JEE Main Practice Paper

Based on JEE Main Pattern

Generated: December 01, 2025 | Difficulty: Medium

Instructions:
- This paper contains 90 questions (30 per subject).
- Each subject has 20 MCQs and 10 Integer Type questions.
- MCQ: +4 for correct, -1 for incorrect.
- Integer: +4 for correct, 0 for incorrect.
- Time: 3 hours | Maximum Marks: 360

Physics

Section A: Multiple Choice Questions (MCQ)

Q1. A beam of unpolarised light of intensity I_0 is passed through a polaroid A and then through another polaroid B which is oriented so that its principal plane makes an angle of $45°$ relative to that of A. The intensity of emergent light is :

    (A) $I_0 4$

    (B) I_0

    (C) $I_0 2$

    (D) $I_0 8$

Q2. The fundamental frequency of a closed organ pipe is equal to the first overtone frequency of an open organ pipe. If length of the open pipe is 60 cm , the length of the closed pipe will be :

    (A) 60 cm

    (B) 45 cm

    (C) 30 cm

    (D) 15 cm

Q3. An electron is projected with uniform velocity along the axis inside a current carrying long solenoid. Then :

    (A) the electron will continue to move with uniform velocity along the axis of the solenoid.

    (B) the electron will be accelerated along the axis.

    (C) the electron path will be circular about the axis.

    (D) the electron will experience a force at to the axis and execute a helical path.

Q4. A proton moving with a constant velocity passes through a region of space without any change in its velocity. If and represent the electric and magnetic fields respectively, then the region of space may have : (A) ; (B) ; (C) ; (D) Choose the most appropriate answer from the options given below :

    (A) (A), (B) and (C) only

    (B) (A), (C) and (D) only

    (C) (A), (B) and (D) only

    (D) (B), (C) and (D) only

Q5. Consider two physical quantities A and B related to each other as $E = \frac{B-x^2}{At}$ where E, x and t have dimensions of energy, length and time respectively. The dimension of AB is

    (A) L -2 M 1 T 0

    (B) L 2 M -1 T 1

    (C) L -2 M -1 T 1

    (D) L 0 M -1 T 1

Q6. The equation of stationary wave is : Which of the following is NOT correct :

    (A) The dimensions of is [T]

    (B) The dimensions of is

    (C) The dimensions of is [L]

    (D) The dimensions of is [L]

Q7. A light string passing over a smooth light fixed pulley connects two blocks of masses m_1 and m_2. If the acceleration of the system is $\frac{g}{8}$, then the ratio of masses is

    (A) 9/7

    (B) 8/1

    (C) 4/3

    (D) 5/3

Q8. A particle of charge - and mass m moves in a circle of radius r around an infinitely long line charge of linear density + . Then time period will be given as: (Consider as Coulomb's constant)

    (A) $T^2 = 4\pi^2 m 2 r 3$

    (B) T= $2\pi r \sqrt{\frac{m}{2}}$

    (C) T= $\frac{1}{2\pi r} \sqrt{\frac{m}{2}}$

    (D) T= $\frac{1}{2\pi} \sqrt{\frac{2}{m}}$

Q9. An object of mass ' m ' is projected from origin in a vertical plane at an angle with the x axis with an initial velocity . The magnitude and direction of the angular momentum of the object with respect to origin, when it reaches at the maximum height, will be [g is acceleration due to gravity]

    (A) along negative -axis

    (B) along positive -axis

    (C) along negative -axis

    (D) along positive -axis

Q10. A transparent film of refractive index, 2.0 is coated on a glass slab of refractive index, 1.45. What is the minimum thickness of transparent film to be coated for the maximum transmission of Green light of wavelength 550 nm . [Assume that the light is incident nearly perpendicular to the glass surface.]

(A) 137.5 nm

(B) 275 nm

(C) 94.8 nm

(D) 68.7 nm

Q11. In a photoelectric effect experiment a light of frequency 1.5 times the threshold frequency is made to fall on the surface of photosensitive material. Now if the frequency is halved and intensity is doubled, the number of photo electrons emitted will be:

(A) Doubled

(B) Quadrupled

(C) Zero

(D) Halved

Q12. Projectiles A and B are thrown at angles of $45°$ and $60°$ with vertical respectively from top of a 400 m high tower. If their times of flight are same, the ratio of their speeds of projection $A:B$ is:

(A) $1:\sqrt{3}$

(B) $\sqrt{2}:1$

(C) $1:2$

(D) $1:\sqrt{2}$

Q13. When a potential difference V is applied across a wire of resistance R , it dissipates energy at a rate . If the wire is cut into two halves and these halves are connected mutually parallel across the same supply, the energy dissipation rate will become:

(A) 1 4 W

(B) 1 2 W

(C) 2 W

(D) 4 W

Q14. In a nuclear fission reaction of an isotope of mass M , three similar daughter nuclei of same mass are formed. The speed of a daughter nuclei in terms of mass defect M will be :

(A) $\sqrt{2c\text{M M}}$

(B) Mc 2/3

(C) $c\sqrt{2\text{M M}}$

(D) $c\sqrt{3\text{M M}}$

Q15. The number of spectral lines emitted by atomic hydrogen that is in the energy level, is

(A) 3

(B) 1

(C) 6

(D) 0

Q16. The mass number of nucleus having radius equal to half of the radius of nucleus with mass number 192 is:

(A) 24

(B) 32

(C) 40

(D) 20

Q17. In finding out refractive index of glass slab the following observations were made through travelling microscope 50 vernier scale division divisions on main scale in each For mark on paper

(A) 1.52

(B) 1.35

(C) 1.42

(D) 1.24

Q18. The radius r , length and resistance R of a metal wire was measured in the laboratory as r= 0.35 ± 0.05 cm , R= 100 ± 10 ohm , = 15 ± 0.2 cm The percentage error in resistivity of the material of the wire is :

(A) 25.6%

(B) 39.9%

(C) 37.3%

(D) 35.6%

Q19. With rise in temperature, the Young's modulus of elasticity

(A) changes erratically

(B) decreases

(C) increases

(D) remains unchanged

Q20. A monochromatic light of wavelength 6000 o A is incident on the single slit of width 0.01 mm . If the diffraction pattern is formed at the focus of the convex lens of focal length 20 cm , the linear width of the central maximum is :

(A) 60 mm

(B) 24 mm

(C) 120 mm

(D) 12 mm

Section B: Integer Type Questions

Q21. Two soap bubbles of radius 2 cm and 4 cm , respectively, are in contact with each other. The radius of curvature of the common surface, in cm , is _ _ _ _ _ _ .

Q22. Two charges of -4 μC and +4 μC are placed at the points $A($ 1, 0, 4 $)$ m and $B($ 2, - 1, 5 $)$ m located in an electric field $\rightarrow E$= 0.20 ^ i V cm^-1 . The magnitude of the torque acting on the dipole is $8\sqrt{} \times$ 10^-5 N m , where = _ _ _ _ _ _ _ _ _.

Q23. Let be the image of the point in the line . Then is equal to_ _ _ _ _ _ _ _

Q24. An air bubble of radius 1.0 mm is observed at a depth of 20 cm below the free surface of a liquid having surface tension and density . The difference between pressure inside the bubble and atmospheric pressure is _ _ _ _ _ . (Take)

Q25. A nucleus has mass number A_1 and volume V_1. Another nucleus has mass number A_2 and volume V_2. If relation between mass number is $A_2 = 4A_1$, then $\frac{V_2}{V_1} =$ _ _ _ _ _ _ _.

Q26. In a closed organ pipe, the frequency of fundamental note is . A certain amount of water is now poured in the organ pipe so that the fundamental frequency is increased to . If the organ pipe has a cross-sectional area of , the amount of water poured in the organ tube is _ _ _ _ _ _ _ _ . (Take speed of sound in air is)

Q27. The fractional compression of water at the depth of 2.5 km below the sea level is _ _ _ _ _ _ . Given, the Bulk modulus of water , density of water , acceleration due to gravity .

Q28. The maximum height reached by a projectile is . If the initial velocity is halved, the new maximum height of the projectile is _ _ _ _ _ .

Q29. The disintegration energy for the nuclear fission of is _ _ _ _ _ _ . Given atomic masses of , Value of

Q30. The position, velocity and acceleration of a particle executing simple harmonic motion are found to have magnitudes of and at a certain instant. The amplitude of the motion is where is _ _ _ _ _ _ _ _

Chemistry

Section A: Multiple Choice Questions (MCQ)

Q31. Which of the following reactions are disproportionation reactions? 1 $Cu^+ \rightarrow Cu^{2+} + Cu$ 2 $3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$ 3 $2KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$ 4 $2MnO_4^- + 3Mn^{2+} + 2H_2O \rightarrow 5MnO_2 + 4H^+$ Choose the correct answer from the options given below:

    (A) 1, 2

    (B) 2, 3, 4

    (C) 1, 2, 4

    (D) 1, 4

Q32. An amount of ice of mass and temperature is transformed to vapour of temperature by applying heat. The total amount of work required for this conversion is, (Take, specific heat of ice , specific heat of water , specific heat of steam , Latent heat of ice and Latent heat of steam)

    (A) 3043 J

    (B) 3024 J

    (C) 3003 J

    (D) 3022 J

Q33. IUPAC name of following hydrocarbon is :

    (A) 2-Ethyl-3,6-dimethylheptane

    (B) 2,5,6-Trimethyloctane

(C) 3,4,7-Trimethyloctane

(D) 2-Ethyl-2,6-diethylheptane

Q34. The ascending acidity order of the following H atoms is

(A) C < D < B < A

(B) A < B < C < D

(C) A < B < D < C

(D) D < C < B < A

Q35. The equilibrium is shifted to the right in :

(A) an acidic medium

(B) a basic medium

(C) a neutral medium

(D) a weakly acidic medium

Q36. Number of complexes from the following with even number of unpaired " " electrons is [Given atomic numbers :]

(A) 2

(B) 1

(C) 4

(D) 5

Q37. Given below are two statements I and II. Statement I: Dumas method is used for estimation of "Nitrogen" in an organic compound. Statement II: Dumas method involves the formation of ammonium sulphate by heating the organic compound with conc . In the light of the above statements, choose the correct answer from the options given below

(A) Statement I is true but Statement II is false

(B) Both Statement I and Statement II are false

(C) Statement I is false but Statement II is true

(D) Both Statement I and Statement II are true

Q38. Phenolic group can be identified by a positive:

(A) Phthalein dye test

(B) Lucas test

(C) Tollen's test

(D) Carbylamine test

Q39. Total number of nucleophiles from the following is :

(A) 7

(B) 4

(C) 6

(D) 5

Q40. IUPAC name of following compound is

(A) 2 – Aminopentanenitrile

(B) 2 – Aminobutanenitrile

(C) 3 – Aminobutanenitrile

(D) 3 – Aminopropanenitrile

Q41. Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R). Assertion (A): reaction of occurs more readily than the reaction of . Reason (R) : The partially bonded unhybridized p-orbital that develops in the trigonal bipyramidal transition state is stabilized by conjugation with the phenyl ring. In the light of the above statements, choose the most appropriate answer from the options given below :

(A) (A) is correct but (R) is not correct

(B) (A) is not correct but (R) is correct

(C) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

(D) Both (A) and (R) are correct and (R) is the correct explanation of

Q42. The -Helix and - Pleated sheet structures of protein are associated with its :

(A) tertiary structure

(B) quaternary structure

(C) secondary structure

(D) primary structure 2025 (23 Jan Shift 2)

Q43. Lassaigne's test is used for detection of:

(A) Nitrogen and Sulphur only

(B) Nitrogen, Sulphur and Phosphorous Only

(C) Phosphorous and halogens only

(D) Nitrogen, Sulphur, and halogens

Q44. The atomic mass of 6 C 12 is 12.000000 u and that of 6 C 13 is 13.003354 u . The required energy to remove a neutron from 6 C 13 , if mass of neutron is 1.008665 u , will be:

(A) 62.5MeV

(B) 6.25MeV

(C) 4.95MeV

(D) 49.5MeV

Q45. Product 'A' Consider the above reactions, identify product and product .

(A) -Propanol -Propanol

(B) -Propanol

(C) -Propanol -Propanol

(D) -Propanol

Q46. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R: Assertion A: The first ionisation enthalpy decreases across a period. Reason R: The increasing nuclear charge outweighs the shielding across the period. In the light of the above statements, choose the most appropriate from the options given below:

(A) Both A and R are true and R is the correct explanation of A

(B) A is true but R is false

(C) A is false but R is true

(D) Both A and R are true but R is NOT the correct explanation of A

Q47. The incorrect statements regarding enzymes are : (A) Enzymes are biocatalysts. (B) Enzymes are non-specific and can catalyse different kinds of reactions. (C) Most Enzymes are globular proteins. (D) Enzyme - oxidase catalyses the hydrolysis of maltose into glucose. Choose the correct answer from the option given below :

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

(B) (B) and (D)

(C) (A), (B) and (C)

(D) (B) and (C)

Q48. Which of the following statement is not true for radioactive decay?

(A) Decay constant increases with increase in temperature.

(B) Amount of radioactive substance remained after three half lives is th of original amount.

(C) Decay constant does not depend upon temperature.

(D) Half life is times of .

Q49. Choose the correct Statements from the following: (A) is a chelating ligand. (B) Metallic aluminium is produced by electrolysis of aluminium oxide in presence of cryolite. (C) Cyanide ion is used as ligand for leaching of silver. (D) Phosphine act as a ligand in Wilkinson catalyst. (E) The stability constants of and are similar with EDTA complexes. Choose the correct answer from the options given below:

(A) (B), (C), (E) only

(B) (C), (D), (E) only

(C) (A), (B), (C) only

(D) (A), (D), (E) only

Q50. The correct IUPAC name of is :

(A) dibromodi(trimethylphosphine)platinum(II)

(B) bis(trimethylphosphine)dibromoplatinum(II)

(C) dibromobis(trimethylphosphine)platinum(II)

(D) bis[bromo(trimethylphosphine)]platinum(II)

Section B: Integer Type Questions

Q51. A transition metal ' ' among and has the highest second ionisation enthalpy. The spin-only magnetic moment value of ion is _____. (Near integer) (Given atomic number)

Q52. If of oxalic acid is required to neutralise of solution, the amount of in of given solution is_____g.

Q53. When 81.0 g of aluminium is allowed to react with 128.0 g of oxygen gas, the mass of aluminium oxide produced in grams is_____ - (Nearest integer) Given : Molar mass of Al is Molar mass of O is

Q54. The formation enthalpies, for and are 220.0 and , respectively, at 298.15 K , and for is at the same temperature. The average bond enthalpy of the bond in water at 298.15 K is _ _ _ _ _ _ _ _ _ (nearest integer).

Q55. An ideal gas, , is expanded adiabatically against a constant pressure of 1 atm untill it doubles in volume. If the initial temperature and pressure is and , respectively then the final temperature is _ _ _ _ _ _ _ (nearest integer). [is the molar heat capacity at constant volume]

Q56. of each of water and acetic acid are mixed. The freezing point of the solution will be . Consider the acetic acid does not dimerise in water, nor dissociates in water. _ _ _ _ _ _ (nearest integer) [Given: Molar mass of water , acetic acid acetic acid: freezing point: , acetic acid]

Q57. Vanillin compound obtained from vanilla beans, has total sum of oxygen atoms and electrons is _ _ _ _ _ _

Q58. An octahedral complex with the formula upon reaction with excess of solution gives 2 moles of . Consider the oxidation state of in the complex is ' '. The value of " " is _ _ _ _ _ _

Q59. Number of colourless lanthanoid ions among the following is _ _ _ _ _ _ _ _

Q60. The molarity of 1 L orthophosphoric acid H_3PO_4 having 70% purity by weight (specific gravity 1.54 g cm^-3) is _ _ _ _ _ _ M . (Molar mass of $H_3PO_4 = 98$ g mol -1)

Mathematics

Section A: Multiple Choice Questions (MCQ)

Q61. If all the words with or without meaning made using all the letters of the word "NAGPUR" are arranged as in a dictionary, then the word at position in this arrangement is :

    (A) NRAGUP

    (B) NRAPUG

    (C) NRAPGU

    (D) NRAGPU

Q62. If the system of equations has infinitely many solutions, then is equal to :

    (A) 51

    (B) 45

    (C) 47

    (D) 49

Q63. The area of the region enclosed by the parabola $y = 4x - x^2$ and $3y = x - 4^2$ is equal to

    (A) 32/9

    (B) 4

    (C) 6

    (D) 14/3

Q64. Let $f: \to R \to 0, \infty$ be strictly increasing function such that $\lim x \to \infty \; f7x \; fx = 1$. Then, the value of $\lim x \to \infty \; f5x \; fx$ -1 is equal to

(A) 4

(B) 0

(C) 7/5

(D) 1

Q65. Let $fx = 2x \; 2 + 5x$- 3, xR . If m and n denote the number of points where f is not continuous and not differentiable respectively, then $m+ n$ is equal to:

(A) 5

(B) 2

(C) 0

(D) 3

Q66. For , , $\neq 0$. If $\sin(-1) + \sin(-1) + \sin(-1) = \pi$ and $+ + -+ = 3$, then equal to

(A) $\sqrt{3}/2$

(B) $1 \sqrt{2}$

(C) $\sqrt{3}$ - 1 $2\sqrt{2}$

(D) $\sqrt{3}$

Q67. If the domain of the function is , then is equal to :

(A) 32

(B) 40

(C) 24

(D) 36

Q68. Consider an A. P. of positive integers, whose sum of the first three terms is 54 and the sum of the first twenty terms lies between 1600 and 1800. Then its term is :

(A) 90

(B) 84

(C) 122

(D) 108

Q69. The solution curve of the differential equation $y \; dx \; dy = x\log e \; x$- $\log e \; y+ 1, x> 0, y>$ 0 passing through the point (e, 1) is

(A) $\log e \; y \; x = x$

(B) $\log e \; y \; x = y \; 2$

(C) $\log e \; x \; y = y$

(D) $2\log e \; x \; y = y+ 1$

Q70. For the function , between the following two statements (S1) for only one value of in . (S2) is decreasing in and increasing in .

(A) Both (S1) and (S2) are correct.

(B) Both (S1) and (S2) are incorrect.

(C) Only (S2) is correct.

(D) Only (S1) is correct.

Q71. Let is neither a multiple of 3 nor a multiple of 4 . Then the number of elements in is

(A) 290

(B) 280

(C) 300

(D) 310

Q72. 60 words can be made using all the letters of the word BHBJO, with or without meaning. If these words are written as in a dictionary, then the word is :

(A) JBBOH

(B) OBBJH

(C) OBBHJ

(D) HBBJO

Q73. If , then equals

(A) 64

(B) 196

(C) 144

(D) 100

Q74. Let f: R→R be defined as fx= a-$b$cos2x x 2 ; x< 0 x 2 + cx+ 2; 0 $\leq$$x$$\leq$1 2$x$+ 1; x> 1 If f is continuous everywhere in R and m is the number of points where f is NOT differential then $m + a + b + c$ equals:

(A) 1

(B) 4

(C) 3

(D) 2

Q75. Let the mean and the variance of 6 observation a, b, 68, 44, 48, 60 be 55 and 194 , respectively if a> b , then a+ 3b is

(A) 200

(B) 190

(C) 180

(D) 210

Q76. Let , where is the constant of integration. If , then equals :

(A) 48

(B) 55

(C) 62

(D) 47

Q77. Let and . If , then is equal to:

(A) 36

(B) 16

(C) 1

(D) 49

Q78. Let the circles and touch each other externally at the point . If the point divides the line segment joining the centres of the circles and internally in the ratio , then equals

(A) 125

(B) 130

(C) 110

(D) 145

Q79. Let and . Then the total number of one-one maps , such that , is :

(A) 480

(B) 240

(C) 120

(D) 180

Q80. Let be the term of an A.P. If for some , and , then is equal to

(A) 98

(B) 126

(C) 142

(D) 112

Section B: Integer Type Questions

Q81. If the integral $525 \pi 2$ $0 \sin 2x \cos(11) 2 x 1 + \cos(5) 2 x 1 2\, dx$ is equal to $n\sqrt{2}$ -64 , then n is equal to _____

Q82. The number of elements in the set $= x, y, z: x, y, z, x+ 2y+ 3z= 42, x, y, z\geq 0$ equals _____

Q83. Let be , using only the principal values of the inverse trigonometric functions. Then is equal to _____

Q84. The number of real solutions of the equation is_____

Q85. An arithmetic progression is written in the following way The sum of all the terms of the row is_____

Q86. The number of integers, between 100 and 1000 having the sum of their digits equals to 14 , is _____

Q87. For , if , then is equal to_____

Q88. Consider two circles $C 1 : x 2 + y 2 = 25$ and $C 2 : (x-) 2 + y 2 = 16$, where $(5, 9)$. Let the angle between the two radii (one to each circle) drawn from one of the intersection points of C 1 and C 2 be $\sin(-1)\sqrt{63}\ 8$. If the length of common chord of $C 1$ and $C 2$ is , then the value of ( ) 2 equals _____.

Q89. Let be an Arithmetic Progression such that . Then is equal to _____

Q90. Let be the point and be the foot of the perpendicular drawn from the point on the line passing through the points and . Then the length of the line segment is equal to

_ _ _ _ _ _ _ _

Answer Key

Physics

Section A (MCQ):

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
(1)	(4)	(1)	(3)	(2)	(1)	(1)	(2)	(3)	(1)
Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
(3)	(4)	(4)	(3)	(3)	(1)	(3)	(2)	(2)	(2)

Section B (Integer):

Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
4	2	11	2190	4	400	1	16	208	17

Chemistry

Section A (MCQ):

Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40
(1)	(1)	(2)	(1)	(2)	(1)	(1)	(1)	(4)	(3)
Q41	Q42	Q43	Q44	Q45	Q46	Q47	Q48	Q49	Q50
(4)	(3)	(4)	(3)	(3)	(3)	(2)	(1)	(3)	(3)

Section B (Integer):

Q51	Q52	Q53	Q54	Q55	Q56	Q57	Q58	Q59	Q60
6	4	153	466	274	31	11	2	2	11

Mathematics

Section A (MCQ):

Q61	Q62	Q63	Q64	Q65	Q66	Q67	Q68	Q69	Q70
(3)	(3)	(3)	(2)	(4)	(1)	(1)	(1)	(3)	(4)
Q71	Q72	Q73	Q74	Q75	Q76	Q77	Q78	Q79	Q80
(3)	(2)	(4)	(4)	(3)	(2)	(2)	(2)	(2)	(2)

Section B (Integer):

Q81	Q82	Q83	Q84	Q85	Q86	Q87	Q88	Q89	Q90
176	169	32	3	1505	70	47	1575	11132	13