JEE (MAINS) MODEL GRAND TEST

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

PHYSICS

1. The area of the parallelogram whose adjacent sides are $(3i + j + 2k)$ and $(i + 4j - 6k)$ is

1) 614 units 2) $\sqrt{614}$ units 3) $\sqrt{573}$ units 4) $\sqrt{717}$ units

2. A freely falling body takes 't' second to travel first $\left(\frac{1}{5}\right)^{th}$ distance. Then, time of descent is

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

3. At a certain height a shell at rest explodes into two equal fragments. One of the fragments receives a horizontal velocity 'u'. The time interval after which, the velocity vectors will be inclined at 120° to each other is

1) $\frac{u}{\sqrt{3}\,g}$ 2) $\frac{\sqrt{3}\,u}{g}$ 3) $\frac{2\,u}{\sqrt{3}\,g}$ 4) $\frac{u}{2\sqrt{3}\,g}$

4. A metallic rod of length L, area of cross-section A and young's modulus Y has coefficient of linear expansion α. If the rod is heated through a temperature T, the energy stored per unit volume will be

1) $\frac{1}{2}Y\alpha T$ 2) $\frac{1}{2}Y\alpha^2T^2$ 3) $\frac{1}{2}YL\alpha T$ 4) $\frac{1}{2}YL\alpha^2T^2$

5. Find the ratio of specific heats for a gaseous mixture consisting of 8 grams of helium and 16 grams of oxygen.

1) $\frac{17}{27}$ 2) $\frac{27}{17}$ 3) $\frac{17}{24}$ 4) $\frac{24}{17}$

6. The maximum tension a rope can withstand is 60 kg wt. The ratio of maximum acceleration with which two boys of masses 20 kg and 30 kg can climb up the rope at the same time is

1) 1 : 2 2) 2 : 1 3) 4 : 3 4) 3 : 2

7. A ball is dropped on the ground from a height h. If the coefficient of restitution is e, find the total distance travelled by the ball before coming to rest and the total time elapsed.

1) $\frac{h(1+e)}{1-e};\ \sqrt{\frac{2h}{g}}\left(\frac{1+e}{1-e}\right)$ 2) $\frac{h(1+e^2)}{(1-e^2)};\ \sqrt{\frac{2h}{g}}\left(\frac{1+e}{1-e}\right)$

3) $\frac{h(1+e^2)}{(1-e^2)};\ \sqrt{\frac{2h}{g}}\left(\frac{1+e^2}{1-e^2}\right)$ 4) $\frac{2h(1+e^2)}{(1-e^2)};\ \sqrt{\frac{2h}{g}}\left(\frac{1+e}{1-e}\right)$

8. A mass m hangs with the help of a string wrapped around a pulley on a frictionless bearing. The pulley has mass 'm' and radius 'R'. Assuming pulley to be a perfect uniform circular disc, the acceleration of the mass 'm', if the string does not slip on the pulley is

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

9. Two chambers, one containing 'm_1' g of a gas at 'P_1' pressure and other containing 'm_2' g of a gas at 'P_2' pressure, are put in communication with each other. If temperature remains constant, the common pressure reached will be

1) $\frac{P_1P_2(m_1+m_2)}{P_2m_1+P_1m_2}$ 2) $\frac{m_1m_2(P_1+P_2)}{(P_2m_1+P_1m_2)}$

3) $\frac{P_1P_2\,m_1}{P_2m_1+P_1m_2}$ 4) $\frac{m_1m_2P_2}{(P_2m_1+m_2P_1)}$

10. A point mass is suspended to the free end of a weightless string of length l and area of cross section A and Young's modulus of the material of the wire Y. If this pendulum is oscillating in a vertical plane the frequency of oscillation will be

1) $\frac{1}{2\pi}\sqrt{\frac{YA}{l}}$ 2) $\frac{1}{2\pi}\sqrt{\frac{ml}{YA}}$ 3) $\frac{1}{2\pi}\sqrt{\frac{YA}{ml}}$ 4) $\frac{1}{2\pi}\sqrt{\frac{l}{m}}$

11. A uniform wire of 20 cm long is bent into a circle. It is placed gently on the surface of water of surface tension 0.07 Nm^{-1} . The extra force than its weight required to pull it out of the water is

1) 0.014 N 2) 0.028 N 3) zero 4) 0.0035 N

12. The time period of a simple pendulum, in the form of a hollow metallic sphere is T. When it is filled with sand and mercury, then its time periods are T_1 and T_2 respectively. When it is partially filled with sand, then its time period is T_3. The correct relation between T_1, T_2 and T_3 will be

1) $T = T_1 = T_2 = T_3$ 2) $T = T_1 = T_2 < T_3$

3) $T_1 = T_2 > T_3 > T$ 4) $T_1 > T_3 > T = T_2$

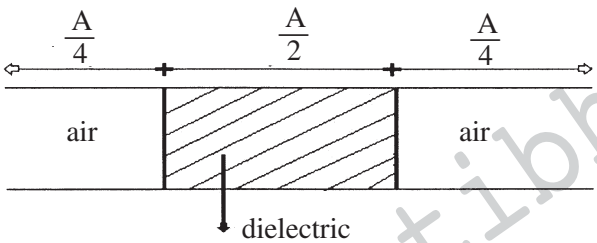
13. A particle of mass 'm' is projected from the surface of earth with a speed $V_0 (V_0 <$ escape velocity$)$. The speed of the particle at a height h = R (radius of the earth) is

1) $\sqrt{gR}$ 2) $\sqrt{V_0^2 - 2gR}$ 3) $\sqrt{V_0^2 - gR}$ 4) $\sqrt{2gR}$

14. Resistance of a given wire is obtained by measuring the current flowing in it and the voltage difference applied across it. If the percentage errors in the measurement of the current and the voltage difference are 3% each, then error in the value of resistance of the wire is

1) 1% 2) 3% 3) 6% 4) zero

15. Consider a parallel plate capacitor of capacity 10 μ F filled with air. When the gap between the plates is filled partly with a dielectric of dielectric constant 4, as shown in figure, the new capacity of the capacitor is (A is the area of plates):



1) 20 μF 2) 40 μF 3) 2.5 μF 4) 25 μF

16. A student finds the balancing length as 'l' with a cell of constant emf in the secondary circuit. Another student connects the same cell in the secondary circuit of potentiometer of half the length but with a cell of double of emf in the primary circuit than used in the primary of circuit of first case. Then the balancing length will be

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

17. In the photo electric effect experiment when the incident wavelengths are λ and $\frac{\lambda}{2}$, the kinetic energies of the photo electrons are E and 2E. The work function of the metal is

1) $\frac{E}{4}$ 2) $\frac{E}{2}$ 3) $\frac{E}{3}$ 4) 0

18. The magnetic induction at a point on the axis of the circular coil is $\frac{1}{2\sqrt{2}}$ times the magnetic induction at the centre of the coil, when current is passed through the coil. If radius of the coil is 10 cm then the distance of that point is

1) 5 cm 2) 10 cm 3) 15 cm 4) 20 cm

19. A coil is suspended in a uniform magnetic field with the plane of the coil parallel to the magnetic lines of force. When a current is passed through the coil, it starts oscillating; it is very difficult to stop. But if an aluminium plate is placed near to the coil, it stops. This is due to

1) development of air current when the plate is placed

2) induction of electrical charge on the plate

3) shielding of magnetic lines of forces as aluminium is a paramagnetic material

4) electromagnetic induction in the aluminium plate giving rise to electromagnetic damping

20. A radioactive nucleus (initial mass number A and atomic number Z) emits 3 α – particles and 2 positrons. The ratio of number of neutrons to that of protons in the final nucleus will be

1) $\frac{A-Z-8}{Z-4}$ 2) $\frac{A-Z-4}{Z-8}$ 3) $\frac{A-Z-12}{Z-4}$ 4) $\frac{A-Z-4}{Z-2}$

21. The equation y = 5 sin (3x/50) cos (450t) represents the stationary wave setup on a vibrating sonometer wire, where x, y are in cm and t in second. The velocity of one of the two progressive waves in that stationary wave is

1) 2.7 ms^{-1} 2) 27 ms^{-1} 3) 7.5 ms^{-1} 4) 75 ms^{-1}

22. A source of sound gives five beats per second, when sounded with another source of frequency 100 s^{-1}. The second harmonic of the source together with a source of frequency 205 s^{-1} gives 5 beats/ sec. The frequency of the first source is

1) 105 s^{-1} 2) 205 s^{-1} 3) 95 s^{-1} 4) 100 s^{-1}

23. The average emf during the positive half cycle of an AC supply of peak value E_0 is

1) $\frac{E_0}{\pi}$ 2) $\frac{E_0}{\sqrt{2}\,\pi}$ 3) $\frac{E_0}{2\pi}$ 4) $\frac{2E_0}{\pi}$

24. Match the following

TYPE – I	**TYPE – II**
a) Continuous spectrum	e) Tungsten emission filament of a bulb
b) Line emission spectrum	f) CO_2 gas
c) Band emission spectrum	g) Sodium vapour lamp
d) Line absorption spectrum	h) Chromosphere of sun

1) a – e, b – f, c – g, d – h 2) a – h, b – g, c – f, d – e

3) a – e, b – g, c – f, d – h 4) a – h, b – f, c – g, d – e

25. Two beams of light having intensities I and 4 I interfere to produce a fringe pattern on a screen. The phase difference between the beams is $\frac{\pi}{2}$ at point A, and π at point B. The difference between the respective intensities at A and B is

1) 2 I 2) 4 I 3) 5 I 4) 7 I

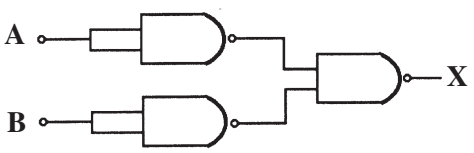
26. A beam of unpolarised light is incident on a tourmaline crystal C. The intensity of the emergent light is I_0 and it is incident on another tourmaline crystal C_2. It is found that no light emerges from C_2. If now C_1 is rotated through 45° towards C_2, the intensity of the light emerging from C_2 is

1) zero 2) $\frac{I_0}{4}$ 3) $\frac{I_0}{2}$ 4) $\frac{3I_0}{4}$

27. In a transistor amplifier $\beta = 62$, $R_L = 5000\ \Omega$ and internal resistance of the transistor is 500 Ω. Its power amplification will be

1) 25580 2) 33760 3) 38440 4) 55760

28. The combination of gates shown below yields



1) NAND gate 2) OR gate

3) NOT gate 4) XOR gate

29. In a p – n junction diode the thickness of depletion layer is 2×10^{-6} m and barrier potential is 0.3 V. The intensity of the electric field at the junction is

1) 0.6×10^{-6} Vm^{-1} from n to p side
2) 0.6×10^{-6} Vm^{-1} from p to n side
3) 1.5×10^{5} Vm^{-1} from n to p side
4) 1.5×10^{5} Vm^{-1} from p to n side

30. A radio can tune to any station in the 7.5 MHz to 12 MHz band. The corresponding wavelength band is

1) 7.5 m to 12 m
2) 25 m to 40 m
3) 2.5 m to 4.0 m
4) 250 m to 400 m

CHEMISTRY

31. The electronic configuration of an ion M^{2+} is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^6$ and the atomic weight of M is 56. The number of protons in the nucleus of M^{2+} is

1) 24
2) 26
3) 28
4) 30

32. An open vessel at 27°C is heated until $\frac{1}{4}^{th}$ mass of the air in it has been expelled. Neglecting the expansion of the vessel, the temperature to which the vessel has been heated is

1) 400°C
2) 127°C
3) 1000°C
4) 477°C

33. How many unit cells are present in cube shaped ideal crystal of NaCl of mass 58.5 g?

1) 2.57×10^{21}
2) 5.14×10^{21}
3) 1.505×10^{23}
4) 1.71×10^{21}

34. 1.0 g of an organic compound containing phosphorous precipitated 0.444 g of $Mg_2P_2O_7$. The percentage of phosphorous in that organic compound is

1) 12.4
2) 24.8
3) 49
4) 75

35. 1.25 Faradays of electricity is passed through solution of $CuSO_4$. The number of gram equivalents of copper deposited on the cathode would be

1) 1
2) 2
3) 2.5
4) 1.25

36. For a spontaneous process

1) ΔG_{system} = +ve only
2) ΔG_{system} = zero
3) ΔS_{total} = –ve
4) ΔS_{total} = + ve

37. Trichloroacetaldehyde was subjected to Cannizzaro's reaction by using NaOH. The mixture of the products contains sodium trichloroacetate and another compound. The other compound is

1) Chloroform
2) 2, 2, 2 – trichloro ethanol
3) Trichloro methanol
4) 2, 2, 2 – trichloro propanol

38. The mole fractions of water and methanol in a solution containing 2 mole of water and 3 moles of methanol are

1) 0.2 and 0.8
2) 0.4 and 0.6
3) $\frac{1}{18}$ and $\frac{1}{8}$
4) $\frac{1}{8}$ and $\frac{1}{18}$

39. A certain amount of PCl_5 is heated to 250°C in a 2 litre vessel till equilibrium is reached. At equilibrium the vessel was found to contain 0.1 mole of PCl_5 and 0.2 mole of Cl_2. The value of K_c for the reaction

$PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$ is

1) 0.02
2) 0.025
3) 0.2
4) 0.04

40. The rate of gaseous reaction is given by K[A] [B]. If the volume of reaction vessel is reduced to $\frac{1}{3}$ of initial volume the reaction rate relative to the original rate is

1) $\frac{1}{16}$
2) $\frac{1}{8}$
3) 6
4) 9

41. The correct order of reducing abilities of hydrides of VA group elements is

1) $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$
2) $NH_3 > PH_3 > AsH_3 > SbH_3 > BiH_3$
3) $NH_3 < PH_3 > AsH_3 > SbH_3 > BiH_3$
4) $SbH_3 > BiH_3 > AsH_3 > NH_3 > PH_3$

42. Horn silver ore is leached with aqueous NaCN solution. The product formed is

1) Silver metal 2) Silver chloride

3) Silver cyanide 4) Sodium argento cyanide

43. The ion having maximum magnetic moment is

1) Co^{+3} 2) Cr^{+3} 3) Ni^{+2} 4) Cu^{+1}

44. The number of lone pairs on chlorine atom in ClO^-, ClO_2^-, ClO_3^-, ClO_4^- ions are

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

45. Volume strength of 250 ml solution containing 6.8 gr of H_2O_2 is

1) 11.2 2) 6.8 3) 8.96 4) 2.24

46. In which of the following sets, all the given species are isostructural?

1) CO_2, NO_2, ClO_2, SiO_2 2) PCl_3, $AlCl_3$, BCl_3, $SbCl_3$

3) BF_3, NF_3, PF_3, AlF_3 4) BF_3^-, CCl_4, NH_4^+, PCl_4^+

47. 10.03×10^{22} atoms of an element weight 4 gms. The atomic mass of the elements is

1) 290 2) 180 3) 24.01 4) 104

48. In a galvanic cell electron flow will be from

1) negative electrode to positive electrode

2) positive electrode to negative electrode

3) there will be no flow of electrons

4) cathode to anode in the external electrons

49. The crystal field splitting energy for octahedral complex (Δ_0) and tetrahedral complex (Δ_t) are related as

1) $\Delta_t = \frac{4}{9}\Delta_0$ 2) $\Delta_t = 0.5\ \Delta_0$ 3) $\Delta_t = 0.33\ \Delta_0$ 4) $\Delta_t = \frac{9}{4}\Delta_0$

50. Froth flotation process used for the concentration of sulphide ore

a) is based on the difference in wettability of different minerals

b) uses sodium ethyl xanthate, as collector

c) uses NaCN as depressant in the mixture of ZnS and PbS when ZnS forms soluble complex and PbS forms froth

1) a, b only correct 2) b, c only correct

3) a, c only correct 4) a, b, c are correct

51. Aryl fluoride may be prepared from diazonium chloride using

1) HBF_4 / $NaNO_2$, Cu, Δ 2) HBF_4 / Δ

3) CuF/HF 4) Cu/HF

52. $C_2H_5OH + I_2 + KOH \rightarrow CHI_3 + KI + X$. Here the missing product 'X' is

1) HCOOK 2) CH_3COOK 3) $(CH_3COO)_2Ca$ 4) $(HCOO)_2Ca$

53. The intermediate product in the preparation of ethanol from ethylene and H_2SO_4 is

1) $C_2H_5^+$ 2) C_2H_4 3) $C_2H_5HSO_4$ 4) $C_2H_5O^+H_2$

54. Which reaction produces acrylonitrile ($CH_2 = CHCN$)

1) Ethyne $\xrightarrow[Ba^{2+}]{HCN}$ 2) Acrylic acid $\xrightarrow[Hg]{KCN}$ 3) Ethyne $\xrightarrow[Hg^{+2}]{KCN}$ 4) Ethyne $\xrightarrow[H^+]{HOCl}$

55. Picric acid is a yellow coloured compound. Its chemical name is

1) m-nitrobenzoic acid 2) 2, 4, 6 - trinitrophenol

3) trinitrotoluene 4) trinitroaniline

56. Identify A, B and C in the following reactions

$$CH_3Cl \xrightarrow{KCN} A \xrightarrow[H_3O^+]{\text{Hydrolysis}} B \xrightarrow[H_3O^+]{C_2H_5OH/H^+} C$$

	A	B	C
1)	CH_3NC	CH_3NHCH_3	$CH_3 - N(CH_3) - C_2H_5$
2)	CH_3CN	CH_3CONH_2	CH_3CO_2H
3)	CH_3CN	CH_3CO_2H	$CH_3CO_2C_2H_5$
4)	CH_3CN	CH_3CO_2H	$(CH_3CO)_2O$

57. Nitro benzene on reduction with Sn/HC*l* gives 'A' which on reaction with acetyl chloride forms 'B' which of the following is 'B'?

1) C_6H_5–CO–CH_3 2) C_6H_5–NH–CO–CH_3

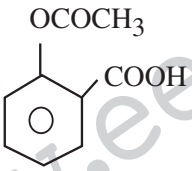
3) C_6H_5–NHC*l* 4) C_6H_5 –O–CO–CH_3

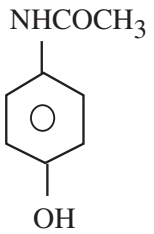
58. Lactose is a disaccharide of

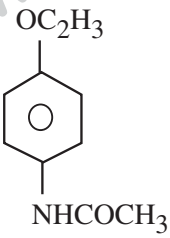
1) β – D – Glucose and β – D – Galactose 2) α – D – Glucose and β – D – Ribose

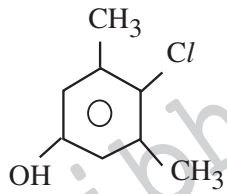
3) α – D – Glucose and β – D – Galactose 4) α – D – Glucose and α – D – Fructose

59. The structure of paracetamol is

1) 

2) 

3) 

4) 

60. 1, 3 - butadiene and styrene on polymerization give

1) Bakelite 2) Terylene 3) Buna-S 4) Teflon

MATHS

61. The image of the point (1, 6, 3) in the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$ is

1) (1, 2, 3) 2) (1, 3, 5) 3) (0, 1, 2) 4) (1, 0, 7)

62. $I = \int_{\pi/4}^{\pi/3} \frac{\sin x}{x}\, dx$ then I lies in

1) $\left(\frac{\sqrt{3}}{8}, \frac{\sqrt{2}}{6}\right)$ 2) $\left(\frac{1}{\sqrt{2}}, \frac{3}{2}\right)$ 3) $\left(\frac{\sqrt{1}}{\sqrt{2}}, \frac{1}{2}\right)$ 4) $\left(-\frac{1}{\sqrt{2}}, \frac{1}{2}\right)$

63. The maximum value of $f(x) = x^3 - 3x$ subject to $x^4 + 36 \le 13x^2$ is

1) 15 2) 18 3) 25 4) ∞

64. $\underset{\theta \to 0}{Lt} \left(\left[\frac{n\sin\theta}{\theta}\right] + \left[\frac{n\tan\theta}{\theta}\right] \right)$, where [x] is greatest integer ≤ x and $n \in I$ is

1) 2n 2) 2n + 1 3) 2n – 1 4) n + 2

65. If 'e' is eccentricity of hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and θ is angle between asymptotes, then $\cos\frac{\theta}{2} =$

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

66. If a, b, c are positive integers such that $a + b + c \leq 8$, then the number of possible values of ordered triplets (a, b, c) is

1) 84 2) 56 3) 83 4) 54

67. A line passing through (3, 4) meets the axes OX and OY at A & B. The minimum area of ΔOAB is

1) 8 2) 16 3) 24 4) 32

68. The plane $x + 2y - kz + 3 = 0$ is perpendicular to the line whose D.r.'s are (2, 4, 3). Then k =

1) 5 2) $-\frac{3}{2}$ 3) 1 4) 0

69. $\lim_{x \to 1} (1 - x^2)^{\frac{1}{\log(1-x)}} =$

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

70. If $f(x) = \frac{1 - \cos ax}{x \sin x}$, $x \neq 0$, $f(0) = \frac{1}{2}$ is continuous at x = 0, then a =

1) ± 2 2) ± 3 3) ± 1 4) ± 4

71. If $x - y = 0$ is tangent to $y = x^2 + bx + c$ at (1, 1). Then

1) $b = -1, c = 1$ 2) $b = 1, c = -1$ 3) $b = -1, c = 0$ 4) $b = 0, c = -1$

72. In Δ ABC, a = 6, b = 3, $\cos(A - B) = \frac{4}{5} \Rightarrow \angle C = ?$

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

73. $\bar{a} = i + 2j + 3k$, $\bar{b} = -i + 2j + k$, $\bar{c} = 3i + j$ and $\bar{d}$ is normal to both $\bar{a}$ & $\bar{b}$ then $(\bar{c}, \bar{d}) =$

1) $\cos^{-1}\frac{4}{\sqrt{30}}$ 2) $\sin^{-1}\frac{4}{\sqrt{30}}$ 3) $\cos^{-1}\frac{2}{\sqrt{30}}$ 4) $\sin^{-1}\frac{2}{\sqrt{30}}$

74. $A = \begin{bmatrix} 0 & 5 \\ 0 & 0 \end{bmatrix}$ and $f(x) = I + x + x^2 + ... + x^{16}$

$\Rightarrow f(A) =$

1) 0 2) $\begin{bmatrix} 1 & 5 \\ 0 & 1 \end{bmatrix}$ 3) $\begin{bmatrix} 1 & 5 \\ 0 & 0 \end{bmatrix}$ 4) $\begin{bmatrix} 0 & 5 \\ 1 & 1 \end{bmatrix}$

75. $f : C \to C$ where 'C' is set of complex numbers and $f(z) = |z|$ then 'f' is

1) one – one 2) onto

3) bijection 4) neither one – one nor onto

76. A line of symmetry to the circle is a

1) tangent 2) polar 3) chord 4) diameter

77. If $x - 2y - a = 0$ is a chord of $y^2 = 4ax$. Then its length is

1) $4\sqrt{5}\,a$ 2) 20 a 3) 5 a 4) 40 a

78. C is centre of $\frac{x^2}{25} + \frac{y^2}{16} = 1$ and S is one focus. Then the ratio of CS to semi major axis is

1) 4 : 5 2) 2 : 3 3) 3 : 5 4) 2 : 5

79. $\int_0^4 [2x + 3]dx$ = ..., where [x] is greatest integer function ≤ x

1) 12 2) 24 3) 26 4) 10

80. 'n' persons are sit in a row at random. The probability that 2 particular persons are never together

1) $\frac{2}{n}$ 2) $\frac{1-2}{n}$ 3) $\frac{(n-1)C_2}{\angle n}$ 4) $\frac{1}{n}$

81. If 4 throws with a pair of dice, the probability of throwing doublet at least once is

1) $\left(\frac{5}{6}\right)^4$ 2) $1-\left(\frac{5}{6}\right)^4$ 3) $1-\left(\frac{1}{6}\right)^4$ 4) $\left(\frac{1}{6}\right)^4$

82. If a, b, c are all positive and a, b, c are in H.P., then the roots of $ax^2 + bx + c = 0$ are

1) real 2) imaginary 3) rational 4) equal

83. The number of n-digit numbers, no two consecutive digits being the same is

1) $\angle n$ 2) $\angle 9$ 3) 9^n 4) n^9

84. In the expansion $\left(\sqrt[5]{3} + \sqrt[7]{2}\right)^{24}$, the rational term is

1) T_{14} 2) T_{16} 3) T_{15} 4) T_7

85. If the 7^{th} term in the expansion of $\left(\frac{3}{\sqrt[3]{84}} + \sqrt{3}\ \log x\right)^9$, x > 0 is 729, then x is

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

86. A set S contains 7 elements. A non-empty subset A of S and an element x of S are chosen at random. The probability that $x \in A$ is

1) $\frac{1}{2}$ 2) $\frac{64}{127}$ 3) $\frac{63}{128}$ 4) $\frac{31}{128}$

87. The area enclosed by the curves $y = x^2$, $y = x^3$, x = 0, x = p where p > 1, is $\frac{1}{6}$, then p equals

1) $\frac{8}{3}$ 2) $\frac{4}{3}$ 3) $\frac{16}{3}$ 4) 2

88. An integrating factor of $\left(1 + y + x^2y\right) dx + \left(x + x^3\right) dy = 0$ is

1) e^x 2) x^2 3) $\frac{1}{x}$ 4) x

89. If $f : R \to C$ defined by $f(x) = e^{2ix}$ for $x \in R$ then, f is [C-is set of complex numbers].

1) one – one 2) on to

3) bijection 4) neither one-one nor onto

90. The condition that $f(x) = ax^3 + bx^2 + cx + d$ has no extreme value is

1) $b^2 - 4ac = 0$ 2) $b^2 = 3ac$ 3) $b^2 < 3ac$ 4) $b^2 > 3ac$

KEY

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

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