

JEE MAINS: TEST SERIES-06

Time : 3 hrs.

M.M. : 360

TOPIC COVERED :

PHYSICS: Complete Syllabus

CHEMISTRY: Complete Syllabus

MATHEMATICS: Complete Syllabus

GENERAL INSTRUCTIONS :

1. The Test Booklet consists of **90 questions**. The maximum marks are **360**.
2. There are **three** subject in the question paper Mathematics, Physics and Chemistry having 30 questions in each subject of equal weightage. Each question allotted **4 (four)** marks for each correct response.
3. *Candidates will be awarded marks as in Instruction No. 2 for correct response of each question. 1 marks will be deducted for indicated incorrect response of each question.*
4. There is only one correct response for each question. Filling up more than one response in each question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instruction 3 above.
5. Four alternatives are given for each question out of which one is correct. **Darken the correct alternative on the given answer-sheet, with a pencil or pen.**
6. Use of calculator is not permitted.
7. Use of unfair means shall invite cancellation of the test.

MATHEMATICS

1. Solution of $(x + y)(xdy + ydx) = xy(dx + dy)$ is
(a) $\frac{x}{y}(x + y) = c$ (b) $(x + y)xy = c$ (c) $xy = (x + y)c$ (d) none of these
2. Number of tangents that can be drawn from any point in the region $\frac{x^2}{a^2} - \frac{y^2}{b^2} > 0$, to the curve $b^2x^2 - a^2y^2 = a^2b^2$ are
(a) 2 (b) 0 (c) Infinite (d) none of these
3. $\int_{-1/2}^{1/2} \cos x \cdot \ln\left(\frac{1+x}{1-x}\right) dx =$
(a) 0 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) none of these
4. For what value of a , does the curves $x^2 + y^2 = a^2$ and $y^2 = 4ax$ intersect orthogonally?
(a) 1 (b) 2 (c) $\pm 2\sqrt{2}$ (d) none of these

5. If $x - 2y = 4$, then the minimum value of xy is
 (a) -1 (b) -2 (c) -3 (d) 0
6. If A, B, C are the vertices of a ΔABC and $\tan\left(\frac{A}{2}\right) = \frac{1}{3}$, $\tan\left(\frac{B}{2}\right) = \frac{2}{3}$, then $\tan\left(\frac{C}{2}\right) =$
 (a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{2}{9}$ (d) $\frac{7}{9}$
7. Let $f(x) = \begin{cases} \frac{x^3}{3} + \frac{x^2}{2} - 6x + 10, & 0 < x \leq 3 \\ -x^2 + 8x - 10, & 3 < x \end{cases}$, then number of critical points and points of maxima for $f(x)$, respectively, are
 (a) 2, 1 (b) 3, 2 (c) 2, 3 (d) 3, 1
8. 3 vectors $\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{b} = 3\hat{i} + 2\hat{j} + \hat{k}$ and $\vec{c} = 2\hat{i} - 2\hat{j} - 5\hat{k}$ are
 (a) collinear (b) mutually perpendicular
 (c) coplanar (d) none of these
9. Trace of a skew symmetric matrix is always
 (a) 1 (b) 0 (c) positive (d) negative
10. Number of common tangents to the hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$ and its director circle is/are
 (a) 1 (b) 2 (c) 3 (d) 4
11. Given $v > p > 0$, then the equation $(x^2 - vx + p) \left(\frac{x^2}{4} + 2\sqrt{v}x + p^2 \right) = 0$ has
 (a) at least 2 distinct real roots (b) at least 2 imaginary roots
 (c) either 4 real or 4 imaginary roots (d) none of these
12. Value of ${}^{16}C_1 + {}^{16}C_3 + {}^{16}C_5 + {}^{16}C_7 =$
 (a) 2^{14} (b) 2^{15} (c) 2^{16} (d) 2^{13}

13. Equation of line which is normal to the curve $xy + 3x - 4y = 0$, at two points is
 (a) $x - y = 0$ (b) $x + y - 1 = 0$ (c) $x - y - 1 = 0$ (d) $x + y + 1 = 0$
14. If all the alphabets of the word "NISSAN" are used to form a dictionary, then the rank of the word "SINSAN" in that dictionary is
 (a) 135 (b) 137 (c) 133 (d) none of these
15. If $z + z^{-1} = 1$, then value of $z^{100} + z^{-100} =$
 (a) 1 (b) i (c) $-i$ (d) -1
16. If $(1 + \sin \alpha)(1 + \sin \beta)(1 + \sin \gamma) = (1 - \sin \alpha)(1 - \sin \beta)(1 - \sin \gamma) = k$, then $k =$
 (a) $2\cos \alpha \cos \beta \cos \gamma$ (b) $-\cos \alpha \cos \beta \cos \gamma$ (c) $\pm \cos \alpha \cos \beta \cos \gamma$ (d) $\pm 2\sin \alpha \sin \beta \sin \gamma$
17. Equation of a sphere whose diametrical end points are A(2, 3, 5) and B (4, 9, -3) is
 (a) $x^2 + y^2 + z^2 - 8x - 12y + 2z - 30 = 0$ (b) $x^2 + y^2 + z^2 - 6x - 12y - 2z + 20 = 0$
 (c) $x^2 + y^2 - z^2 - 6x - 12y + 2z - 20 = 0$ (d) none of these
18. Value of $\int_0^{100} [\sqrt{x}] dx$, where [.] is G.I.F., is
 (a) 615 (b) 415 (c) 400 (d) none of these
19. Value of $\int \{f(x)g''(x) - f''(x).g(x)\} dx$ is
 (a) $f(x).g'(x) + f''(x).g(x)$ (b) $f(x).g'(x) - f''(x).g(x)$
 (c) $\frac{f(x)}{g'(x)}$ (d) $f(x).g(x) - f''(x).g'(x)$
20. If $\sin \theta + \operatorname{cosec} \theta = 2$; then $\sin^2 \theta + \operatorname{cosec}^2 \theta =$
 (a) 1 (b) 4 (c) 2 (d) none of these
21. $\lim_{x \rightarrow 0} \frac{\cos 2x^3 - 1}{\sin^6 2x} =$
 (a) $\frac{1}{24}$ (b) $-\frac{1}{8}$ (c) $\frac{1}{8}$ (d) none of these

22. If $z = (1 - t) + i\sqrt{t^2 + t + 2}$ is any point on the Argand plane, where t is a real parameter, then locus of z is
 (a) Ellipse (b) Hyperbola (c) Straight line (d) none of these
23. Let z_i 's; $i = 1, 2, 3, \dots, 8$, be the roots of equation $\{z - (2 + 2i)\}^8 = 1$, then $\sum_{i=1}^8 |z_i|$ can't exceed
 (a) 30 (b) 40 (c) $24 + 16\sqrt{2}$ (d) $20 + 16\sqrt{2}$
24. In the above question $\sum_{i=1}^8 |z_i|$ is always greater than,
 (a) $8 + 16\sqrt{2}$ (b) $10 + 16\sqrt{2}$ (c) 40 (d) none of these
25. Number of roots of the equation $x - 5\sqrt{x} - 14 = 0$ is/are
 (a) 1 (b) 2 (c) 3 (d) 4

Read the following questions and choose

- A. Both **Statement-1** and **Statement-2** are true and **Statement-2** is correct explanation of **Statement-1**.
 B. Both **Statement-1** and **Statement-2** are true but **Statement-2** is not a correct explanation of **Statement-1**.
 C. **Statement-1** is true and **Statement-2** is false.
 D. **Statement-1** is false but **Statement-2** is true
26. **Statement-1:** If a and b are integers and roots of $x^2 + ax + b = 0$ are rational then they must be integers.
Statement-2: If the coefficient of x^2 in a quadratic equation is unity, then its roots must be integers.
 (a) A (b) B (c) C (d) D
27. **Statement-1:** If $P\left(\frac{A}{B}\right) \geq P(A)$, then $P\left(\frac{B}{A}\right) \geq P(B)$
Statement-2: $P\left(\frac{A}{B}\right) = \frac{P(A \cap B)}{P(B)}$
 (a) A (b) B (c) C (d) D
28. **Statement-1:** If the vector \hat{a} and \hat{c} are non-collinear, then the lines $\hat{r} = 6\hat{a} - \hat{c} + \lambda(2\hat{c} - \hat{a})$ and $\hat{r} = \hat{a} - \hat{c} + \mu(\hat{a} + 3\hat{c})$ are coplanar.
Statement-2: There exists λ and μ such that the two values of \hat{r} become same.
 (a) A (b) B (c) C (d) D

29. **Statement-1:** If 3 positive numbers in G.P. represent sides of a triangle then the common ratio of the G.P. must

lie between $\frac{\sqrt{5}-1}{2}$ and $\frac{\sqrt{5}+1}{2}$.

Statement-2: 3 positive real numbers form a triangle if the sum of any two is greater than the third.

- (a) A (b) B (c) C (d) D

30. **Statement-1:** The minimum value of $\sin \alpha + \sin \beta + \sin \gamma$, where α, β, γ are real numbers such that $\alpha + \beta + \gamma = \pi$, is negative.

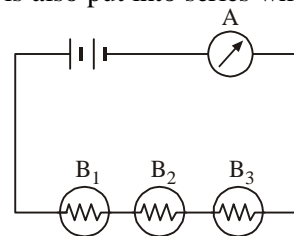
Statement-2: α, β, γ are angles of a triangle

- (a) A (b) B (c) C (d) D

PHYSICS

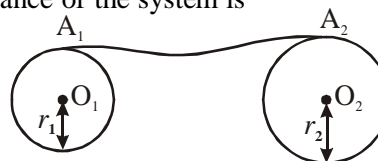
31. Three bulbs B_1, B_2 and B_3 are connected across a d.c. source. An ammeter A is also put into series which reads 1.0 ampere. The bulbs B_2 and B_3 glow brightly whereas B_1 glows slightly. This is because

- (a) Resistance of B_1 is much less than that of B_2 and B_3
 (b) The circuit between B_1 and B_2 is opened
 (c) Filament of the bulb B_1 is opened
 (d) Entire applied voltage drops across the ammeter



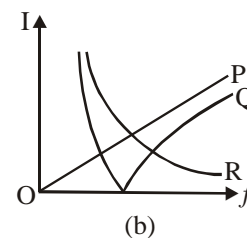
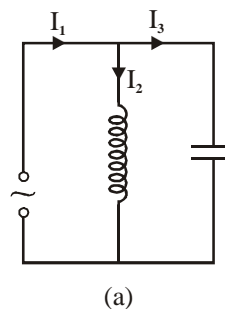
32. Two spherical conductors A_1 and A_2 of radii r_1 and r_2 and carrying charges q_1 and q_2 are connected in air by a copper wire as shown in the figure. Then the equivalent capacitance of the system is

- (a) $4\pi \epsilon_0 r_1 r_2 / (r_2 - r_1)$ (b) $4\pi \epsilon_0 (r_1 + r_2)$
 (c) $4\pi \epsilon_0 r_2$ (d) $4\pi \epsilon_0 r_1$



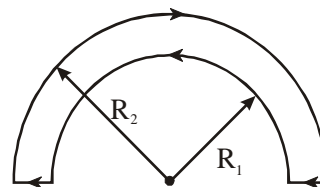
33. In the circuit shown in figure (a), the rms currents I_1, I_2 and I_3 are altered by varying the frequency f of the oscillator. The output voltage of the oscillator remains sinusoidal and has a fixed amplitude. Which curves in figure (b), indicate correctly the variations of the currents I_1 and I_2 and I_3 with frequency?

- (a) $I_1 = Q, I_2 = Q, I_3 = Q$
 (b) $I_1 = R, I_2 = Q, I_3 = Q$
 (c) $I_1 = Q, I_2 = P, I_3 = R$
 (d) $I_1 = Q, I_2 = R, I_3 = P$



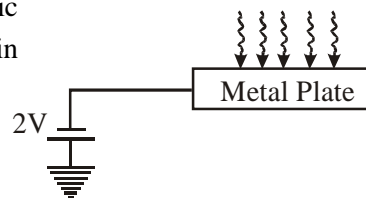
34. A wire loop PQRS formed by joining two semi-circular carries a current I as shown. The magnitude of magnetic induction at the centre O is

- (a) $\frac{\mu_o I}{4\pi} \left(\frac{1}{R_1} - \frac{1}{R_2} \right)$ (b) $\frac{\mu_o I}{2\pi} \left(\frac{1}{R_1} - \frac{1}{R_2} \right)$
 (c) $\frac{\mu_o I}{4} \left(\frac{1}{R_1} + \frac{1}{R_2} \right)$ (d) $\frac{\mu_o I}{4} \left(\frac{1}{R_1} - \frac{1}{R_2} \right)$



35. The electrical conductivity of a semiconductor increases when electromagnetic radiation of wavelength shorter than 2480 nm is incident on it. The band gap in (eV) for the semiconductor is

- (a) 1.1 eV (b) 2.5 eV
 (c) 0.5 eV (d) 0.7 eV



36. In Young's double slit experiment, the 7th maximum with wavelength λ_1 is at a distance d_1 and that with wavelength λ_2 is at a distance d_2 . Then d_1/d_2 is

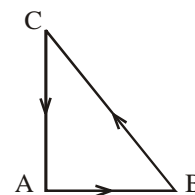
- (a) λ_1/λ_2 (b) λ_2/λ_1 (c) λ_1^2/λ_2^2 (d) λ_2^2/λ_1^2

37. Which of the following is not a characteristics of simple harmonic motion ?

- (a) Amplitude of the oscillation must be constant
 (b) Frequency and period of the oscillation must be independent of the amplitude
 (c) The restoring force that acts on the particle must be proportional to the displacement and opposite in direction
 (d) There must not be the position of stable equilibrium

38. Three forces start acting simultaneously on a particle moving with velocity \mathbf{v} . These forces are represented in magnitude and direction by the three sides of a triangle ABC. The particle will now move with velocity.

- (a) less than \mathbf{v} (b) greater than \mathbf{v}
 (c) $|\mathbf{v}|$ in the direction of the largest force BC (d) \mathbf{v} , remaining unchanged



39. For the three most common types of radiation α , β and γ , list them in order most penetrating first to least penetrating last.

- (a) β, α, γ (b) γ, β, α (c) α, γ, β (d) α, β, γ

40. Pick out the correct statements.

- (a) Diffraction is exhibited by all electromagnetic waves but not by mechanical waves
 (b) Diffraction cannot be observed with a plane polarised light
 (c) The limit of resolution of a microscope decreases with increase in the wavelength of light used
 (d) The width of central maximum in the diffraction pattern due to single slit increases as wavelength increases

41. Two satellites of mass m_1 and m_2 ($m_1 > m_2$) are going around the earth in orbit of radius r_1 and r_2 ($r_1 > r_2$). Which one statement about their velocities is correct?

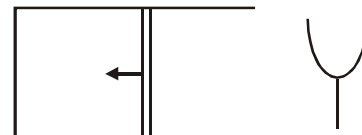
- (a) $\frac{v_1}{r_1} = \frac{v_2}{r_2}$ (b) $v_1 < v_2$ (c) $v_1 = v_2$ (d) $v_1 > v_2$

42. A solid copper cube of edges 1 cm is suspended in an evacuated enclosure. Its temperature is found to fall from 100°C to 99°C in 100 s. Another solid copper cube of edge, 2 cm with similar manner. The time required for this cube to cool from 100°C to 99°C will be approximately

- (a) 400 s (b) 200 s (c) 50 s (d) 25 s

43. A piston fitted in cylindrical pipe is pulled as shown in the figure. A tuning fork is sounded at open end and loudest sound is heard at consecutive open length 13 cm, 41 cm and 69 cm. The frequency of tuning fork if velocity of sound is 350 m/s is

- (a) 1250 Hz (b) 625 Hz
(c) 417 Hz (d) 715 Hz



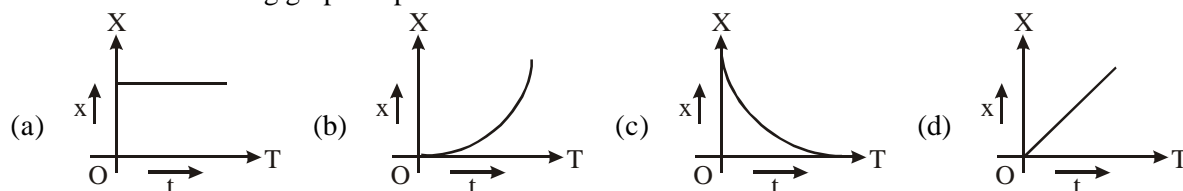
44. A source of sound emits waves with frequency f Hz and speed v m/s. Two observers move away from this source in opposite directions each with a speed $0.2v$ relative to the source. The ratio of frequencies heard by the two observers will be

- (a) 3 : 2 (b) 2 : 3 (c) 1 : 1 (d) 4 : 10

45. Dimensions of Stefan's constant are

- (a) ML^2T^{-2} (b) $\text{ML}^2\text{T}^{-2}\theta^{-4}$ (c) $\text{MT}^{-3}\theta^{-4}$ (d) MT^{-2}L^0

46. Which of the following graphs represents one dimensional uniform motion



47. A machine gun of mass M fires n bullets per second. The mass and speed of each bullet is m and v respectively. The force exerted on the machine gun is

- (a) zero (b) mvn (c) Mvn (d) Mvn/m

48. A heavy small sized sphere is suspended by a string of length l . The sphere rotates uniformly in a horizontal circle with the string making an angle θ with the vertical. Then the time period of this conical pendulum is

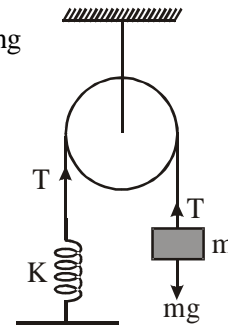
- (a) $T = 2\pi\sqrt{\left(\frac{l}{g}\right)}$ (b) $T = 2\pi\sqrt{\left(\frac{l \sin \theta}{g}\right)}$ (c) $T = 2\pi\sqrt{\left(\frac{l \cos \theta}{g}\right)}$ (d) $T = 2\pi\sqrt{\left(\frac{l}{g \cos \theta}\right)}$

49. A thin circular ring of mass M and radius R is rotating about its axis with a constant angular velocity ω . Two objects each of mass m are attached gently to the ring. The ring now rotates with an angular velocity
- (a) $\omega M / (M + m)$ (b) $\omega(M - 2m) / (M + 2m)$
(c) $\omega M / (M + 2m)$ (d) $\omega(M + 2m) / M$

50. An annular ring with inner and outer radii R_1 and R_2 is rolling without slipping with a uniform angular speed. The ratio of the forces experienced by the two identical particles situated on the inner and outer parts of the ring, F_1/F_2 is
- (a) $\frac{R_2}{R_1}$ (b) $\left(\frac{R_1}{R_2}\right)$ (c) 1 (d) $\frac{R_1}{R_2}$

51. Figure below shows a mass m suspended with a mass less inextensible string passing over a constant is K . The time period of oscillation of mass m is

- (a) $2\pi\sqrt{\frac{m}{2k}}$ (b) $2\pi\sqrt{\frac{m}{k}}$
(c) $2\pi\sqrt{\frac{2m}{k}}$ (d) none of the above



52. A body floats with $1/3$ of its volume outside water and $3/4$ of its volume inside another liquid, the density of another liquid is
- (a) $9/4$ gm/cc (b) $4/9$ gm/cc (c) $8/9$ gm/cc (d) $2/9$ gm/cc
53. The extension in string, obeying Hooke's law is x . The speed of sound in the stretched string is V . If the extension in the string is increased to $1.5x$, the speed of sound will be
- (a) $1.212 V$ (b) $0.61 V$ (c) $1.5 V$ (d) $0.75 V$
54. The equation of a travelling wave is given by $y = 0.5 \sin (20x - 400t)$ where x and y are in metre and t is in second. The velocity of the wave is
- (a) 10 m/s (b) 20 m/s (c) 200 m/s (d) 400 m/s
55. A man runs toward a plain mirror at a speed of 15 m/s. What is the speed of his image?
- (a) 10.5 m/s (b) 15 m/s (c) 30 m/s (d) 45 m/s
56. The plane surface of a plano-convex lens of focal length f is silvered. It will behave as
- (a) Plane mirror (b) Convex mirror of focal length $2f$
(c) Concave mirror of focal length $f/2$ (d) None of these
57. A voltmeter of resistance R is to be used to measure the potential difference across a resistance r . In which case the reading will be nearest to that in the absence of voltmeter?
- (a) $R < r$ (b) $R > r$ (c) $R = r$ (d) $R = 0$

58. In a full wave rectifier the current in each of the diodes flow in
 (a) the complete cycle of the input signal (b) half cycle of the input signal
 (c) only one fourth cycle of the input signal (d) none of these
59. An atom emits a spectral line of wavelength λ when an electron makes a transition between levels of energy E_1 and E_2 . When expression correctly relates λ , E_1 and E_2 ?
 (a) $\lambda = \frac{hc}{E_1 + E_2}$ (b) $\lambda = \frac{2hc}{E_1 + E_2}$ (c) $\lambda = \frac{2hc}{E_1 - E_2}$ (d) $\lambda = \frac{hc}{E_1 - E_2}$
60. Photoelectric effect is the phenomenon in which
 (a) photons come out of a metal when it is hit by a beam of electrons
 (b) photons come out of the nucleus of an atom under the action of an electric field
 (c) electrons come out of a metal with a constant velocity which depends upon the frequency and intensity of incident light wave
 (d) electrons come out of a metal with different velocities not greater than a certain value which depends only on the frequency of the incident light wave and not on its intensity

CHEMISTRY

61. Excess of NaOH added will separate
 (a) $\text{Al}(\text{OH})_3$; $\text{Zn}(\text{OH})_2$ (b) AlCl_3 , ZnCl_2 (c) $\text{Fe}(\text{OH})_3$, $\text{Mg}(\text{OH})_2$ (d) $\text{Fe}(\text{OH})_3$, $\text{Al}(\text{OH})_3$
62. On heating colourless solid A, gas B (liquid at room temperature) and gas C are formed. A is decomposed by NaOH on heating to form gas D giving white fumes with HCl. Gas C occupies 800 ml/g at N.T.P. Hence A is
 (a) NH_4NO_3 (b) NaNO_2 (c) NH_4Cl (d) NH_4NO_2
63. Molten sodium chloride conducts electricity due to the presence of
 (a) free electrons (b) ions (c) Na atom (d) Cl atom
64. Which will give NO_2 on heating?
 (a) NH_4NO_2 (b) NH_4NO_3 (c) NaNO_3 (d) LiNO_3
65. Of the following acids:
 I. hypo phosphorous acid II. hydrofluoric acid
 III. oxalic acid IV. glycine
 (a) I, II are monobasic, III dibasic acid and IV amphoteric
 (b) II monobasic, I, III dibasic acid, IV amphoteric
 (c) I monobasic, II, III dibasic, IV amphoteric
 (d) I, II, III dibasic, IV amphoteric.

66. In the following reaction $\text{B(OH)}_3 + \text{H}_2\text{O} \longrightarrow [\text{B(OH)}_4]^- + \text{H}^+$
- (a) B(OH)_3 is a Lewis acid (b) B(OH)_3 is a Lewis base
 (c) B(OH)_3 is amphoteric (d) none is correct
67. Select correct statement
- (a) catenation is maximum in carbon
 (b) carbon has pronounced ability to form $p\pi - p\pi$ multiple bonds to itself and to other elements like O and N
 (c) both (a) & (b) are correct
 (d) none is correct
68. In the following statements, select the correct statement(s)
- (a) $\text{N(CH}_3)_3$ has pyramidal structure (b) $\text{N(SiH}_3)_3$ shows planar arrangement
 (c) both correct (d) none is correct
69. Out of CO_2 , SiO_2 , GeO_2 , SnO_2 and PbO_2
- (a) CO_2 and SiO_2 are acidic, SnO_2 is amphoteric acid PbO_2 is an oxidising agent
 (b) PbO_2 is converted to $\text{Pb(NO}_3)_2$ on reaction with HNO_3
 (c) both are correct
 (d) none is correct
70. Which substance when boiled with NaOH will evolve NH_3
- (a) ethylamine (b) aniline (c) acetamide (d) acetoxime
71. Grignard reagent and acetyl chloride does not react with
- (a) RNH_2 (b) R_2NH (c) R_3N (d) none of these
72. The product D in the following sequence of reactions is
- $$\text{CH}_3\text{COOH} \xrightarrow{\text{NH}_3} \text{A} \xrightarrow{\text{heat}} \text{B} \xrightarrow{\text{P}_2\text{O}_5} \text{C} \xrightarrow{\text{Na} + \text{C}_2\text{H}_5\text{OH}} \text{D}$$
- (a) ester (b) amine (c) acid (d) alcohol
73. Which of the following carboxylic acids undergoes decarboxylation easily
- (a) $\text{C}_6\text{H}_5 - \text{CO} - \text{CH}_2\text{COOH}$ (b) $\text{C}_6\text{H}_5 - \text{CO} - \text{COOH}$
 (c) $\text{C}_6\text{H}_5 - \underset{\text{OH}}{\text{CH}} - \text{COOH}$ (d) $\text{C}_6\text{H}_5 - \underset{\text{NH}_2}{\text{CH}} - \text{COOH}$

74. *n*-Butyraldehyde can be synthesised from *n*-propylmagnesium bromide and
 (a) Ethyl orthoformate (b) Acetyl chloride (c) *n*-Butyl formate (d) Formic acid
75. $\text{HC} \equiv \text{N} + \text{HCl} \xrightarrow[\text{AlCl}_3]{\text{Anhyd.}} \text{A} \xrightarrow[\text{Anhyd. AlCl}_3]{\text{C}_6\text{H}_6} \text{B} \xrightarrow{\text{H}_2\text{O}} \text{C}$
 In the above sequence of reactions, A, B and C respectively are
 (a) CH_2NCl , $\text{C}_6\text{H}_5\text{Cl}$, $\text{C}_6\text{H}_5\text{OH}$ (b) $\text{CHCl} = \text{NH}$, $\text{C}_6\text{H}_5\text{CH} = \text{NH}$, $\text{C}_6\text{H}_5\text{CHO}$
 (c) $\text{CHCl} = \text{NH}$, $\text{C}_6\text{H}_5\text{Cl}$, $\text{C}_6\text{H}_5\text{OH}$ (d) CH_2O , $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$, $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$
76. The acidity of
 (i) *p*-nitrophenol (ii) *o*-nitrophenol (iii) *m*-nitrophenol (iv) phenol
 decreases in the order
 (a) (i) > (ii) > (iii) > (iv) (b) (iv) > (i) > (ii) > (iii) (c) (ii) > (iii) > (i) > (iv) (d) (iii) > (ii) > (i) > (iv)
77. A weak acid HX has dissociation constant = 1×10^{-5} M. On reaction with alkali it forms a salt NaX. The degree of hydrolysis of 0.1 M NaX is
 (A) 0.0001% (b) 0.01% (c) 0.1% (d) 0.15%
78. Which has the maximum conductivity in their 0.1 M solution?
 (a) $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$ (b) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$ (c) $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$ (d) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$
79. 0.1 mole of CH_3NH_2 ($K_b = 5 \times 10^{-4}$) is mixed with 0.08 mole of HCl and diluted to one litre. $[\text{H}^+]$ in solution is
 (a) 8×10^{-2} M (b) 8×10^{-11} M (c) 1.6×10^{-11} M (d) 8×10^{-5} M
80. According to second law of thermodynamics, a process (reaction) is spontaneous, if during the process
 (a) $\Delta S_{\text{universe}} > 0$ (b) $\Delta S_{\text{universe}} = 0$ (c) $\Delta H_{\text{system}} > 0$ (d) $\Delta S_{\text{universe}} = \Delta S_{\text{system}}$
81. Consider the following cell reaction: $2\text{Fe}(\text{s}) + \text{O}_2(\text{g}) + 4\text{H}^+ \rightarrow 2\text{Fe}^{2+}(\text{aq}) + 2\text{H}_2\text{O}(\text{l})$ E° of cell = 1.67 V. If $[\text{Fe}^{2+}] = 10^{-3}$; $\text{Pr}(\text{O}_2) = 0.1$ atm and pH = 3.0 the cell potential at 25°C is
 (a) 1.47 V (b) 1.77 V (c) 1.87 V (d) 1.57 V
82. In the titration of potassium dichromate solution with acidified Mohr's salt the number of moles of Mohr salt required per mole of dichromate is
 (a) 3 (b) 4 (c) 5 (d) 6
83. Calculate the ebullioscopic constant for water. The heat of vaporization is 40.685 kJ mol⁻¹.
 (a) 0.512 K kg mol⁻¹ (b) 1.86 K kg mol⁻¹ (c) 5.12 K kg mol⁻¹ (d) 3.56 K kg mol⁻¹

84. $2\text{N}_2\text{O}_5 \rightarrow 4\text{NO}_2 + \text{O}_2$
 If $-\frac{\Delta[\text{N}_2\text{O}_5]}{\Delta t} = k_1[\text{N}_2\text{O}_5]$, $-\frac{\Delta[\text{NO}_2]}{\Delta t} = k_2[\text{N}_2\text{O}_5]$, $\frac{\Delta[\text{O}_2]}{\Delta t} = k_3[\text{N}_2\text{O}_5]$ then
 (a) $k_1 = k_2 = k_3$ (b) $2k_1 = k_2 = 4k_3$ (c) $2k_1 = 4k_2 = k_3$ (d) none of these
85. Which among the following is not a π -bonded organometallic compound?
 (a) $\text{K}[\text{PtCl}_3(\eta^2\text{-C}_2\text{H}_4)]$ (b) $\text{Fe}(\eta^5\text{-C}_5\text{H}_5)^2$ (c) $\text{Cr}(\eta^6\text{-C}_6\text{H}_6)_2$ (d) $(\text{CH}_3)_4\text{Sn}$.
86. One mole of complex compound $\text{Co}(\text{NH}_3)_5\text{Cl}_3$ gives 3 mol of ions on dissolution in water. One mole of same complex reacts with two mol of AgNO_3 solution to form $\text{AgCl}(s)$. The structure of complex is
 (a) $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$ (b) $[\text{Co}(\text{NH}_3)_3\text{Cl}_3] \cdot 2\text{NH}_3$
 (c) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl} \cdot 2\text{NH}_3$ (d) $[\text{Co}(\text{NH}_3)_4\text{Cl}]\text{Cl}_2 \cdot \text{NH}_3$.
87. The geometry of $\text{Ni}(\text{CO})_4$ and $\text{Ni}(\text{PPh}_3)_2\text{Cl}_2$ are
 (a) both square planar (b) tetrahedral and square planar respectively
 (c) both tetrahedral (d) square planar and tetrahedral respectively.
88. Which of the following is incorrect
 (a) Glucose is reducing sugar (b) Fructose is reducing sugar
 (c) Sucrose is reducing sugar (d) Glucose and Fructose form same osazone
89. A 0.004 M solution of Na_2SO_4 is isotonic with 0.01 M solution of glucose at same temperature. Apparent degree of dissociation of Na_2SO_4 is
 (a) 25% (b) 50% (c) 75% (d) 85%
90. The bombarding projectile in the following transformation is ${}_7^{14}\text{N} + ? \longrightarrow {}_6^{14}\text{C} + {}_1^1\text{H}$
 (a) proton (b) deuteron (c) neutron (d) ${}_{-1}^0e$

JEE MAINS: TEST SERIES-06

P_{AG}, C_{SK}, M_{BR}

ANSWERS

Mathematics

- | | | | | |
|---------|---------|---------|---------|---------|
| 1. (b) | 2. (c) | 3. (a) | 4. (d) | 5. (b) |
| 6. (d) | 7. (d) | 8. (d) | 9. (b) | 10. (d) |
| 11. (a) | 12. (a) | 13. (b) | 14. (d) | 15. (d) |
| 16. (c) | 17. (b) | 18. (a) | 19. (b) | 20. (c) |
| 21. (d) | 22. (b) | 23. (c) | 24. (a) | 25. (a) |
| 26. (c) | 27. (a) | 28. (a) | 29. (a) | 30. (d) |

Physics

- | | | | | |
|---------|---------|---------|---------|---------|
| 31. (a) | 32. (b) | 33. (d) | 34. (d) | 35. (c) |
| 36. (a) | 37. (d) | 38. (d) | 39. (b) | 40. (d) |
| 41. (b) | 42. (d) | 43. (b) | 44. (c) | 45. (c) |
| 46. (d) | 47. (b) | 48. (c) | 49. (c) | 50. (d) |
| 51. (b) | 52. (c) | 53. (a) | 54. (b) | 55. (b) |
| 56. (c) | 57. (b) | 58. (b) | 59. (d) | 60. (d) |

Chemistry

- | | | | | |
|---------|---------|---------|---------|---------|
| 61. (d) | 62. (d) | 63. (b) | 64. (d) | 65. (c) |
| 66. (a) | 67. (c) | 68. (c) | 69. (c) | 70. (c) |
| 71. (c) | 72. (b) | 73. (a) | 74. (a) | 75. (b) |
| 76. (a) | 77. (b) | 78. (d) | 79. (b) | 80. (a) |
| 81. (d) | 82. (d) | 83. (a) | 84. (b) | 85. (d) |
| 86. (a) | 87. (a) | 88. (c) | 89. (c) | 90. (c) |