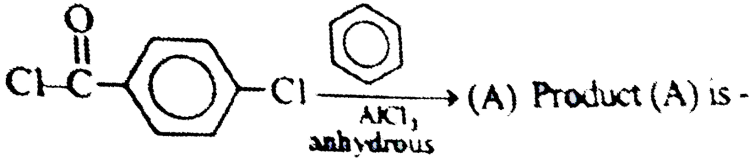
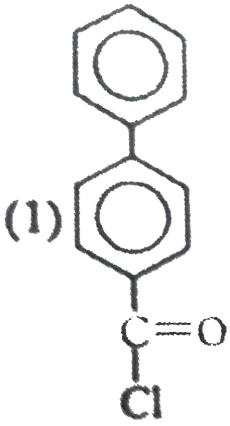
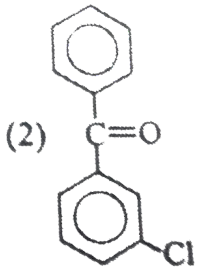
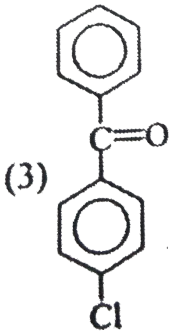
16. 

A. 

B. 

C. 

D. $Ph - \overset{\overset{O}{||}}{C} - Ph$

Answer: C

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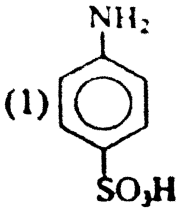
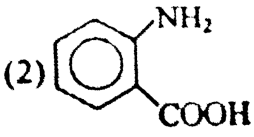
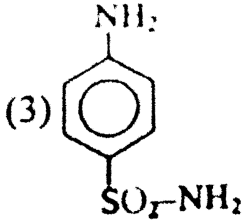
17. Struture of paracetaamol is -

A. 

B. 

C. 

D. none of these

Answer: D

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18. For a reaction to occur spontaneously :

A. ΔS Must be negative

B. $(- \Delta H_T \Delta S)$ must be postive

C. $\Delta H + T\delta S$ must be negative

D. ΔH must be negative

Answer: B

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19. Given the following reaction at equilibrium $N_2(g) + 3H_2(g) \Leftrightarrow 2NH_3(g)$. Some inert gas at constant pressure is added to the system. Predict which of the following facts:

A. more $NH_3(g)$ is produced

B. Less NH_3 (g) is produced

C. No affect on the equilibrium

D. k_p of the reaction is decreased

Answer: B

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20. Two liquids A and B have P_A° and P_B° in the ratio of $1:3$ and the ratio of number of moles of A and B in liquid phase are $1:3$ then mole fraction of A in vapour phase in equilibrium with the solution is equal to :

A. 0.1

B. 0.2

C. 0.5

D. 1.0

Answer: A

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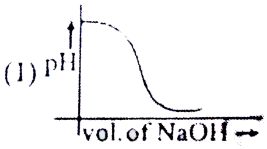
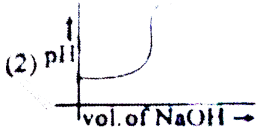
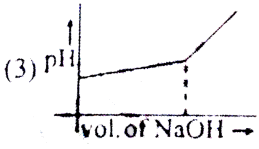
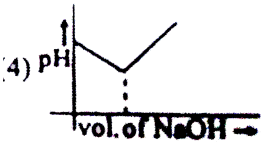
21. which one of the following curves represents the graph of pH during titration of NaOH and HCl (aq).?

A. 

B. 

C. 

D. 

Answer: B

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22. The chloride of a metal contains 71% chlorine by weight and the vapour density of it is 50. The atomic weight of the metal will be -

A. 29

B. 58

C. 35.5

D. 71

Answer: A

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23. which of the following statement is / are correct ?

A. the pH of 1.0×10^{-8} M solution of HCl is 8.

B. the cnjugate base of $H_2PO_4^-$ is HPO_4^{2-}

C. Autoprotolysis constant of water decreases with temperature

D. when a solution of a weak monoprotic acid is titrated against a strong base , at half - neutralization point $pH = (1/2)pk_a$

Answer: B

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24. Which of the following alcohols gives a red colour in victor meyer test :-

A. n- propyl alcohol

B. isoproyl alcohol

C. $(CH_3)_3C - OH$

D. Sec. Buty alcohol

Answer: A

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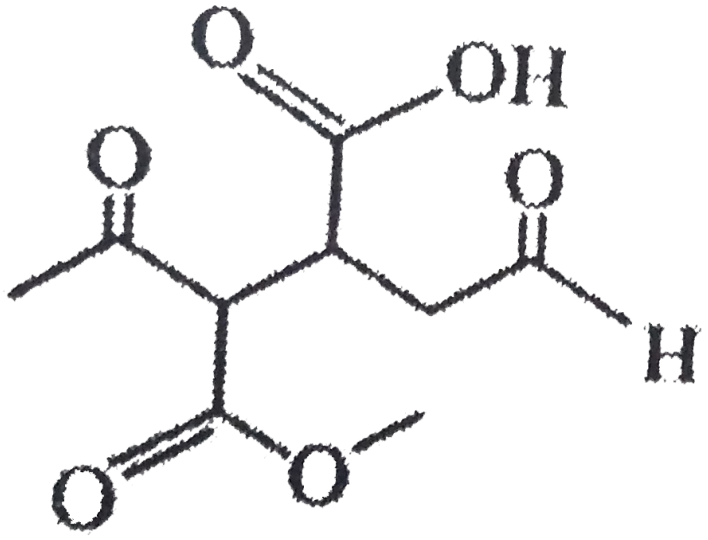
25. 

in the above given compound how many functional group reduced by LAH (lithium aluminium hydride) and SBH (sodium Borohydride) respectively ?

A. 4,4

B. 4,3,

C. 3,4

D. 4,2

Answer: D

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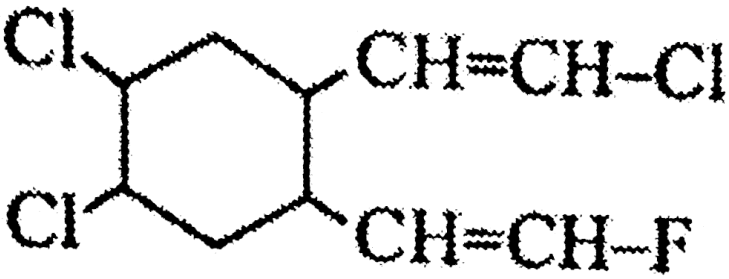
26. How many stereoisomers are possible for -



A. 2^4

B. 2^5

C. 2^6

D. 2^7

Answer: C

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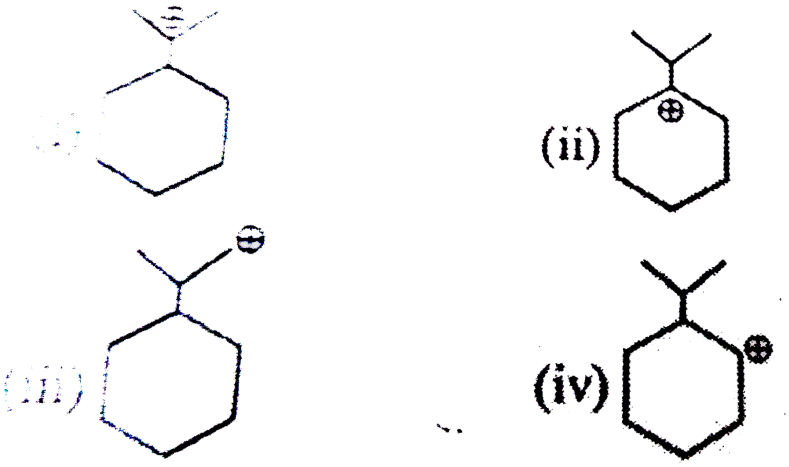
27. Arrange the following carbocation in order of stability :



A. $i > ii > iii > iv$

B. $i > ii > iv > iii$

C. $ii > i > iv > iii$

D. $ii > i > iii > iv$

Answer: B

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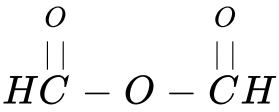
28. What is the IUPAC name for the following compound ?



A. Propanoic anhydride

B. Methanoic anhydride

C. Formyl formate

D. Ethanoic anydride

Answer: B

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