RB IIT Academy MAINS PART TEST 4

1) Equation of the plane containing the lines $\overline{r} = \left(\bar{i} - 2\bar{j} + \overline{k}\right) + t\left(\bar{i} + 2\bar{j} - \overline{k}\right)$ $\overline{r} = \left(\bar{i} + 2\bar{j} - \overline{k}\right) + \overline{s}\left(\bar{i} + \bar{j} + 3\overline{k}\right)$ is

A) $\overline{r}.\left(7\bar{i} - 4\bar{j} - \overline{k}\right) = 14$ B) $\overline{r}.\left(\bar{i} + 2\bar{j} - \overline{k}\right) = 10$ C) $\overline{r}.\left(\bar{i} + \bar{j} + 3\overline{k}\right) = 20$ D) $\overline{r}.\left(\bar{i} - 2\bar{j} + \overline{k}\right) = 27$

2) If z_1, z_2 and z_3 are the vertices of an isosceles right angled triangle , right angled at the vertex z_2, then $(z_3 - z_2)^2 + (z_1 - z_2)^2 =$

A) 0 B) $(z_1 - z_3)^2$ C) $\left(\frac{z_1 + z_3}{2}\right)^2$ D) None of these

3) If z_1, z_2, z_3 are non-zero complex numbers representing the points A, B, C such that $\frac{2}{z_1} = \frac{1}{z_2} + \frac{1}{z_3}$. Then

A) A, B, C are collinear. B) Circle Passes through points A, B, C has centre at origin O

C) Circle Passes through A, B, C passes through origin D) None of these.

4) The complex number 3 + 4i is rotated about origin by an angle of $\frac{\pi}{4}$ and then stretched 2- times. The complex number corresponding to new position is

A) $\sqrt{2}(-3 + 4i)$ B) $\sqrt{2}(-1 + 7i)$ C) $\sqrt{2}(3 - 4i)$ D) $\sqrt{2}(-1 - 7i)$

5) If $(a + ib)^5 = \alpha + i\beta$ then $(b + ia)^5$ is equal to

A) $\beta - i\alpha$ B) $\beta + i\alpha$ C) $\alpha - \beta$ D) $-\alpha - i\beta$

6) If $\Delta ABC, sinAsinBsinC = p$, $\cos A \cos B \cos C = q$ then the cubic equation having roots $\tan A, \tan B, \tan C$ is

A) $qx^3 - px^2 - qx - p = 0$ B) $qx^3 - px^2 + qx - p = 0$

C) $qx^3 - px^2 - (q + 1)x - p = 0$ D) $qx^3 - px^2 + (q + 1)x - p = 0$

7) The reflection of the point $P(1,0,0)$ in the line $\frac{x-1}{2}=\frac{y+1}{-3}=\frac{z+10}{8}$ is

A) (3, -4, -2) B) (5, -8, -4) C) (1, -1, -10) D) (2, -3, 8)

8) The ratio in which the plane $\overline{r}.\left(\hat{i}-2\hat{j}+3\hat{k}\right)=17$ divides the line joining the points $-2\hat{i}+4\hat{j}+7\hat{k}$ and $3\hat{i}-5\hat{j}+8\hat{k}$ is

A) 1:5 B) 1:10 C) 3:5 D) 3:10

9) Let $f(x)=2x^3+ax^2+bx$ where $a,b\in N$ if graph of $f(x)$ cuts the x–axis at 3 distinct points, then minimum value of a^2+b^2 is

A) 10 B) 2 C) 9 D) 4

10) If $p_1p=2\left(q_1+q\right)$ then which of following statement about the quadratic equations $x^2+px+q=0;\ x^2+p_1x+q_1=0$ is always true Here $p,p_1,q,q_1,\in R$

A) Both the equation ha real roots B) Both the equations have imaginary roots

C) At least one of the equations has real roots D) Exactly one of them has equal roots

11) If the equation $x^2+9y^2-4x+3=0$ is satisfied for real values of x and y then

A) $x\in[1,3],y\in[1,3]$ B) $x\in[1,3],y\in\left[\frac{-1}{3},\frac{1}{3}\right]$ C) $x\in\left[\frac{-1}{3},\frac{1}{3}\right],y\in[1,3]$

D) $x\in\left[\frac{-1}{3},\frac{1}{3}\right],y\in\left[\frac{-1}{3},\frac{1}{3}\right]$

12) For a non zero polynomial P, the equation $|P(x)|=e^x$ has

A) At least one solution B) No solution C) Exactly 2 solution D) Exactly 1 solution

13) If $ax^2+bx+c=0$ has no real zeroes, and if $c<0$, then

A) a< 0 B) a + b + c > 0 C) 4a + 2b + c > 0 D) a – b + c > 0

14) The equation $|2ax-3|+|ax+1|+|5-ax|=\frac{1}{2}$ possesses

A) Infinite number of real solution for some $a \in R$

B) Finite number of real solutions for some $a \in R$ C) No real solution for some $a \in R$

D) No real solution for all $a \in R$

15) A, B, C are the points on x, y and z axes respectively in a three dimensional co-ordinate system with O as origin. Suppose the area of triangles OAB,OBC and OCA are 4, 12 and 6 respectively, then the area of the triangle ABC equals

A) 16 B) 14 C) 28 D) 32

16) Equation of the plane passing through the origin and perpendicular to the planes $x + 2y + z = 1, 3x - 4y + z = 5$

A) $x + 2y - 5z = 0$ B) $x - 2y - 3z = 0$ C) $x - 2y + 5z = 0$ D) $3x + y - 5z = 0$

17) $\bar{a}, \bar{b}, \bar{c}$ are three unit vectors equally inclined to each other at an angle $\frac{\pi}{3}$ then the value of

$\left[\bar{a} + \bar{b} \ \bar{b} + \bar{c} \ \bar{c} + \bar{a}\right]^2 + \left[\bar{a} \times \bar{b} \ \bar{b} \times \bar{c} \ \bar{c} \times \bar{a}\right]$ is

A) $\frac{3}{4}$ B) $\frac{5}{2}$ C) $\frac{7}{2}$ D) 4

18) If $|\bar{a}| = 3, |\bar{b}| = 4$ and $|\bar{c}| = 5$ then $|\bar{a} - \bar{b}|^2 + |\bar{b} - \bar{c}|^2 + |\bar{c} - \bar{a}|^2$ does not exceed

A) 25 B) 50 C) 75 D) 150

19) Angle between the vectors $\vec{a}$ and $\vec{b}$,w here $\vec{a}$, $\vec{b}$, $\vec{c}$are unit vectors satisfying $\vec{a} + \vec{b} + \sqrt{3}\vec{c} = \vec{0}$ is

A) $\frac{\pi}{2}$ B) $\frac{\pi}{6}$ C) $\frac{\pi}{4}$ D) $\frac{\pi}{3}$

20) The value of $Cot16^0cot44^0 + cot44^0cot76^0 - cot76^0cot16^0$ is

A) 3 B) $\frac{1}{3}$ C) $-\frac{1}{3}$ D) -3

21) If in ΔABC, $\tan A+\tan B+\tan C>0$ then the triangle is

A) acute angled B) obtuse angled C) right angled D) nothing can be said

22) The minimum value of $(Sinx+Cosecx)^2+(Cosx+Secx)^2\ \ \forall x\in R$ is

A) 7 B) 8 C) 9 D) 10

23) If $\theta\in\left(\frac{\pi}{4},\frac{\pi}{2}\right)$ and $\sum_{n=1}^{\infty}\frac{1}{\tan^n\theta}=\sin\theta+\cos\theta$ then the value of $\tan\theta$ is

A) $\sqrt{3}$ B) $\sqrt{2}+1$ C) $2+\sqrt{3}$ D) $\sqrt{2}$

24) The value of ${}^{12}C_2+{}^{13}C_3+{}^{14}C_4+\ldots\ldots+{}^{999}C_{989}$

A) ${}^{1000}C_{11}-12$ B) ${}^{1000}C_{11}+12$ C) ${}^{999}C_{11}-12$ D) ${}^{1000}C_{989}$

25) The Coefficient of x^9 in $\left(x-{}^{21}C_0\right)\left(x-{}^{21}C_1\right)\left(x-{}^{21}C_2\right)\ldots\ldots\ldots\left(x-{}^{21}C_{10}\right)is$

A) $2^{40}-\frac{1}{2}\,{}^{42}C_{20}$ B) $2^{39}-\frac{1}{2}\,{}^{42}C_{21}$ C) $2^{40}-{}^{42}C_{20}$ D) $2^{39}-\frac{1}{4}\,{}^{42}C_{21}$

26) If $A=\begin{bmatrix}0&\alpha\\0&0\end{bmatrix}$ and $(A+I)^{50}-50A=\begin{bmatrix}a&b\\c&d\end{bmatrix}$ .Then value of $a+b+c+d=$

A) 0 B) 1 C) 2 D) 4

27) Equations $3x-2y+z=0,\ \lambda x-14y+15z=0,\ \ x+2y-3z=0$ have solutions other than $x=y=z=0$ then $\lambda=$

A) 1 B) 2 C) 3 D) 5

28) If 7 divide $32^{32^{32}}$ then remainder is

A) 1 B) 0 C) 4 D) 6

29) If the number of terms in $\left(1+x^{-1}+x^{-2}\right)^{n}$ is 53 then the larest prime p so that n! is divisible by 5^{p-1}

A) 3 B) 5 C) 7 D) 11

30) If n is even positive integer, then the condition that the greatest term in the expansion $(1+x)^{n}$ of may have the greatest coefficient also is

A) $\frac{n}{n+2}<x<\frac{n+2}{n}$ B) $\frac{n+1}{n}<x<\frac{n}{n+1}$ C) $\frac{n}{n+4}<x<\frac{n+4}{n}$ D) None of these

31) Imagine a light planet revolving around a very massive star in a circular orbit of radius R with a period of revolution T. If the gravitational force of attraction between planet and star is proportional to $R^{-\frac{5}{2}}$, then T^2 is proportional to

A) R^3 B) $R^{7/2}$ C) $R^{5/2}$ D) $R^{3/2}$

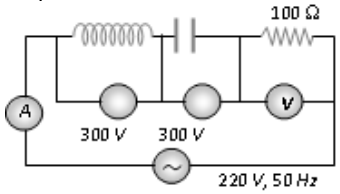
32) A rocket of mass M is launched vertically from the surface of the earth with an initial speed V. Assuming the radius of the earth to be R and negligible air resistance, the maximum height attained by the rocket above the surface of the earth is

A) $R/\left(\frac{gR}{2V^2}-1\right)$ B) $R\left(\frac{gR}{2V^2}-1\right)$ C) $R/\left(\frac{2gR}{V^2}-1\right)$ D) $R\left(\frac{2gR}{V^2}-1\right)$

33) A projectile is projected with velocity kv_e in vertically upward direction from the ground into the space. $(v_e$ is escape velocity and $k<1)$. If air resistance is considered to be negligible then the maximum height from the centre of earth to which it can go, will be : R = radius of earth

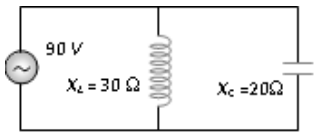
A) $\frac{R}{k^2+1}$ B) $\frac{R}{k^2-1}$ C) $\frac{R}{1-k^2}$ D) $\frac{R}{k+1}$

34) In the circuit shown below, what will be the readings of the voltmeter and ammeter



A) $800V, 2.2A$ B) $300V, 2A$ C) $220V, 2.2A$ D) $100V, 2.1A$

35) In the adjoining figure the impedance of the circuit will be



A) $120\ ohm$ B) $50\ ohm$ C) 60 ohm D) 90 ohm

36) Match the following

current	R.M.S values
1) $x_0 \sin \omega t$	$i) x_0$
2) $x_0 \sin \omega t \cos \omega t$	$ii) \frac{x_0}{\sqrt{2}}$
3) $x_0 \sin \omega t + x_0 \cos \omega t$	$iii) \frac{x_0}{(2\sqrt{2})}$

A) 1. (i), 2. (ii), 3. (iii) B) 1. (ii), 2. (iii), 3. (i) C) 1. (i), 2. (iii), 3 (ii) D) None of these

37) Two equal charges q of opposite sign separated by a distance $2a$ constitute an electric dipole of dipole moment p. If P is a point at a distance r from the centre of the dipole and the line joining the centre of the dipole to this point makes an angle θ with the axis of the dipole, then the potential at P is given by $(r >> 2a)$ (Where $p = 2qa$)

A) $V = \frac{p \cos \theta}{4\pi\varepsilon_0 r^2}$ B) $V = \frac{p \cos \theta}{4\pi\varepsilon_0 r}$ C) $V = \frac{p \sin \theta}{4\pi\varepsilon_0 r}$ D) $V = \frac{p \cos \theta}{2\pi\varepsilon_0 r^2}$

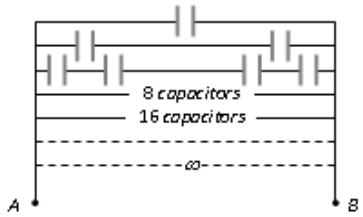
38) Two identical thin rings each of radius R meters are coaxially placed at a distance R meters apart. If Q1 coulomb and Q2 coulomb are respectively the charges uniformly spread on the two rings, the work done in moving a charge qfrom the centre of one ring to that of other is

A) Zero B) $\frac{q(Q_1 - Q_2)(\sqrt{2}-1)}{\sqrt{2}.4\pi\varepsilon_0 R}$ C) $\frac{q\sqrt{2}(Q_1+Q_2)}{4\pi\varepsilon_0 R}$ D) $\frac{q(Q_1+Q_2)(\sqrt{2}+1)}{\sqrt{2}.4\pi\varepsilon_0 R}$

39) A charge $+q$ is fixed at each of the points $x = x_0,\ x = 3x_0,\ x = 5x_0$ ..... infinite, on the $x-$axis and a charge $-q$ is fixed at each of the points $x = 2x_0,\ x = 4x_0, x = 6x_0$,..... infinite. Here x_0 is a positive constant. Take the electric potential at a point due to a charge Q at a distance r from it to be $Q/(4\pi\varepsilon_0 r)$. Then, the potential at the origin due to the above system of charges is

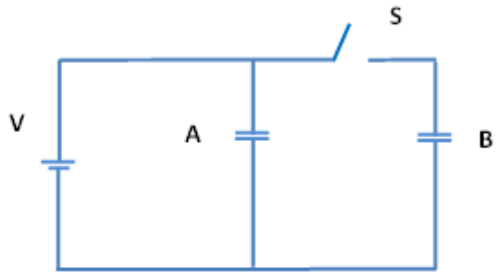
A) 0 B) $\frac{q}{8\pi\varepsilon_0 x_0 \ln 2}$ C) ∞ D) $\frac{q \ln 2}{4\pi\varepsilon_0 x_0}$

40) An infinite number of identical capacitors each of capacitance $1\mu F$ are connected as in adjoining figure. Then the equivalent capacitance between A and $B$is



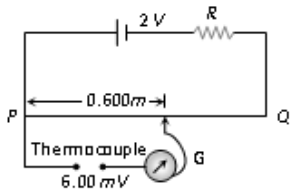
A) $1\mu F$ B) $2\mu F$ C) $\frac{1}{2}\mu F$ D) ∞

41) Figure given below shows two identical parallel plate capacitors connected to a battery with switch S closed. The switch is now opened and the free space between the plate of capacitors is filled with a dielectric of dielectric constant 3. What will be the ratio of total electrostatic energy stored in both capacitors before and after the introduction of the dielectric



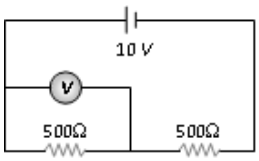
A) 3 B) 5 C) 0.6 D) 1.6

42) Figure shows a simple potentiometer circuit for measuring a small e.m.f. produced by a thermocouple. The meter wire PQ has a resistance $5\Omega$and the driver cell has an e.m.f. of $2V$ If a balance point is obtained0.600 m along $PQ$when measuring an e.m.f. of 6.00 $m.V$ value of resistance $R\Omega$ then R =



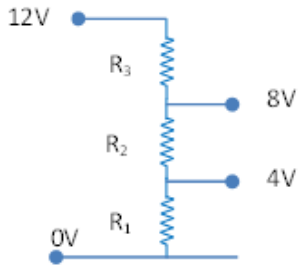
A) 995 B) 1995 C) 2995 D) None of these

43) A voltmeter of resistance 1000 Ω is connected across a resistance of 500 Ω in the given circuit. What will be the reading of voltmeter



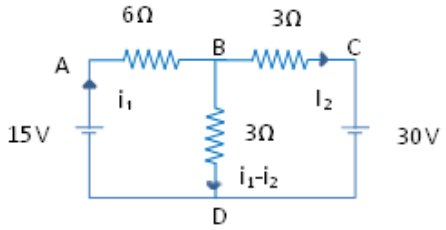
A) $1V$ B) $2V$ C) $6V$ D) $4V$

44) A potential divider is used to give outputs of $4V$ and $8V$ from a $12V$ source. Which combination of resistances, R_1, R_2, R_3 gives the correct voltages i.e $R_1 : R_2 : R_3$



A) 2 : 1 : 2 B) 1 : 1 : 1 C) 2 : 2 : 1 D) 1 : 1 : 2

45) In the circuit shown in figure, find the current through the branch BD

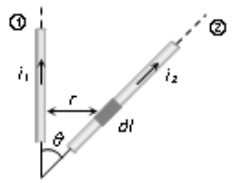


A) $5A$ B) $0A$ C) $3A$ D) $4A$

46) Wires 1 and 2 carrying currents i_1 and i_2 respectively are inclined at an angle θ to each other.

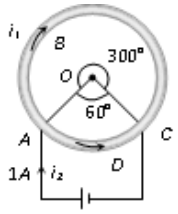
What is the force on a small element dl of wire 2 at a distance of r from wire 1 (as shown in figure)

due to the magnetic field of wire1



A) $\frac{\mu_0}{2\pi r} i_1\, i_2\, dl\, \tan\theta$ B) $\frac{\mu_0}{2\pi r} i_1\, i_2\, dl\, \sin\theta$ C) $\frac{\mu_0}{2\pi r} i_1\, i_2\, dl\, \cos\theta$ D) $\frac{\mu_0}{4\pi r} i_1\, i_2\, dl\, \sin\theta$

47) A cell is connected between the points A and C of a circular conductor ABCD of centre O with angle $AOC = 60^o$. If B_1 and B_2 are the magnitudes of the magnetic fields at O due to the currents in ABC and ADC respectively, the ratio $\frac{B_1}{B_2}$ is

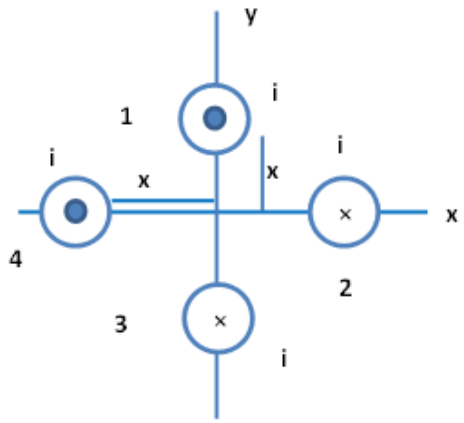


A) 0.2 B) 6 C) 1 D) 5

48) Two particles each of mass m and charge q are attached to the two ends of a light rigid rod of length 2R.The rod is rotated at constant angular speed about a perpendicular axis passing through its centre.The ratio of the magnitudes of the magnetic moment of the system and its angular momentum about the centre of the rod is $\frac{kq}{4m}$ then k =

A) 1 B) 2 C) 3 D) 4

49) What will be the resultant magnetic field at origin due to four infinite length wires. If each wire produces magnetic field 'B' at origin is $\sqrt{k}B$ then $k =$

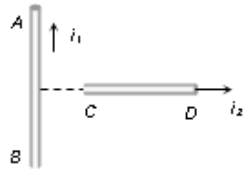


A) 4 B) 2 C) 8 D) 0

50) An infinitely long, straight conductor AB is fixed and a current is passed through it.

Another movable straight wire CD of finite length and carrying current is held perpendicular to

it and released. Neglect weight of the wire

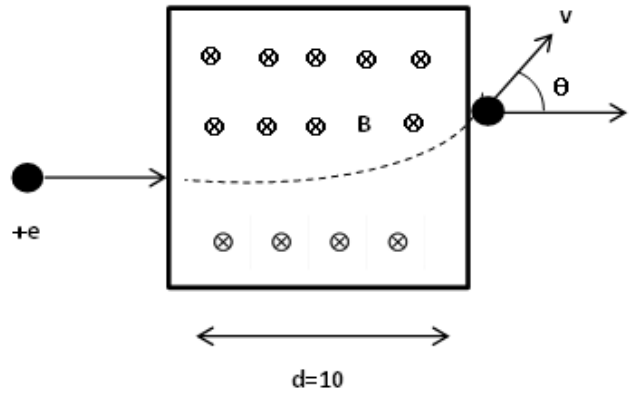


A) The rod CD will move upwards parallel to itself B) The rod CD will move downward parallel to itself

C) The rod CD will move upward and turn clockwise at the same time

D) The rod CD will move upward and turn anti –clockwise at the same time

51) A proton accelerated by a potential difference $500\ KV$ moves though a transverse magnetic field of $0.51\ T$ as shown in figure. The angle θ^o through which the proton deviates from the initial direction of its motion is then θ

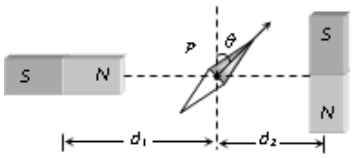


A) 15 B) 30 C) 45 D) 60

52) Two identical short bar magnets, each having magnetic moment M, are placed a distance of 2d apart with axes perpendicular to each other in a horizontal plane. The magnetic induction at a point midway between them is

A) $\frac{\mu_0}{4\pi}(\sqrt{3})\frac{M}{d^3}$ B) $\frac{\mu_0}{2\pi}(\sqrt{3})\frac{M}{d^3}$ C) $\left(\frac{2\mu_0}{\pi}\right)\frac{M}{d^3}$ D) $\frac{\mu_0}{4\pi}(\sqrt{5})\frac{M}{d^3}$

53) Two magnets A and B are identical and these are arranged as shown in the figure. Their length is negligible in comparison to the separation between them. A magnetic needle is placed between the magnets at point P which gets deflected through an angle θ under the influence of magnets. The ratio of distance d_1 and d_2 will be



A) $(2\tan\theta)^{1/3}$ B) $(2\tan\theta)^{-1/3}$ C) $(2\cot\theta)^{1/3}$ D) $(2\cot\theta)^{-1/3}$

54) A copper rod of length l is rotated about one end perpendicular to the magnetic field B with constant angular velocity ω. The induced e.m.f. between thetwo ends is

A) $\frac{1}{2}B\omega l^2$ B) $\frac{3}{4}B\omega l^2$ C) $B\omega l^2$ D) $2B\omega l^2$

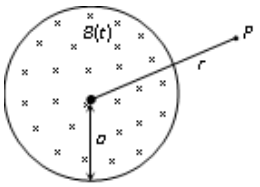
55) An e.m.f. of 15 volt is applied in a circuit containing 5 henry inductance and 10 ohm resistance. The ratio of the currents at time $t=\infty$ and at t = 1 second is

A) $\frac{e^{1/2}}{e^{1/2}-1}$ B) $\frac{e^2}{e^2-1}$ C) $1-e^{-1}$ D) e^{-1}

56) Two coils have a mutual inductance 0.005 H. The current changes in the first coil according to equation $I = I_0 \sin \omega t$, where $I_0 = 0A$ and w = 100 π radian/sec. The maximum value of e.m.f. in the second coil is

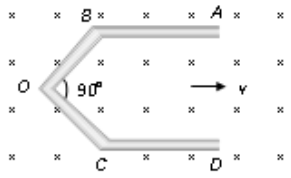
A) 2π B) 5π C) π D) 4π

57) A uniform but time-varying magnetic field B(t) exists in a circular region of radius a and is directed into the plane of the paper, as shown. The magnitude of the induced electric field at point P at a distance r from the centre of the circular region



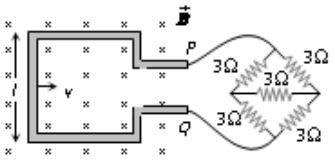
A) is zero B) Decreases as $\frac{1}{r}$ C) Increases as r D) Decreases as $\frac{1}{r^2}$

58) A conductor ABOCD moves along its bisector with a velocity of $1m/s$ through a perpendicular magnetic field of $1wb/m^2$, as shown in fig. If all the four sides are of 1m length each, then the induced emf between points A and D is



A) 0 B) 1.41 volt C) 0.71 volt D) None of these

59) A square metallic wire loop of side 0.1 and resistance of 1Ω is moved with a constant velocity in a magnetic field of $2Wb/m^2$ as shown in figure. The magnetic field is perpendicular to the plane of the loop, loop is connected to a network of resistances. What should be the velocity of loop so as to have a steady current of $1mA$ in loop



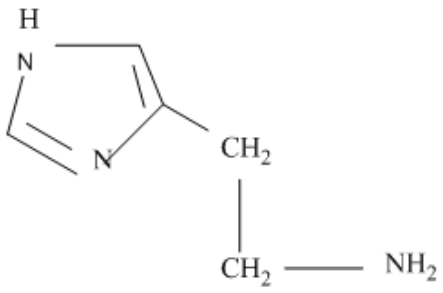
A) $1cm/sec$ B) $2cm/sec$ C) $3cm/sec$ D) $4cm/sec$

60) The true value of angle of dip at a place is 60^0 the apparent dip in a plane inclined at an angle of 30^0 with magnetic meridian is

A) $\tan^{-1}\frac{1}{2}$ B) $\tan^{-1}(2)$ C) $\tan^{-1}\left(\frac{2}{3}\right)$ D) None of these

61) Which one of the following is an antihistamine

A) Terpineol B) Chloramphenicol C) Zantac D) Salvarsan

62) The drug  is used as

A) Antacid B) Analgesic C) Antimicrobial D) Antiseptic

63) Artificial sweetener which is stable under cold conditions only is

A) Aspartame B) Saccharine C) Alitame D) Sucralose

64) The Hormone that helps in the conversion of glucose to glycogen is

A) Adrenaline B) Insulin C) Cortisone D) Bile acids

65) Which one of the following bases is not present in DNA

A) Quinoline B) Adenine C) Cytosine D) Thymine

66) Which of the set consists only of essential amino acids

A) Alanine,tyrosine,cystine B) Leucine lysine,tryptophan C) Alanine,glutamine,lysine D) Leucine,proline,glycine

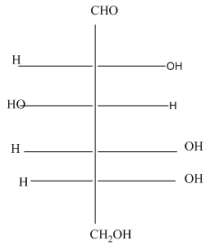
67) Which of the statements about “Denaturation “given below are correct
(A) Denaturation of proteins causes loss of secondary and tertiary structures of the protein
(B)Denaturation leads to the conversion of double strand of DNA into single strand
(C)Denaturation affects primary structure which gets distorted

A) (A) and (B) B) (A) (B) and (C) C) (B) and (C) D) (A) and (C)

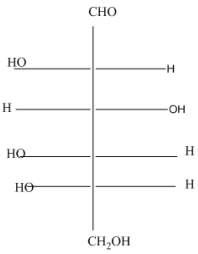
68) Which of the following pairs give positive Tollen's test

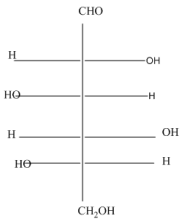
A) Glucose,sucrose B) Glucose ,fructose C) Hexanal acetophenone D) fructose,sucrose

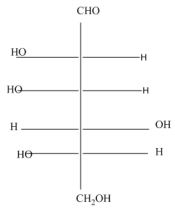
69) The structure of $D-(+)-$ glucose is

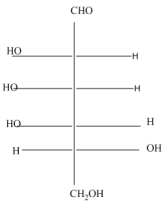


The structure of $L-(-)-$glucose is

A)


B)


C)


D)


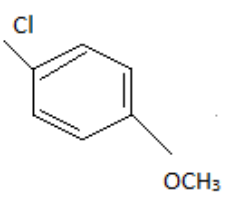
70) Among cellulose polyvinyl chloride nylon and natural rubber ,the polymer in which the intermolecular force of attraction is weakest in

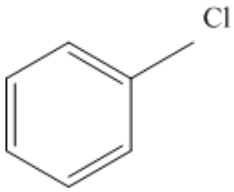
A) Nylon B) Polyvinyl chloride C) Cellulose D) Natural rubber

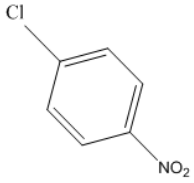
71) Ebonite is

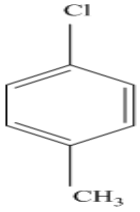
A) Polropene B) Natural rubber C) Synthetic rubber D) Highly vulcanized

72) Which of the following compounds undergoes nucleophilic substitution reaction most easily

A)


B)


C)


D)


73) Identify Z in the following series

$$C_2H_5I \xrightarrow{Alco.KOH} X \xrightarrow{Br_2} Y \xrightarrow{KCN} Z$$

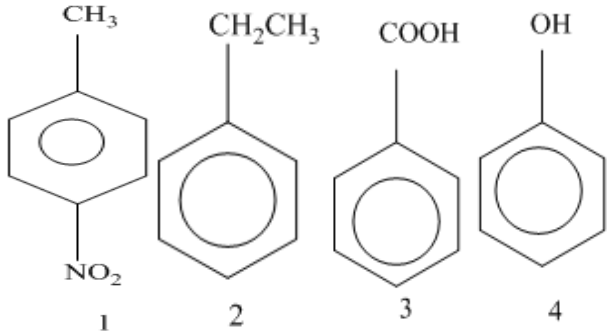
A) CH_3CH_2CN B)  C) $BrCH_2 - CH_2CN$ D) $BrCH = CHCN$

74) Unknown alcohol is treated with the “Lucas reagent” to determine whether the alcohol is primary secondary or tertiary. Which alcohol reacts fastest and by what mechanism

A) Secondary alcohol by S_N^1 B) Tertiary alcohol by S_N^1 C) Secondary alcohol by S_N^2

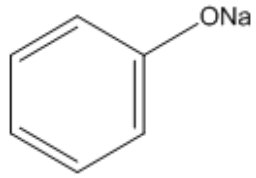
D) Tertiary alcohol by S_N^2

75) Which will undergo a Friedel-Craft’s alkylation reaction

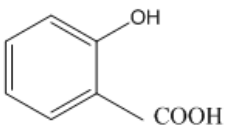


A) 1,2 and 4 B) 1 and 3 C) 2 and 4 D) 1 and 2

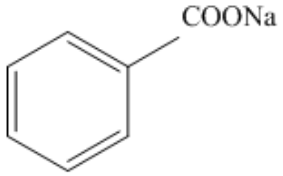
76) The compound X in the reaction

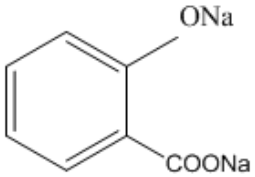


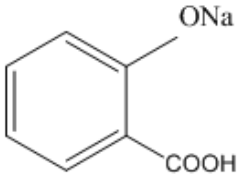
$$+ CO_2 \xrightarrow{390K} X \xrightarrow[H_2O]{HCl}$$

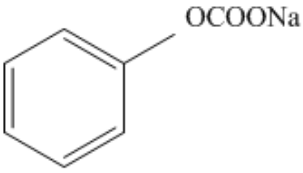


is

A) 

B) 

C) 

D) 

77) The products formed in the following reaction

$C_6H_5-O-CH_3+HI \xrightarrow{heat} are$

A) C_6H_5-I and CH_3-OH B) C_6H_5-OH and CH_3-I C) $C_6H_5-CH_3$ and HOI
D) C_6H_6 and CH_3OI

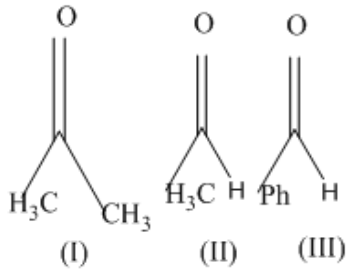
78) Which of the following pairs can be distinguished by sodium hypoiodite

A) CH_3CHO and CH_3COCH_3 B) CH_3CH_2CHO andCH_3COCH_3
C) CH_3CH_2OH and$CH_3CH_2CHOHCH_3$ D) CH_3OH andCH_3CH_2CHO

79) The key step in cannizzaro's reaction is the intermolecular shift of

A) Proton B) Hydride ion C) Hydronium ion D) Hydrogen bond

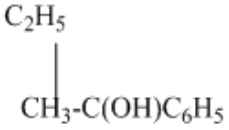
80) The order or reactivity of phenyl magnesium bromide with the following compound is



A) (II)>(III)>(I) B) (I)>(III)>(II) C) (II)>(I)>(III) D) All react with the same rate

81) In a set of the given reactions, acetic acid yielded a product C

$CH_3COOH+PCl_5 \rightarrow A \xrightarrow[anh.AlCl_3]{C_6H_6} B \xrightarrow[ether]{C_2H_5MgBr} C$ Product C would be

A) 

B) $CH_3CH(OH)C_2H_5$ C) $CH_3COC_6H_5$
D) $CH_3CH(OH)C_6H_5$

82) Which of the following acids has the smallest dissociation constant

A) $CH_3CHFCOOH$ B) FCH_2CH_2COOH C) $BrCH_2CH_2COOH$

D) $CH_3CHBrCOOH$

83) Acetamide is treated separately with the following reagents.Which would give methyl amine

A) PCl_5 B) $NaOH + Br_2$ C) Sodalime D) Hot concH_2SO_4

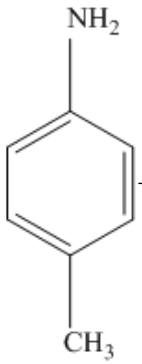
84) $CH_3NH_2 + CHCl_3 + KOH \rightarrow$ Nitrogen containing compound $+KCl + H_2O.$ Nitrogen containing compound is

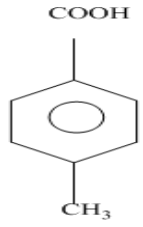
A) $CH_3 - C \equiv N$ B) $CH_3 - NH - CH_3$ C) $CH_3 - N \equiv C^+$ D) $CH_3N^+ \equiv C^-$

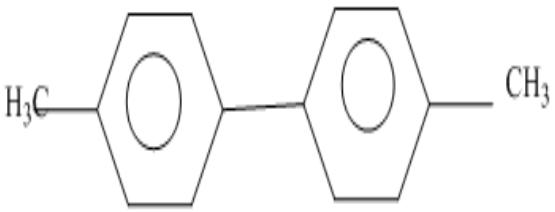
85) A compound with molecular mass 180 is acylated with CH_3COCl to get a compound with molecular

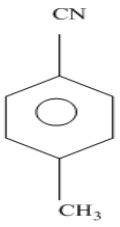
mass 390 The number of amino groups present per molecule of the former compound is

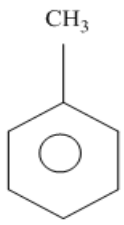
A) 2 B) 5 C) 4 D) 6

86) In the reaction  $\xrightarrow[0-5^\circ C]{NaNO_2/HC} D \xrightarrow[\Delta]{CuCN/KCN} E + N_2$ The product E is

A) 

B) 

C) 

D) 

87) The incorrect statement among the following is

A) Hydrogen is used to reduce NiO B) Zirconium is refined by van Arkel method

C) The sulphide ore galena is concentrated by froth floatation

D) In the metallurgy of iron ,the flux used is SiO_2

88) Considering Ellingham diagram ,which of the following metals can be used to reduce alumina

A) Fe B) Zn C) Mg D) Cu

89) Roasted gold ore $+CN^- + H_2O \xrightarrow{O_2} [X] + OH^-; [X] + Zn \rightarrow [Y] + Au\,[X]$ and $[Y]$ are

A) $X = [Au(CN)_2]^-$; $Y = [Zn(CN)_4]^{2-}$ B) $X = [Au(CN)_4]^{3-}$ $Y = [Zn(CN)_4]^{2-}$ C) $X = [Au(CN)_2]^-$ $Y = [Zn(CN)_6]^{4-}$ D) $X = [Au(CN)_4]^{3-}$ $Y = [Zn(CN)_6]^{2-}$

90) Which one of the following ores is best concentrated by froth floatation method

A) Siderite B) Galena C) Malachite D) Magnetite

91) Excess pressure inside a soap bubble is three times that of the other bubble, then the ratio of their volumes will be

A) 1:3 B) 1:9 C) 1:27 D) 1:81

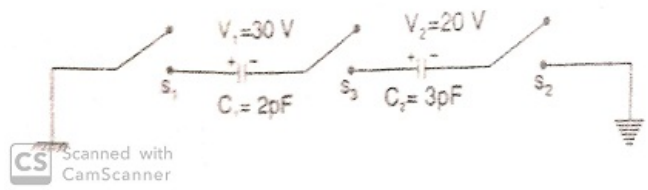
92) The least gold number is possible for

A) Potato starch B) Maize starch C) Rice starch D) gelatin

93) The values 'a' for which the function $f(x) = (a+2)x^3 - 3ax^2 + 9ax - 1$ decreases for all real values of x is

A) $a \leq -2$ B) $a \geq -2$ C) $a \leq -3$ D) $-3 \leq a < -2$

94) For the circuit shown, which of the following statement is true



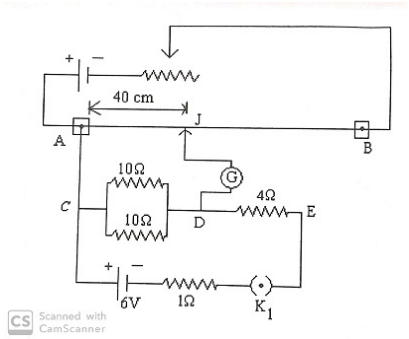
A) With S_1 closed $V_1 = 15V, V_2 = 20V$ B) With S_3 closed $V_1 = V_2 = 25V$

C) With S_1 and S_2 closed $V_1 = V_2 = 0$ D) With S_1 and S_3 closed $V_1 = 30V, V_2 = 20V$

95) A parallel plate capacitor of capacitance C is connected to a battery and is charged to a potential difference V. Another capacitor of capacitance 2C is similarly charged to a potential difference 2V. The charging battery is now disconnected and the capacitors are connected in parallel to each other in such a way that the positive terminal of one is connected to the negative terminal of the other. The final energy of the configuration is

A) zero B) $\frac{3}{2}CV^2$ C) $\frac{35}{6}CV^2$ D) $\frac{9}{2}CV^2$

96) In the circuit shown in fig., the potential difference between the points C and D is balanced against 40 cm length of potentiometer wire of total length 100 cm. In order to balance the potential difference between the points D and E. The jockey be pressed on potentiometer wire at a distance of in cm



A) 16 B) 32 C) 56 D) 80

97)
Breathing movements can be estimated by

A) Barometer B) Spirometer C) Spigmomanometer D) Voltmeter