SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

JEE MAIN TOT GT-9

Time: 3 Hours **Max. Marks: 300 M**

SECTION – I
(SINGLE CORRECT ANSWER TYPE)

This section contains 20 multiple choice questions. Each question has 4 options (A), (B), (C) and (B) for its answer, out of which **ONLY ONE** option can be correct.
Marking scheme: +4 for correct answer, 0 if not attempted and -1 if not correct.

MATHEMATICS

1. **The general solution of the equation** $2\cot^2 x+2\sqrt{3}\cot x+4\operatorname{cosec} x+8=0$ is

A) $n\pi\pm\frac{\pi}{6}$ B) $2n\pi-\frac{\pi}{6}$ C) $2n\pi\pm\frac{\pi}{6}$ D) $n\pi+\frac{\pi}{6}$

2. **AB is a vertical pole with its end A on level ground. C is mid-point of the pole AB and P is a point on the ground such that** $AP=2AB$ **if** $\angle BPC=\beta$ **then** $Tan\beta=$_____

A) $\frac{2}{9}$ B) $\frac{4}{9}$ C) $\frac{6}{7}$ D) $\frac{1}{4}$

3. **The inverse of the proposition** $(p\wedge\sim q)\to r$ **is**

A) $\sim r\to\sim p\vee q$ B) $(\sim p\vee q)\to\sim r$ C) $r\to p\wedge\sim q$ D) $\sim p\wedge q\to\sim r$

4. **If** $|x|<1$ **them the sum of the series**

$\frac{x}{1-x^2}+\frac{x^2}{1-x^4}+\frac{x^4}{1-x^8}+.....\infty$ is _____

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

5. **A bag contains a large number of white and black marbles in equal proportions. Two samples of 5 marbles are selected (with replacement), at random. The probability that the first sample contains exact by 1 black and second sample contains exact by 3 black marbles is** _____

A) $\frac{15}{32}$ B) $\frac{25}{512}$ C) $\frac{15}{1024}$ D) $\frac{35}{256}$

6. **A sequence of matrices is defined as**

$m(1)=[1],\ m(2)=\begin{bmatrix}2&3\\4&5\end{bmatrix},\ m(3)=\begin{bmatrix}6&7&8\\9&10&11\\12&13&14\end{bmatrix}$ **and so on then trace of** $m(17)$ **is**

A) 27,798 B) 27,987 C) 27,897 D) 27,895

7. **For the set of linear equations** $\lambda x-3y+z=0,\ x+\lambda y+3z=1,$ **and** $3x+y+5z=2,$ **the values of** λ **for which the equations does not have unique solution are**

A) $-1,\frac{-11}{5}$ B) $1,\frac{-11}{5}$ C) $-1,\frac{11}{5}$ D) $1,\frac{11}{5}$

8. **If** $z=(1+ix)^n$ **is a complex number such that its real part in equal to the imaginary part where** $x\in R$ **and** $n\in Z^+,$ **Then the possible value of** x **is** _____

A) $Tan\frac{\pi}{n}$ B) $Tan\frac{\pi}{2n}$ C) $Tan\frac{5\pi}{4n}$ D) $Tan\frac{3\pi}{2n}$

9. **In an equilateral triangle with vertices $A(\bar{a})$ $B(\bar{b})$ and $C(\bar{c})$, $P(\bar{p})$ is any interior point of ΔABC and D,E,F are the feet of perpendiculars from P to $\overline{BC},\overline{CA}$ and $\overline{AB}$ respectively. If $|\bar{d}-\bar{p}|+|\bar{e}-\bar{p}|+|\bar{f}-\bar{p}|=\lambda|\bar{c}-\bar{a}|$ then λ =_____**

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

10. **The locus of P(x, y, z) which is equidistant from the lines $\bar{r}=\bar{k}+t\bar{i}$ and $\bar{r}=-\bar{k}+s\bar{j}$ is**

A) $x^2 - y^2 - 4z = 0$ B) $x^2 - y^2 + 4z = 0$
C) $x^2 + y^2 - 4z = 0$ D) $x^2 + y^2 + 4z = 0$

11. **Let M be set of set of all 3×3 matrices with elements integers. A relation R on M is defined such that ARB if $(A-B)$ is skew symmetric. Then R is**

A) Reflexive only B) Reflexive and symmetric only
C) Symmetric and transitive only D) equivalence relation

12. **The distance of the point $(1,0,-3)$ from the plane $x-y-z=9$ measured parallel to the line $\frac{x-2}{2}=\frac{y+2}{3}=\frac{z-6}{-6}$ is _____**

A) 6 B) 7 C) $\frac{7}{2}$ C) $\frac{8}{3}$

13. **If $f(x)=\begin{cases}\min & \{x,x^2\} \quad , \quad x\geq 0\\ \min & \{2x,x^2-1\}, \quad x<0\end{cases}$ then the number of points interval $[-2,2]$ where $f(x)$ is not differentiable is _____**

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

14. **A tangent to the curve $\frac{x^2}{25}+\frac{y^2}{16}=1$ meets the coordinate axes in A and B respectively. Then the minimum value of AB is _____**

A) 81 B) 9 C) 243 D) 729

15. **If $\lim_{t\to x}\frac{t^2f(x)-x^2f(t)}{t-x}=1$ and $f(1)=1$ then $f\left(\frac{3}{2}\right)=$ _____**

A) $\frac{2}{9}$ B) $\frac{23}{18}$ C) $\frac{31}{18}$ D) $\frac{43}{18}$

16. $\lim_{m\to\infty}\int_{-\infty}^{\infty}\frac{dx}{1+x^2+x^4+.....+x^{2m}}=$ _____ **where** $m\in N$

A) 4 B) $\frac{4}{3}$ C) $\frac{3}{4}$ D) 0

17. $\int\frac{(1+\ln x)^2}{1+\ln x^{x+1}+\left(\ln x^{\sqrt{x}}\right)^2}dx=$ _____

A) $\ln(x+\ln x)+c$ B) $\ln(1+x\ln x)+c$
C) $\ln(x-\ln x)+c$ D) $\ln(1-x\ln x)+c$

18. **Let $g(x)=2f\left(\frac{x}{2}\right)+f(2-x)$ and $f^{11}(x)<0$ for all $x\in(0,2)$ then $g(x)$ is monotonically decreasing in the internal _____**

A) $\left(0,\frac{4}{3}\right)$ B) $\left(\frac{4}{3},2\right)$ C) $\left(\frac{2}{3},2\right)$ D) $(1,2)$

19. **If $(10,5)$ is focus of a parabola for which $x-$axis is tangent and y-axis is normal them the equation of the directrix of the parabola is _____**

A) $2x+y-25=0$ B) $2x-y+25=0$ C) $2x-y-25=0$ D) $2x+y+25=0$

20. **The centre of the smallest circle touches the circle $x^2+y^2=4$ and $x+y=5\sqrt{2}$ is _____**

A) $\left(\frac{5}{\sqrt{2}},\frac{5}{\sqrt{2}}\right)$ B) $\left(\frac{7}{\sqrt{2}},\frac{7}{\sqrt{2}}\right)$ C) $\left(\frac{5}{2\sqrt{2}},\frac{5}{2\sqrt{2}}\right)$ D) $\left(\frac{7}{2\sqrt{2}},\frac{7}{2\sqrt{2}}\right)$

SECTION-II
(Numerical Value Answer Type)

This section contains 5 questions. The answer to each question is a Numerical values comprising of positive or negative decimal numbers
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21. **If $[.]$ denotes greatest integer function and $f(x)=\sin^{-1}\left[x^2+\frac{1}{2}\right]+\cos^{-1}\left[x^2-\frac{1}{2}\right]$, Then the value of f(x) is_____**

22. **If $'d'$ is the distance between the point $(-1,-5,10)$ and the point of intersection of the line $\frac{x-2}{3}=\frac{y+1}{4}=\frac{z+2}{12}$ with the plane $x-y-z=5$ then $\frac{3d^3}{5}$ is equal to _____**

23. **If $f(x)=x^3+x^2-5x-1=0$ has roots α,β,γ then $[\alpha]+[\beta]+[\gamma]=$ _____**

24. **A pair of numbers is picked up randomly from the set $\{1,2,3,5,7,11,12,13,17,19\}$. The probability that the number 11 was picked given that the sum of numbers was even is nearly equal to _____**

25. **If in a frequency distribution then mean and median are 21 and 22 respectively, then its mode is equal to _____**

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PHYSICS

26. **The kinetic energy *K* of a particle moving along a circle of radius *R* depends upon the distance moved from rest *s*, as $K = as^2$. The force acting on the particle is (*a* is a positive constant)**

A) $2a\frac{s^2}{R}$ B) $2as\left[1+\frac{s^2}{R^2}\right]^{1/2}$ C) $2as$ D) $2a$

27. **A body cools down from 50^0C to 45^0C in 5 min and 45^0C to 40^0C is 8 min. Find the temperature of the surrounding. Assume Newton's law of cooling.**

A) 34^0C B) 24^0C C) 39^0C D) 20^0C

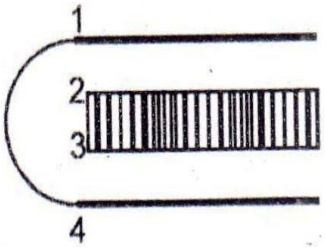
28. **When an ideal diatomic gas is heated at constant pressure the fraction of the heat energy supplied which increases the internal energy of the gas is:**

A) (2/5) B) (3/5) C) (7/5) D) (5/7)

29. **A cubical block is floating in a liquid with half of its volume immersed in the liquid. When the whole system accelerates upward with a net acceleration of g/2, the fraction of volume immersed in the liquid will become**

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

30. **Found it identical plates 1, 2, 3 and 4 are placed parallel to each other at equal distance as shown in the figure. Plates 1 and 4 are joined together and the space between 2 and 3 is filled with dielectric of dielectric constant k = 2. The capacitance of the system between 1 and 3 , 2 and 4 are C_1 and C_2 respectively. The ratio C_1/C_2 is:**

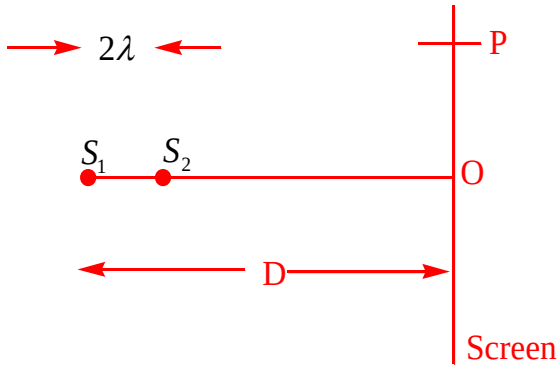


A) $5/3$ B) 1 C) $3/5$ D) $5/7$

31. **An arc of radius *r* carries charge. The linear density of charge is λ and the arc subtends an angle $\frac{\pi}{3}$ at the centre. What is electric potential at the centre?**

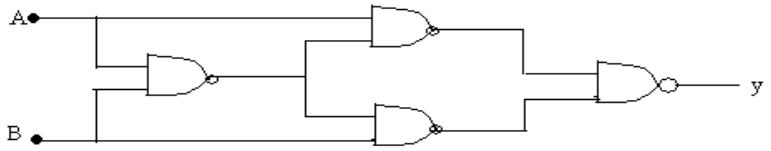
A) $\frac{\lambda}{4\varepsilon_0}$ B) $\frac{\lambda}{8\varepsilon_0}$ C) $\frac{\lambda}{12\varepsilon_0}$ D) $\frac{\lambda}{16\varepsilon_0}$

32. **Two sources S_1 *and* S_2 emitting coherent light waves of wavelength λ in the same phase are situated as shown. The minimum distance OP, so that the light intensity detected at P is equal to that at O is(D>>λ)**



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

33. Truth table for system of four NAND gates as shown in figure is :



1)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

2)

A	B	Y
0	0	0
0	1	0
1	0	1
1	1	1

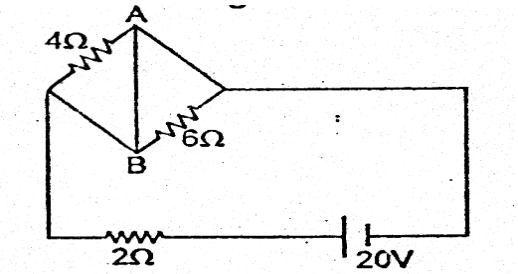
3)

A	B	Y
0	0	1
0	1	1
1	0	0
1	1	0

4)

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1

34. In the circuit shown in the figure (neglect the internal resistance of the battery)



A) power supplied by the battery is 100 watt

B) current flowing in the circuit through the battery is 5A

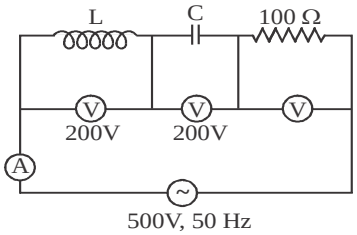
C) potential difference across 4Ω resistance is equal to the potential difference across 6Ω resistance

D) current in wire AB is zero

35. A charged particle enters a uniform magnetic field with velocity at an angle of 45° with magnetic field. The pitch of the helical path followed by the particle is *P*. The radius of the helix will be

A) $\frac{P}{\sqrt{2}\,\pi}$ B) $\sqrt{2}\,P$ C) $\frac{P}{2\pi}$ D) $\frac{\sqrt{2}P}{\pi}$

36. Find the reading of A.C voltmeter across the resistance and A.C ammeter in the circuit



A) 500V, 5A B) 250V, 5A C) 250V, 10A D) 500V, 2.5A

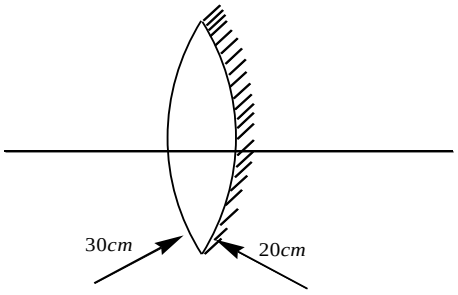
37. Two identical charged spheres are suspended by strings of equal lengths the strings make an angle of 30^0 with each other, when suspended in a liquid of density 0.8 gm/cc the angle remains the same. If density of the material of the sphere is 1.6 gm/cc then dielectric constant of the liquid is

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

38. A pipe of length 85 cm is closed from one end. Find the number of possible natural oscillations of air column in the pipe whose frequencies below 1250 Hz. The velocity of sound in air is 340 m/s

A) 12 B) 8 C) 6 D) 4

39. A biconvex lens is made of glass with refractive index 1.5 and radii of curvature 20 cm and 30 cm. if the surface whose radius is 20 cm silvered, the effective focal length of the optical device formed is



A) $-\frac{60}{11}cm$ B) $\frac{60}{11}cm$ C) $-\frac{79}{11}cm$ D) $-\frac{69}{11}cm$

40. An alternating current $I = I_0 \sin \omega t$ is flowing in a circuit. The ratio of rms current in the interval of 0 to T and the average current in the circuit for the time interval from T/8 to 3T/8 (where T is time period) is:

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

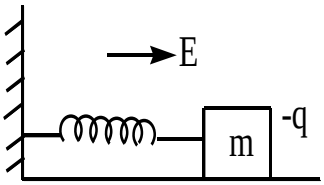
41. A star initially has 10^{40} deuterons. It produces energy via the process $_1H^2 + {}_1H^2 \rightarrow {}_1H^3 + {}_1H^1$ and $_1H^2 + {}_1H^3 \rightarrow {}_2He^4 + {}_0n^1$ If the average power radiated by the star is 10^{16}W, the deuteron supply of the star is exhausted in a time of the order of [The mass of the nuclei are as follows : $mass\ of\ {}_1H^2 = 2.014amu; mass\ of\ {}_0n^1 = 1.008amu; mass\ of\ {}_1H^1 = 1.007amu; mass\ of\ {}_2He^4 = 4.001amu$]

A) 10^6s B) 10^8s C) 10^{12}s D) 10^{13}s

42. **A carrier wave of peak voltage 12 V is used to transmit a message signal. The peak voltage of modulating signal in order to have a modulation index as 0.75 is**

A) 12V B) 9V C) 6 V D) 3V

43. **A block of mass 'm' containing a net negative charge '–q' is placed on a frictionless horizontal table and is connected to wall through an unstretched spring of spring constant 'k'. if the horizontal electric field 'E' parallel to the spring is switched on, then the maximum compression of the spring is**

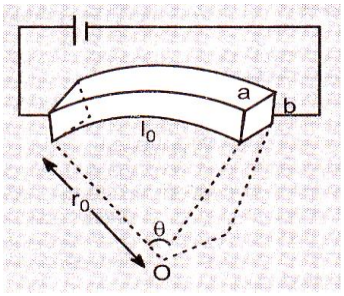


A) $\sqrt{\frac{qE}{K}}$ B) $\frac{2qE}{K}$ C) $\frac{qE}{K}$ D) 0

44. **A metallic rod of length $'l'$ rotates with angular velocity 'ω' about an axis passing through one end and perpendicular to the rod. If mass of electron is 'm' and its charge is '-e' then the magnitude of potential difference between its two ends is**

A) $\frac{m\omega^2 l^2}{2e}$ B) $\frac{m\omega^2 l^2}{e}$ C) $\frac{m\omega^2 l}{e}$ D) $\frac{m\omega^2 l}{2e}$

45. **A curved rectangular bar forms a resistor. The curved sides are concentric circular arcs. If ρ is the resistivity of the material of bar, l_0 is the length of inner arc of radius $r_0, (r_0 + b)$ is the radius of the outer arc, and a is the width of the bar. The electric resistance of the bar across its rectangular ends is:**



A) $\frac{\rho l_0}{a r_0}$ B) $\frac{\rho l_0}{a r_0 \ln\left[1+\frac{b}{r_0}\right]}$ C) $\frac{2\rho l_0}{a r_0 \ln\left[1+\frac{b}{r_0}\right]}$ D) $\frac{4\rho l_0}{a \ln\left[1-\frac{b}{r_0}\right]}$

SECTION- II
(Numerical Value Answer Type)

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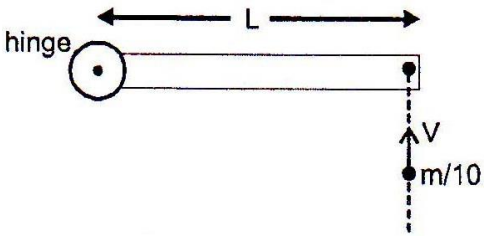
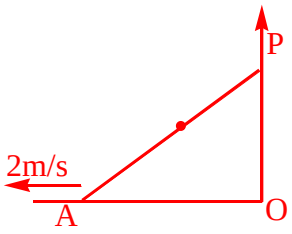
46. **When a belt moves horizontally at a constant speed of 1.5 ms^{-1}, gravel is falling on it at 5 kgs^{-1}, then, the extra power needed to drive the belt is**

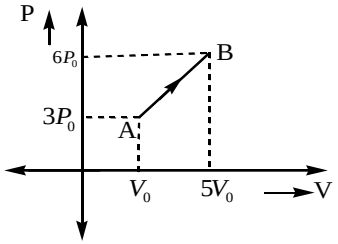
47. **A thin uniform rod of mass 'm' of length 'L' hinged at one end. This rod is maintained in horizontal position by colliding very tiny balls of each mass m/10 completely elastically 10 times per sec striking on the opposite end as shown in figure. Find the speed of the ball** $\left(g = 10ms^{-2}\right)$



48. **A Ladder AP of length 5m inclined to a vertical wall is slipping over a horizontal surface with velocity of 2 m/s, when 'A' is at a distance 3m from 'O' , the velocity of centre of mass at this moment is**



49. **One mole of a monoatomic ideal gas undergoes the process** $A \to B$ **in the given P-V diagram. The specific heat for this process is** $\frac{xR}{10}$ what is the value of x?



50. **A screw gauge gives the following reading when used to measure the diameter of a wire main scale reading 0 mm circular scale reading 52 divisions. Given that 1mm on main scale corresponds to 100 divisions of the circular scale The diameter of wire from the above data in mm is**

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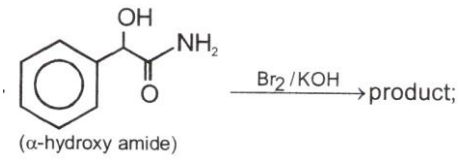
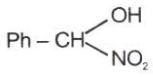
51.



Product of this Hoffmann bromamide reaction is:

A) $Ph - \overset{OH}{\overset{|}{C}}H - NH_2$

B) $Ph - CHO$



C)

D) $Ph - CH_2 - NH_2$

52. **In chlorobenzene solutions, the basic strength of amines increases in the order**

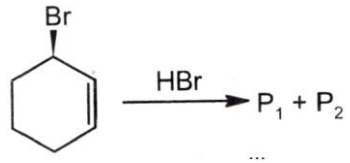
A) $(C_2H_5)_3N < (C_2H_5)_2NH < C_2H_5NH_2$

B) $C_2H_5NH_2 < (C_2H_5)_2NH < (C_2H_5)_3N$

C) $(C_2H_5)_2NH < C_2H_5NH_2 < (C_2H_5)_3N$

D) $(C_2H_5)_3N < (C_2H_5)NH_2 < (C_2H_5)_2NH$

53.

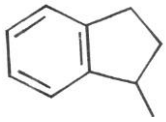
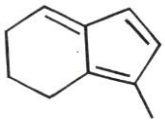
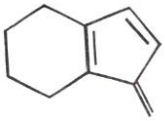
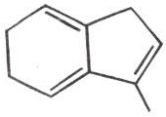


P_1 **&** P_2 **are major dibromo products. What is the relationship between** P_1 **&** P_2

A) Diastereomer B) Enantiomers

C) Configurational isomer D) Constitutional isomer

54. **Which of the following isomeric hydrocarbons is most acidic?**

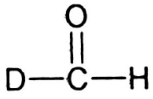
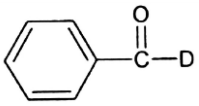
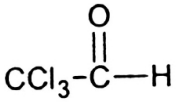
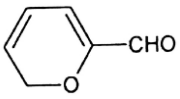
A)  B)  C)  D) 

55. $\alpha - D -$ **Glucose and** $\beta - D -$ **glucose differ from each other due to difference in one carbon with respect to its**

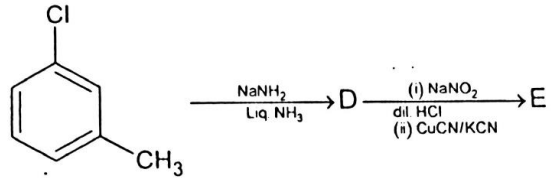
A) Size of hemiacetal ring B) Number of OH groups

C) Configuration D) Conformation

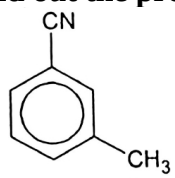
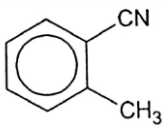
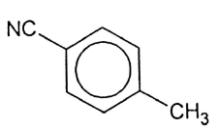
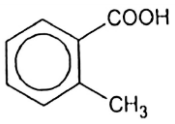
56. **Which of the following compounds does not undergo Cannizzaro reaction?**

A)  B)  C)  D) 

57.



Find out the product E.

A)  B)  C)  D) 

58. **Which of the following represents the correct order of stability of the given carbocations?**

A) $F_3\overset{+}{C} > F_3C-\overset{+}{\underset{|}{C}} > \overset{+}{C}H_3$ B) $H_3\overset{+}{C} > F_3C-\overset{+}{\underset{|}{C}} > F_3\overset{+}{C}$

C) $F_3C-\overset{+}{\underset{|}{C}} > F_3\overset{+}{C} > H_3\overset{+}{C}$ D) $F_3C-\overset{+}{\underset{|}{C}} > H_3\overset{+}{C} > F_3\overset{+}{C}$

59. **What fraction of total voids (octahedral and tetrahedral) is occupied by Cr^{+3} in $CrCl_3$. If Cl^- ions are in CCP**

A) 1/3 B) 1/6 C) 1/9 D) 1/12

60. **The de Broglie wavelength of an electron in the ground state of hydrogen atom is:**

$\left[K.E. = 13.6\ eV;\ 1\text{eV} = 1.602\times10^{-19}\ J\right]$

A) 33.28 nm B) 3.328 nm C) 0.3328 nm D) 0.0332 nm

61. **For the reaction**

$\left[Ag(CN)_2\right]^-_{(ag)} \rightleftharpoons Ag^-_{(ag)} + 2CN^-_{(ag)}$**, the equilibrium**

Constant at 25^0C is 4.0×10^{-19}**. Calculate the silver ion concentration in a solution which was originally 0.10 M in KCN and 0.03 M in** $AgNO_3$.

A) $1.5\times10^{-18}M$ B) $2.5\times10^{-18}M$ C) $7.5\times10^{-18}M$ D) $5.5\times10^{-18}M$

62. **n-factor for HCl in reaction** $K_2Cr_2O_7 + HCl \rightarrow KCl + CrCl_3 + Cl_2$

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

63. **The EMF for the cell Ag(s) |AgCl(s)|KCl(0.2M)|| KBr (0.001M)| AgBr(s) | Ag(s) at 25^0C is (K_{sp} (AgCl) = 2.0 x 10^{-10}; K_{sp} (AgBr) = 4.0 x 10^{-13}, 2.303 RT/F = 0.06, log 2 = 0.C)**

A) 0.024V B) -0.024V C) -0.24V D) -0.012V

64. **For a first order homogeneous gaseous reaction** $A \rightarrow 2B + C$ **then initial pressure was** P_i **while total pressure after time *t* was** P_t**. Then expression for rate constants K in terms** P_i, P_t **and *t* is**

A) $K = \frac{2.303}{t}\log\left(\frac{2P_i}{3P_i - P_t}\right)$ B) $K = \frac{2.303}{t}\log\left(\frac{2P_i}{2P_t - P_i}\right)$

C) $K = \frac{2.303}{t}\log\left(\frac{P_i}{P_i - P_t}\right)$ D) None of these

65. **Among** $LiCl$, $BeCl_2$, **and** $RbCl$ **the compound with greatest and least ionic character, respectively are**

A) $LiCl$ and $RbCl$ B) $RbCl$ and $BeCl_2$

C) $RbCl$ and $MgCl_2$ D) $MgCl_2$ and $BeCl_2$

66. **Which of the following traids have approximately equal size?**

A) $Na^{\oplus}, Mg^{2+}, Al^{3+}$ (isoelectronic) B) F^-, Ne, O^{2-} (isoelectronic)

C) Fe, Co, Ni D) Mn^{2+}, Fe^{2+}, Cr (isoelectronic)

67. **In the extraction of copper, metal is formed in the Bessemer converter due to reaction.**

A) $Cu_2S + 2Cu_2O \rightarrow 6Cu + SO_2$ B) $Cu_2S \rightarrow 2Cu + S$

C) $Fe + Cu_2O \rightarrow 2Cu + FeO$ D) $2Cu_2O \rightarrow 4Cu + O_2$

68. **Optical isomerism is not shown by complex.**

A) $\left[Cr(OX_3)\right]^{3-}$ B) $\left[Co(en)_2Cl_2\right]^+ (Cis-form)$

C) $\left[Co(en)_2Cl_2\right]^+ (Trans-form)$ D) $\left[Cr(en)_3\right]^{3+}$

69. **Sodium peroxide on treatment with cold dil.** H_2SO_4 gives

A) $H_2O + Na_2SO_4O_2$ B) $H_2O + Na_2SO_4$

C) $H_2O_2 + Na_2SO_4$ D) $H_2O + Na_2SO_3$

70. **Among** NO_3^-, AsO_3^{3-}, CO_3^{2-}, ClO_3^-, SO_3^{2-}, **and** BO_3^{3-} **ions, the non-planar species are**

A) AsO_3^{3-}, SO_3^{2-} *and* ClO_3^- B) NO_3^-, SO_3^{2-} *and* ClO_3^-

C) CO_3^{2-}, AsO_3^{3-} *and* SO_3^{2-} D) NO_3^-, CO_3^{2-} *and* ClO_3^-

SECTION-II
(Numerical Value Answer Type)

This section contains 5 questions. The answer to each question is a Numerical values comprising of positive or negative decimal numbers.
Marking scheme: +4 for correct answer, 0 in all other cases.

71. **0.2595 g of an organic substance in a quantitative analysis yielded 0.35 g of the barium sulphate. The percentage of Sulphur in the substance is**

72. **If 2-chloro-3-methyl pentane is treated with ethanolic KOH solution, how many different alkenes would be formed** *via* E_2 **elimination reaction?**

73. **The standard heat of formation of** U_3O_8 **is -853.5 kcal/mol and the standard heat of the reaction**

$3UO_2 + O_2 \rightarrow U_3O_8$ **is -76.01 kcal**

The standard heat of formation of UO_2 **is**

74. **Vapour pressure of solution containing 6g of a non-volatile solute in 180g water is 20 torr. Of 1 mole water is further added, then vapour pressure increases by 0.02 torr. The molar mass of the non-volatile solute is**

75. **Half litre each of three samples of H_2O_2 labelled 10vol, 15vol, 20vol are mixed and then diluted with 1700ml of water. Calculate relative strength of resultant H_2O_2 solution.**