JEE MAIN

MODEL GRAND TEST

No. of Questions: 90 **Maximum Marks: 360** **Time: 3 Hrs**

MATHEMATICS

1. Numbers of divisors of $2^5\ 3^2\ 5^3$ which are divisible by 2 but not divisible by 6 and 8 is

1) 16 2) 4 3) 2 4) 8

2. $f(x) = \lim_{n\to\infty} (\sin x)^{2n}$ then set of points of discontinuity of f(x) is

1) $\left\{(2n+1)\frac{\pi}{4}, n \in z\right\}$ 2) $\left\{(2n+1)\frac{\pi}{2}, n \in z\right\}$

3) $\left\{(2n+1)\frac{\pi}{3}, n \in z\right\}$ 4) $\left\{(2n+1)\frac{\pi}{12}, n \in z\right\}$

3. If $a, b, c \in R^+$, $a + b + c = 9$ then minimum value of $\left(\frac{1}{a}+1\right)\left(\frac{1}{b}+1\right)\left(\frac{1}{c}+1\right)$ is

1) $\frac{64}{27}$ 2) 3 3) 9 4) 27

4. Given the family of lines $a(3x + 4y + 6) + b(x + y + 2) = 0$. The lines of the family situated at the greatest distance from the point P(2, 3) has equation

1) $4x + 3y - 8 = 0$ 2) $5x + 3y + 2 = 0$

3) $4x + 3y + 8 = 0$ 4) $5x + 3y - 9 = 0$

5. If the lengths of two perpendicular tangents form a point to parabola are 3 and 4 units and then length of latus rectum is k then [k] = ([.] is greatest integer function)

1) 0 2) 1 3) 4 4) 5

6. Let P_1, P_1' be the feet of the perpendicular drawn from focus on a tangent to an ellipse whose length of semi main axis is 20, if $\sum_{i=1}^{10} (SP_1)(S'P_1') = 2560$ then the value of eccentricity is

1) $\frac{1}{5}$ 2) $\frac{2}{5}$ 3) $\frac{4}{5}$ 4) $\frac{3}{5}$

7. If the equation $|x^2 + 2x + a| = 2$ has exactly 4 real and distinct solutions, then

1) $a > -1$ 2) $a < -1$ 3) $a > 2$ 4) $a < 5$

8. If $f(x) = \frac{e^{2x}-1}{1+e^{2x-1}}$ then $f\left(\frac{1}{1234}\right) + f\left(\frac{3}{1234}\right) + f\left(\frac{5}{1234}\right) + \ldots\ldots\ldots + f\left(\frac{1233}{1234}\right) =$

1) 1233 2) $\frac{617}{2}$ 3) $\frac{1233}{2}$ 4) 1234

9. The equation of the plane through the point $\bar{i} + 2\bar{j} - \bar{k}$ and perpendicular to the line of intersection of the planes $\bar{r}.(3\bar{i} - \bar{j} + \bar{k}) = 1$, $\bar{r}.(\bar{i} + 4\bar{j} - 2\bar{k}) = 2$ is

1) $\bar{r}.(2\bar{i} - 7\bar{j} - 13\bar{k}) = 1$ 2) $\bar{r}.(2\bar{i} + 7\bar{j} + 13\bar{k}) = 1$

3) $\bar{r}.(2\bar{i} - 7\bar{j} + 13\bar{k}) = 3$ 4) $\bar{r}.(2\bar{i} + 7\bar{j} - 13\bar{k}) = 17$

10. The value of $x(x \in N)$ for which the 6^{th} term of $\left[\sqrt{2^{\log(10-3^x)}} + \sqrt[5]{2^{(x-2)\log 3}}\right]^m$ $m \in N$ is equal to 21 and binomial coefficients of the second, third and fourth terms are respectively the first, third and fifth terms of an A.P

1) 2 2) 4 3) 0 4) 1

11. The geometric mean of 10 observations on a certain variable was calculated as 16.2. It was later discovered that one of the observations was wrongly recorded as 12.9, infact it was 21.9. The correct geometric mean is

1) $\left(\frac{(16.2)^9 \times (21.9)}{12.9}\right)^{1/10}$ 2) $\left(\frac{(16.2)^{10} \times 21.9}{12.9}\right)^{1/10}$

3) $\left(\frac{(16.2)^{10} \times 12.9}{21.9}\right)^{1/10}$ 4) $\left(\frac{(16.2)^{11} \times 21.9}{12.9}\right)^{1/11}$

12. If in a triangle ABC $\begin{vmatrix} 1 & a & b \\ 1 & c & a \\ 1 & b & c \end{vmatrix} = 0$, then the value of $\sin^2 A + \sin^2 B + \sin^2 C$ is (where a, b, c are side lengths of ΔABC)

1) $\frac{9}{4}$ 2) $\frac{4}{9}$ 3) $\frac{3\sqrt{3}}{2}$ 4) 1

13. $\theta \in [0, 2\pi]$ and z_1, z_2, z_3 are three complex numbers such that they are collinear and $\left(1 + |\sin\theta|\right)z_1 + \left(|\cos\theta| - 1\right)z_2 - \sqrt{2}\, z_3 = 0$ atleast one of the complex numbers z_1, z_2, z_3 is non zero then number of values of θ

1) 4 2) 8 3) 2 4) 0

14. Let $a = \cos^{-1}(\cos 20)$, $b = \cos^{-1}(\cos 30)$ and $c = \sin^{-1}(\sin(a + b))$, then maximum value of $\sin(2(a + b + c)x) + \cos^2(a + b + c)\, x$ is

1) $\frac{\sqrt{5} - 1}{4}$ 2) $\frac{\sqrt{5} + 1}{4}$ 3) $\frac{\sqrt{5} + 1}{2}$ 4) $\frac{\sqrt{5} - 1}{2}$

15. If $4\cos 36^\circ + \cot 7\frac{1}{2} = \sqrt{a} + \sqrt{b} + \sqrt{c} + \sqrt{d} + \sqrt{e} + \sqrt{f}$ then find the value of $a - b + c - d + e + f$ where $a < b < c < d < e < f$ are natural numbers

1) 8 2) 9 3) 7 4) 10

16. A circle passes through the points (6, 8) $(7, \sqrt{51})$ and $(\sqrt{24}, 2\sqrt{19})$. If a variable Quadrilateral is inscribed in this circle, then maximum area of quadrilateral is

1) 100 2) 200 3) 400 4) 1000

17. Let z_1, z_2, z_3 be complex numbers such that $|z_1| = |z_2| = |z_3| = 1$, $z_1 + z_2 + z_3 = 1$ and $z_1 z_2 z_3 = 1$ then $|(z_1 + 2)(z_2 + 2)(z_3 + 2)| =$

1) 9 2) 12 3) 20 4) 15

18. Let a function $f : R \to R$ be is $f(x) = \min\{|x - 1|, |x - 2|, |x - 3| \ldots\ldots |x - 2012|\}$ then the value of $\int_0^{2013} f(x)dx =$

1) $\frac{2015}{4}$ 2) $\frac{2014}{4}$ 3) $\frac{2015}{2}$ 4) $\frac{2014}{2}$

19. [y] is the integral part of y, then $\int_{\Pi/2}^{3\,\Pi/2} [2 \sin x]dx =$

1) $-\Pi$ 2) 0 3) $\frac{-\Pi}{2}$ 4) $\frac{\Pi}{2}$

20. A parallelopiped is formed by planes drawn through the points (2, 3, 5) and (5, 9, 7) parallel to the coordinate planes. The length of a diagonal of the parallelopiped is

1) 7 2) $\sqrt{38}$ 3) $\sqrt{155}$ 4) $\sqrt{39}$

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

1) $\frac{x}{x+\sqrt{x}+1} + c$ 2) $\frac{2x}{x+\sqrt{x}+1} + c$

3) $\frac{1}{x+\sqrt{x}+1} + c$ 4) $\frac{-2x}{x+\sqrt{x}+1} + c$

22. Solution of $\frac{1+\frac{x^2}{2!}+\frac{x^4}{4!}+....}{x+\frac{x^3}{3!}+\frac{x^5}{5!}+....} = \frac{dx+dy}{dx-dy}$ is

1) $2ye^{2x} = ce^{2x} + 1$ 2) $2ye^{2x} = ce^{2x} - 1$

3) $ye^{2x} = ce^{2x} + 2$ 4) $ye^{2x} = ce^{-2x} + 2$

23. If $f : R \to R$ is real function defined by $f(x) = \frac{\sqrt{3}\sin x}{2+\cos x}$ then the range of f (x) is

1) $\left[\frac{-1}{2}, \frac{1}{2}\right]$ 2) $\left[\frac{-\sqrt{3}}{2}, \frac{\sqrt{3}}{2}\right]$ 3) $\left[-1, \frac{1}{2}\right]$ 4) $[-1, 1]$

24. $\lim_{x\to 0}\left[\lim_{n\to\infty} \frac{\sin x + \sin^2 x + ... + \sin n x}{x}\right] =$

1) e 2) 3 3) 2 4) 1

25. Let $a = 2i + j - 2k$ and $b = i + j$. If c is a vector such that $a.c = |c|, |c - a| = 2\sqrt{2}$ and the angle between $a \times b$ and c is 30°, then $|(a \times b) \times c| =$

1) $\frac{2}{3}$ 2) $\frac{3}{2}$ 3) 2 4) 3

26. The hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ passes through point of intersection of the lines $x - 3\sqrt{5}\,y = 0$ and $\sqrt{5}x - 2y = 13$ and the length of its latus rectum is $\frac{4}{3}$ units, then the value of $9e^2$ is equal to (where e is the eccentricity)

1) 9 2) $\frac{10}{9}$ 3) 10 4) 12

27. Let $f(x) = \frac{a^2-4}{a^2+2}x^3 - 3x + \sin 3$. Then for f(x) to be a decreasing function in R, possible values of a are given by

1) $(-\infty, -2)$ 2) $[2, \infty)$ 3) $[-2, 2]$ 4) $(-\infty, -1]$

28. The area of the region bounded by the curves $y = 2^x$, $y = 2x - x^2$ and the lines $x = 0$, $x = 2$ is

1) $3\log 2 - \frac{4}{3}$ 2) $\frac{3}{\log 2} - \frac{4}{3}$ 3) $\frac{1}{\log 2} - \frac{4}{3}$ 4) $\frac{3}{\log 2} + \frac{4}{3}$

29. Equation of a line which is parallel to the line common to the pair of lines given by $6x^2 - xy - 12y^2 = 0$, $15x^2 + 14xy - 8y^2 = 0$ and the sum of whose intercepts on the axes is 7, is

1) $2x - 3y = 42$ 2) $3x + 4y - 12 = 0$ 3) $5x - 2y = 10$ 4) $3x + 4y = 12$

30. If P(x) is a polynomial of 3rd degree and $P^{II}(1) = 0$, $P^{III}(1) = 6$ then $P^{II}(0) =$

1) 0 2) 6 3) -6 4) 4

PHYSICS

31. A charge Q is uniformly distributed over a long rod AB of length 'L' as shown in the figure. The electric potential at the point O lying at a distance L from the end A is

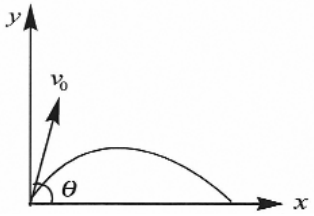
1) $\frac{3Q}{4\pi\varepsilon_0 L}$ 2) $\frac{Q}{4\pi\varepsilon_0 L \ln 2}$ 3) $\frac{Q \ln 2}{4\pi\varepsilon_0 L}$ 4) $\frac{Q}{8\pi\varepsilon_0 L}$

32. A particle slides from rest from the topmost point of a vertical circle of radius r along a smooth chord making an angle θ with the vertical. The time of descent is

1) Least for $\theta = 0$ 2) Maximum for $\theta = 0$

3) Least for $\theta = 45°$ 4) Independent of θ

33. A small particle of mass 'm' is projected at an angle θ with the X – axis with an initial velocity v_0 in the x – y plane as shown in the figure. At a time $t < (v_0 \sin\theta / g)$, the angular momentum of the particle is



1) $-mgv_0t^2 \cos\theta\hat{j}$ 2) $mgv_0t \cos\theta\hat{k}$

3) $-\frac{1}{2} mgv_0t^2 \cos\theta\hat{k}$ 4) $\frac{1}{2} mgv_0t^2 \cos\theta\hat{i}$

34. The fundamental frequency of an open pipe is '*f* '. The pipe is held vertically in water with half of its length inside the water. The fundamental frequency of the air column in the pipe is (neglect end correction)

1) *f* 2) $\frac{f}{2}$ 3) 2*f* 4) 4*f*

35. A spherical ball of radius 'r' and relative density 0.5 is floating in equilibrium in water with half of it immersed in water. The work done in pushing the ball down so that whole of it is just immersed in water is : (where ρ is the density of water)

1) $\frac{5}{12}\pi r^4 \rho g$ 2) $0.5\ \rho rg$ 3) $\frac{4}{3}\pi r^3 \rho g$ 4) $\frac{2}{3}\pi r^4 \rho g$

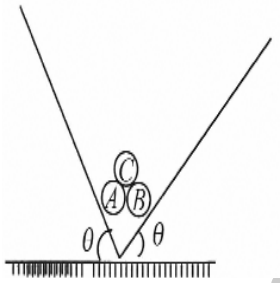
36. In the formula $X = 3YZ^2$, X and Z have the dimensions of capacitance and magnetic induction, respectively. The dimensions of Y in MKS system are

1) $M^{-3}L^{-2}T^{-2}A^{-4}$ 2) $ML^{-2}A^0$ 3) $M^{-3}L^{-2}T8A^4$ 4) $M^{-3}L^{-2}T^4A^4$

37. A ball falling in a lake of depth 200m shows a decrease of 0.1% in its volume at the bottom. The bulk modulus of elasticity of the material of the ball is (Take g = 10ms^{-2})

1) 10^9 Nm^{-2} 2) 2×10^9 Nm^{-2} 3) 3×10^9 Nm^{-2} 4) 4×10^9 Nm^{-2}

38. Three identical rigid circular cylinders A, B and C are arranged on smooth inclined surfaces shown in figure. The least value of q that prevents the arrangement from collapse is



1) $\tan^{-1}(1/2)$ 2) $\tan^{-1}(1/2\sqrt{3})$ 3) $\tan^{-1}(1/3\sqrt{3})$ 4) $\tan^{-1}(1/4\sqrt{3})$

39. A long cylindrical vessel has a small hole of diameter D at its bottom. This vessel can be lowered vertically in water to a depth h without any water entering the vessel. Given A = surface tension, B = density and C = acceleration due to gravity. The value of h is

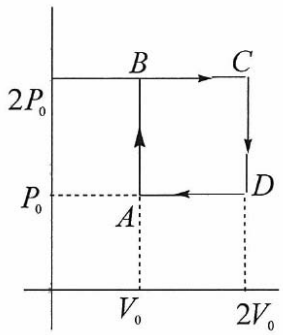
1) $\frac{A}{DBC}$ 2) $\frac{2A}{DBC}$ 3) $\frac{3A}{DBC}$ 4) $\frac{4A}{DBC}$

40. A vessel is partly filled with a liquid. Coefficient of cubical expansion of material of the vessel and liquid are γ_v and γ_L respectively. If the system is heated, then the volume unoccupied by the liquid will necessary

1) Remain unchanged if $\gamma_v = \gamma_L$ 2) increase if $\gamma_v = \gamma_L$

3) decrease if $\gamma_v = \gamma_L$ 4) None of the above

41. Helium gas goes through a cycle ABCDA (consisting of two isochoric and isobaric lines) as shown in figure. Efficiency of this cycle nearly: (Assume the gas to be ideal)



1) 15.4% 2) 9.1% 3) 10.5% 4) 12.5%

42. The velocity of a particle is $v = v_0 + gt + ft$. If its position is x = 0 at t = 0, then its displacement after unit time (t = 1) is

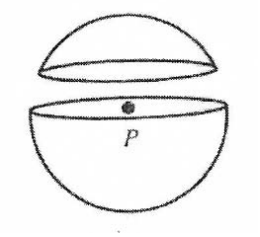
1) $v_0 + (g/2) + (f/3)$ 2) $v_0 + g + f$

3) $v_0 + (g/2) + f$ 4) $v_0 + 2g + 3f$

43. An ideal gas having f degrees of freedom is isobarically heated. The ratio of the work done by it , to the change in its internal energy will be

1) $\frac{f}{2}$ 2) $\frac{2}{f}$ 3) $\frac{2}{(f-2)}$ 4) $\frac{(f-2)}{2}$

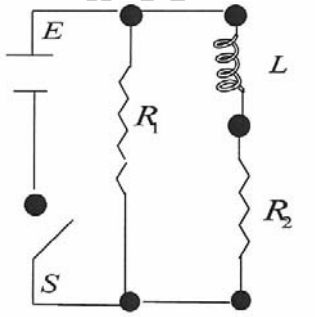
44. A spherical shell is cut into two pieces along a chord as shown in the figure. P is a point on the plane of the chord. The gravitational field at P due to the upper part is I_1 and that due to the lower part is I_2. What is the relation between them?



1) $I_1 > I_2$ 2) $I_1 < I_2$

3) $I_1 = I_2$ 4) No definite relation

45. An inductor of inductance L = 400 mH and resistors of resistances R_1 = 2 Ω and R_2 = 2 Ω are connected to a battery of emf 12 V as shown in the figure. The internal resistance of the battery is negligible. The switch S is closed at t = 0. The potential drop across L as a function of time is



1) $6e^{-5t}$ V 2) $\frac{12}{t}e^{-3t}$ V 3) $6\left(1-e^{-1/0.2}\right)$V 4) $12e^{-5t}$ V

46. A body is falling under gravity. When it loses a gravitational potential energy by U, its speed is v. The mass of the body shall be

1) $\frac{2U}{v}$ 2) $\frac{U}{2v}$ 3) $\frac{2U}{v^2}$ 4) $\frac{U}{2v^2}$

47. One end of a spring of force constant k is fixed to a vertical wall and other to a body of mass m resting on a smooth horizontal surface. There is another wall at a distance x_0 from the body. The spring is then compressed by $2x_0$ and released. The time taken to strike the wall is :

1) $\frac{\pi}{6}\sqrt{\frac{m}{k}}$ 2) $\sqrt{\frac{m}{k}}$ 3) $\frac{2\pi}{3}\sqrt{\frac{m}{k}}$ 4) $\frac{\pi}{4}\sqrt{\frac{m}{k}}$

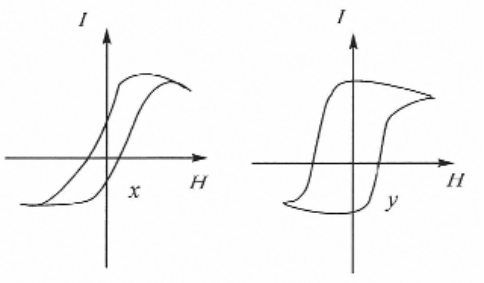
48. A particle of mass m is attached to a spring (of spring constant k) and has a natural angular frequency ω_0. An external force F(t) proportional to cos ωt ($\omega \neq \omega_0$) is applied to the oscillator. The displacement amplitude of the oscillator will be proportional to

1) $\frac{m}{\omega_0^2 - \omega^2}$ 2) $\frac{1}{m(\omega_0^2 - \omega^2)}$ 3) $\frac{1}{m(\omega_0^2 + \omega^2)}$ 4) $\frac{m}{\omega_0^2 + \omega^2}$

49. The supply voltage to a room is 120 V. The resistance of the lead wires is 6 Ω. A 60-W bulb is already switched on. What is the decrease of voltage across the bulb, when a 240 W heater is switched on in parallel to the bulb

1) 2.9 V 2) 13.3 V 3)10.4 V 4) 0 V

50. Two ferromagnetic materials X and Y have hysteresis curves of the shapes shown (see figure)



1) X and Y are suitable for making a permanent magnet as well as an electromagnet.

2) X is more suitable for making a permanent magnet while Y is more suitable for making an electromagnet.

3) X is more suitable for making an electromagnet while Y is more suitable for making a permanent magnet.

4) neither X nor Y is suitable for making either a permanent magnet or electromagnet.

51. In LCR circuit resonant frequency is 600 Hz and half power points are at 650 and 550 Hz. The quality factor is

1) $\frac{1}{6}$ 2) $\frac{1}{3}$ 3) 6 4) 3

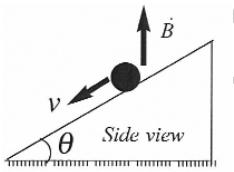
52. A plane electromagnetic wave Ez = 100 cos (6 × 10^8t + 4x) V / m propagates in a medium of refractive index

1) 1.5 2) 2.0 3) 2.4 4) 4.0

53. The number of nuclear fissions that takes place in a nuclear reactor of power 320 MW in 1 minute is (Energy released per fission is 200 MeV)

1) 10^{19} 2) 6×10^{19} 3) 6×10^{20} 4) 10^{20}

54. A conducting rod of length l and mass m is moving down a smooth inclined plane of inclination q with constant velocity v. A current i is flowing in the conductor in a direction perpendicular to paper inwards. A vertically upward magnetic field $\vec{B}$ exists in space. Then magnitude of the magnetic field $\vec{B}$ is



1) $\frac{mg}{il}\sin\theta$ 2) $\frac{mg}{il}\tan\theta$ 3) $\frac{mg\cos\theta}{il}$ 4) $\frac{mg}{il\sin\theta}$

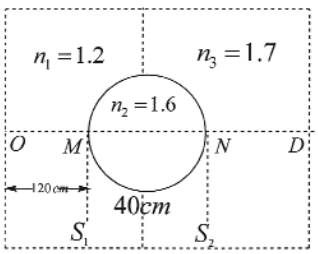
55. A transparent sphere of radius 20 cm and refractive index 1.6 is fixed in a hole of the partition separating the two media: A (refractive index $n_1 = 1.2$) and B (refractive index. $n_3 = 1.7$). A luminous point objects is placed 120 cm from the surface of the sphere in medium A. It is viewed from D in medium B in a direction normal to the sphere. Find the position of the image formed by the rays, from point N.

1) 304 cm, left side of N

2) 175 cm, right side of N

3) 204 cm, right side of N

4) 220 cm, left side of N



56. A radar has a power of 1k W and is operating at a frequency of 10 GHz. It is located on a mountain top of height 500 m. The maximum distance up to which it can detect object located on the surface of the earth (Radius of earth = 6.4×10^6 m) is

1) 80 km 2) 16 km 3) 40 km 4) 64 km

57. For a particle of mass m enclosed in a one dimensional box of length L, the de Broglie concept would lead to stationary waves, with nodes at the two ends. The energy values allowed for such a system (with n as integer) will be

1) $\frac{h^2}{8mL^2}\ n^2$ 2) $\frac{h^2}{4mL}\ n^2$ 3) $\frac{h}{4mL}\ n$ 4) $\frac{h^2}{4mL^2}\ n^2$

58. Hydrogen atom is excited from ground state to another state with principal quantum number equal to 4. Then the number of spectral lines in the emission spectra will be

1) 2 2) 3 3) 5 4) 6

59. In Young's double slit experiment, one of the slit is wider than other, so that amplitude of the light from one slit is double of that from other slit. If I_m be the maximum intensity, the resultant intensity I when they interfere at phase difference ϕ is given by:

1) $\frac{I_m}{9}(4 + 5\cos\phi)$ 2) $\frac{I_m}{3}(1 + 2\cos^2\frac{\phi}{2})$

3) $\frac{I_m}{5}(1 + 4\cos^2\frac{\phi}{2})$ 4) $\frac{I_m}{9}(1 + 8\cos^2\frac{\phi}{2})$

60. If the ratio of concentration of electrons to that of holes in a semiconductor is $\frac{7}{5}$ and the ratio of currents is $\frac{7}{4}$. What is the ratio of their drift velocities?

1) $\frac{4}{7}$ 2) $\frac{5}{8}$ 3) $\frac{4}{5}$ 4) $\frac{5}{4}$

CHEMISTRY

61. Successive ionisation potentials of an element 'M' are 8.3, 25.1, 37.9, 259.3 and 340.1 ev. The formula of its bromide is

1) MBr_5 2) MBr_4 3) MBr_3 4) MBr_2

62. $B(OH)_3 + NaOH \rightleftharpoons Na[B(OH)_4]$

How can this reaction be made to proceed in forward direction?

1) Addition of cis 1, 2 diol 2) Addition of borax

3) Addition of trans 1, 2 diol 4) Addition of $Na_2H\ PO_4$

63. Wt. of 1 mole of unit cells of NaCl crystals is .....

1) 58.5 gm 2) 58.5 amu 3) 234 gm 4) 55.8 amu

64. A mixture of Na_2CO_3 and $CaCO_3$ having a total weight of 100 gm on strong heating produces 11.2 lit of CO_2 at S.T.P. The percentage of Na_2CO_3 in the mixture is

1) 10% 2) 25% 3) 70% 4) 50%

65. The ratio of the wavelengths of the first line in the Lyman series of the spectrum of hydrogen and first line in the Balmer series of the spectrum of He^+ is

1) $\frac{20}{27}$ 2) $\frac{27}{20}$ 3) $\frac{27}{5}$ 4) $\frac{20}{21}$

66. Heats of combustion of H_2, C_2H_6 and C_2H_4 are respectively 285.6, 1558.3 and 1409 KJ $mole^{-1}$. The heat of hydrogenation of ethene is

1) + 136.3 KJ 2) – 136.3 KJ 3) + 13.63 KJ 4) – 13.63 KJ

67. Two grams of H_2 diffuses in 10 minutes. The weight of O_2 that can diffuse from the same container in the same under similar condition is

1) 4 gm 2) 0.5 gm 3) 6 gm 4) 8 gm

68. Excess of ozone when passed through 1 lit of 1 M H_2O_2 solution, the volume of oxygen liberated at STP will be …..

1) 11.2 lit 2) 22.4 lit 3) 5.6 lit 4) 44.8 lit

69. $BCl_3 \xrightarrow{LiAlH_4 \text{ / dry ether}}$ 'A' $\xrightarrow[200^\circ]{NH_3}$ 'B'. The Empirical formula of 'B' is

1) $B_3N_3H_6$ 2) $B_2H_6.2NH_3$ 3) BNH_2 4) B_2H_6

70. The solubility of H_2 in water at 25°C, if its partial pressure 1 bar (K_H = 71.18 k.bar) is

1) 7.8×10^{-4} M / l 2) 7.8×10^{-2} M / l 3) 7.8×10^{-3} M / l 4) 7.8×10^{-5} M / l

71. The correct stability order of alkenes on the basis of hyper conjugation is

1) Ethylene > Propene > 2 – butane > 2.3 – dimethyl – 2 – butene

2) 2 – butene > 2, 3 – dimethyl – 2 – butene > Ethylene > propene

3) 2, 3 – dimethyl – 2 – butene > 2 – butene > propene > ethylene

4) 2, 3 – dimethyl – 2 – butene > 2 – butene > ethylene > propene

72. The charge / size ratio of a cation determines its polarising power. Which one of the following sequences represents the increasing order of the polarising power of the cationic species, K^+, Ca^{2+}, Mg^{2+}, Be^{2+}

1) $Ca^{2+} < Mg^{2+}$, $Be^{2+} < K^+$ 2) $Mg^{2+} < Be^{2+} < K^+ < Ca^{2+}$

3) $Be^{2+} < K^+ < Ca^{2+} + Mg^{2+}$ 4) $K^+ < Ca^{2+} < Mg^{2+} < Be^{2+}$

73. 0.5 g of an organic compound containing nitrogen on Kjeldahlising required 29 ml of N/5 H_2SO_4 for complete neutralisation of ammonia. The percentage of nitrogen in the compound is

1) 34.3 2) 16.24 3) 21.6 4) 14.8

74. In a First order reaction the concentration of reactant decreases from 800 mol/ dm_3 to 50 mol/dm_3 in 2×10^4 sec. The rate constant of reaction in sec^{-1} is

1) 2×10^4 2) 3.45×10^5 3) 1.386×10^{-4} 4) 2×10^{-4}

75. Which of the following is a correct statement?

1) PAN, O_3 are formed by chemical reactions from the primary pollutants.

2) SO_2, CO_2 are secondary pollutants

3) Sewage, domestic waste are non degradable pollutants

4) DDT, B.H.C, are degradable pollutants

76. $\underset{\text{Ester (X)}}{C_4H_8O_2} \xrightarrow[\text{(ii) HoH / HCl}]{\text{(i) } CH_3MgBr} \underset{\text{Alcohol (Y)}}{C_4H_{10}O_2}$

Alcohol 'Y' gives Lucas test with in 5 minutes thus (X), and (Y) respectively are

1) $CH_3COOC_2H_5$, $(CH_3)_3$ C – OH 2) $HCOOC_3H_7$, $(CH_3)_2$, CH – OH

3) $C_2H_5COOCH_3$, $(C_2H_5)_3$ COH 4) $HCOOC_3H_7$, $(CH_3)_3$ COH

77. On addition of one ml. solution of 10% NaCl to 10 ml. gold sol in the presence of 0.025gm starch, the coagulations is prevented because starch has the gold number of

1) 0.025 2) 0.25 3) 25 4) 2.5

78. Which of the following set of compounds have no existence?

1) PCl_5, $AsCl_5$, PF_5 2) PH_5, PCl_5, BiI_5

3) PH_5, PCl_5, NCl_3 4) PH_5, SbF_3, SbF_5

79. What is the EMF of the cell for the reaction $Fe^{2+} + Zn \rightarrow Zn^{2+} + Fe$. Given that E^0Zn / Zn^{2+} (1.0 M) = 0.76 V, E^0Fe / Fe^{2+} (1.0 M) = 0.41 V

1) 1.17 V 2) 0.35 V 3) –1.17 V 4) –0. 35 V

80. If $\Delta_0 >$ P, the correct electronic configuration for d^4 system will be

1) $t^4_{2g}\, e^0_g$ 2) $t^3_{2g}\, e^1_g$

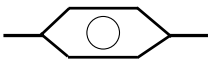
3) $t^0_{2g}\, e^4_g$ 4) $t^2_{2g}\, e^2_g$

81. The percentage of 'p' character in the orbital's forming p-p bonds in P_4

1) 25 2) 33 3) 50 4) 75

82. The drug that is effective in the treatment of "Typhoid"

1) Novalgin 2) Quinine 3) Chloromphenicol 4) Paracetamol

83. $C_2H_4 \xrightarrow[\text{reagent}]{\text{Baeyer's}} X$; H_3C–  –$CH_3 \xrightarrow{KMnO_4/H^+} Y$;

Polymer of X & Y is

1) Nylon 6, 6 2) PET (or) Dacron 3) Thiokol 4) Nylon – 6

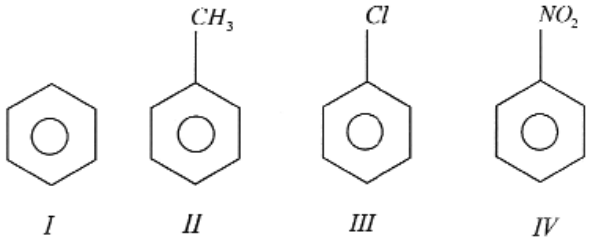
84. Benzoyl chloride is prepared from benzoic acid by

1) Cl_2 / hυ 2) SO_2Cl_2 3) $SOCl_2$ 4) Cl_2, H_2O

85. The steroid hormone containing carbonyl carbon is

1) Estradiol 2) Progesterone 3) Insulin 4) Ethylene

86. Identify the correct order of reactivity in electrophilic substitution reactions of the following compounds.



1) I > II > III > IV 2) IV > III > II > I

3) II > I > III > IV 4) II > III > I > IV

87. The product obtained via oxymercuration ($HgSO_4 + H_2SO_4$) of but – 1 – yne would

1) $CH_3 - CH_2 - CH_2 - CHO$ 2) $CH_3 - CH_2 - \overset{\overset{O}{\|}}{C} - CH_3$

3) $CH_3 - CH_2 - CHO + HCHO$ 4) $CH_3 - CH_2 - COOH + HCOOH$

88. Which of the following can convert benzene to acetophenone?

1) CH_3COCl anhydrous $AlCl_3$ 2) CH_3OH anhydrous $AlCl_3$

3) CH_3Cl anhydrous $AlCl_3$ 4) C_6H_5COCl anhydrous $AlCl_3$

89. Which of the suggested tests can be used to differentiate the given compounds

1) CH_3OH and C_2H_5OH (Lucas test)

2) CH_3CHO and CH_3CH_2CHO (Tollen's test)

3) 1° and 2° amine (Carbyl amine test)

4) $CH_3 - \overset{\overset{O}{\|}}{C} - CH$ and $CH_3 - CH_2 - \overset{\overset{O}{\|}}{C} - CH_3$

(Brady's reagent)

90. A compound (A) $C_5H_{10}O$ forms a phenyl hydrazone and give negative tollen's and iodo from tests. The compound on reduction gives n pentane. The compound 'A' is

1) Pentanal 2) Pentan –2–one 3) Pentan –3– one 4) amyl Alcohol

KEY

1-4; 2-2; 3-1; 4-3; 5-3; 6-4; 7-2; 8-2; 9-1; 10-1; 11-2; 12-1; 13-1; 14-3; 15-2; 16-2; 17-4; 18-1; 19-3; 20-1; 21-2; 22-2; 23-4; 24-4; 25-2; 26-3; 27-3; 28-2; 29-4; 30-3; 31-3; 32-4; 33-3; 34-1; 35-1; 36-3; 37-2; 38-3; 39-4; 40-2; 41-1; 42-1; 43-2; 44-3; 45-4; 46-3; 47-3; 48-2; 49-3; 50-2; 51-3; 52-2; 53-3; 54-2; 55-3; 56-1; 57-1; 58-4; 59-4; 60-4; 61-3; 62-1; 63-3; 64-4; 65-1; 66-2; 67-4; 68-4; 69-3; 70-1; 71-3; 72-4; 73-2; 74-3; 75-1; 76-1; 77-3; 78-2; 79-2; 80-1; 81-4; 82-3; 83-2; 84-3; 85-2; 86-3; 87-2; 88-1; 89-3; 90-3.

(This Grand Test prepared by subject experts of Sri Chaitanya Educational Institutions)