

JEE Main Practice Paper

Based on JEE Main Pattern

Generated: December 01, 2025 | Difficulty: Easy

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. While measuring the diameter of a wire using a screw gauge, the following readings were noted. The main scale reading is 0.5 mm and the circular scale reading is equal to 42 divisions. The pitch of the screw gauge is 1 mm and it has 100 divisions on the circular scale. The diameter of the wire is calculated using the formula: Diameter = Main Scale Reading + (Circular Scale Reading / Total Divisions) * Pitch. The value of the diameter is:

- (A) 21
- (B) 142
- (C) 71
- (D) 42

Q2. As the temperature increases, the Young's modulus of elasticity

- (A) changes erratically
- (B) decreases
- (C) increases
- (D) remains unchanged

Q3. The equation representing a stationary wave is: Which of the following statements is NOT accurate:

- (A) The dimensions of is [T]
- (B) The dimensions of is
- (C) The dimensions of is [L]
- (D) The dimensions of is [L]

Q4. The principle of the Wheatstone bridge is utilized to determine the specific resistance S_1 of a given wire, which has a length L and a radius r . If X represents the resistance of the wire, then the specific resistance is expressed as: $S_1 = \frac{X}{\pi r^2 L}$. If the length of the wire is increased to twice its original length, what will be the new value of the specific resistance?

- (A) $A \frac{1}{4}$

- (B) $2S_1$
- (C) $A_{\frac{1}{2}}^1$
- (D) A_1^1

Q5. Which of the following statements is false regarding stopping potential?

- (A) It is sometimes the maximum kinetic energy of electrons emitted.
- (B) It increases with increase in intensity of the incident light.
- (C) It depends on the nature of emitter material.
- (D) It depends upon frequency of the incident light.

Q6. The radius r , length l and resistance R of a metal wire was measured in the laboratory as $r = 0.45 \pm 0.05\text{cm}$, $R = 120 \pm 12\text{ohm}$, $l = 18 \pm 0.3\text{cm}$. The percentage error in resistivity of the material of the wire is:

- (A) 30.0%
- (B) 42.1%
- (C) 38.5%
- (D) 36.4%

Q7. If 60 Vernier divisions are equal to 58 main scale divisions of a travelling microscope and one smallest reading of main scale is 0.6 mm the Vernier constant of travelling microscope is:

- (A) 0.1 mm
- (B) 0.1 cm
- (C) 0.01 cm
- (D) 0.01 mm

Q8. Light exits from a convex lens when a light source is positioned at its focal point. The configuration of the light's wavefront is:

- (A) both spherical and cylindrical
- (B) plane
- (C) spherical
- (D) cylindrical

Q9. An electric dipole is situated at a distance of 2 cm from an infinite plane sheet that possesses a positive charge density. Select the correct option from the choices below.

- (A) Potential energy and torque both are maximum.
- (B) Torque on dipole is zero and net force is directed away from the sheet.
- (C) Torque on dipole is zero and net force acts towards the sheet.
- (D) Potential energy of dipole is minimum and torque is zero.

Q10. What will be the percentage reduction in the lamp's brightness if the current decreases by 20%?

- (A) 46%
- (B) 26%
- (C) 36%

(D) 56%

Q11. In a nuclear fission process involving an isotope with mass M , three identical daughter nuclei of equal mass are produced. The velocity of a daughter nucleus in terms of the mass defect ΔM will be:

- (A) $\sqrt{2}MM$
- (B) $M\Delta M^{\frac{2}{3}}$
- (C) $M\sqrt{2}\Delta MM$
- (D) $M\sqrt{3}\Delta MM$

Q12. What is the mass number of a nucleus whose radius is half that of a nucleus with a mass number of 192?

- (A) 24
- (B) 32
- (C) 40
- (D) 20

Q13. If the total energy transferred to a surface in time t is $8.12 \times 10^5 \text{ J}$, then the magnitude of the total momentum delivered to this surface for complete absorption will be:

- (A) $3.10 \times 10^{-3} \text{ kgms}^{-1}$
- (B) $1.95 \times 10^{-3} \text{ kgms}^{-1}$
- (C) $2.70 \times 10^{-3} \text{ kgms}^{-1}$
- (D) $4.85 \times 10^{-3} \text{ kgms}^{-1}$

Q14. The accurate form of Bernoulli's equation is (the symbols are defined in the usual way):

- (A) constant
- (B) constant
- (C) constant
- (D) constant

Q15. A thin plano convex lens made of glass of refractive index 1.6 is immersed in a liquid of refractive index 1.3. When the plane side of the lens is silver coated for complete reflection, the lens immersed in the liquid.

- (A) 0.18 m
- (B) 0.22 m
- (C) 0.14 m
- (D) 0.12 m

Q16. The total kinetic energy of 1 mole of nitrogen at $30^\circ C$ is : [Use universal gas constant (R) = $8.31 \text{ Jmol}^{-1} \text{ K}^{-1}$]

6996.0 J 6105.0 J 6412.5 J 5780.5 J

Which of the following effects cannot be accounted for by the wave theory of light? 2025
(28 Jan Shift 2)

- (A) Compton effect
- (B) Refraction of light
- (C) Reflection of light
- (D) Diffraction of light

The minimum energy required by a hydrogen atom in ground state to emit radiation in Balmer series is nearly :

- (A) 1.6 eV
- (B) 13.0 eV
- (C) 2.0 eV
- (D) 11.0 eV

A beam of unpolarised light of intensity $I_0 = 80 \text{ W/m}^2$ 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) $I_0 \times \frac{1}{4}$
- (B) $I_0 \times \frac{1}{2}$
- (C) $I_0 \times \frac{1}{8}$
- (D) $I_0 \times \frac{3}{4}$

Section B: Integer Type Questions

Q20. A force displaces a body from a position of 2 m to a position of 5 m. The work done by this force is _____.

Q21. Three balls of masses m_1, m_2 , and m_3 respectively are arranged at the vertices of an equilateral triangle of side a . The moment of inertia of the system about an axis through the centroid and perpendicular to the plane of the triangle will be

Q22. A parallel beam of monochromatic light with a wavelength of 5000 \AA strikes a single narrow slit of width 0.001 mm perpendicularly. The light is then focused by a convex lens onto a screen positioned at its focal plane. The angle of diffraction at which the first minima will occur is (*degrees*).

Q23. A solid circular disc of mass 60 kg rolls along a horizontal floor so that its center of mass has a speed of 0.5 m s^{-1} . The absolute value of work done on the disc to stop it is _____ J.

Q24. The displacement of a particle executing Simple Harmonic Motion (SHM) is given by $x(t) = A \cos(\omega t + \phi)$, where A is the amplitude, ω is the angular frequency, and ϕ is the phase constant. The time period of motion is $T = \frac{2\pi}{\omega}$. The velocity of the particle at $t = 0$ is

Q25. If Rydberg's constant is R , the longest wavelength of radiation in the Paschen series will be $\alpha \frac{1}{R}$, where $\alpha = 144$.

Q26. Two soap bubbles of radius 3 cm and 5 cm, respectively, are in contact with each other. The radius of curvature of the common surface, in cm, is _____.

Q27. An electric field \vec{E} passes through a surface of area A with a unit vector \hat{n} . The electric flux Φ_E for that surface is given by the equation $\Phi_E = \vec{E} \cdot \hat{n}A$. If the electric field strength is 12 N/C and the area is 1 m^2 , what is the electric flux for that surface?

Q28. A body of mass m moving with a uniform speed v in a plane along the line at a distance r from the origin. The angular momentum L of the particle about the origin will be given by the expression $L = mvr$. What is the angular momentum of the particle about the origin if $m = 5 \text{ kg}, v = 12 \text{ m/s}$, and $r = 1 \text{ m}$?

Q29. A charge of $q = 2 \times 10^{-6} C$ is moving with a velocity of $v = 3 \times 10^5 m/s$ along the positive x -axis under a magnetic field of strength $B = 0.5 T$. The force acting on the charge is given by $F = qvB \sin \theta$, where θ is the angle between the velocity and the magnetic field direction. If the angle $\theta = 90^\circ$, the value of F is

Chemistry

Section A: Multiple Choice Questions (MCQ)

Q30. Which of the following species is unable to act as an oxidizing agent?

- (A) $N\{3\}^{-}$
- (B) $SO\{4\}^{2-}$
- (C) $BrO\{3\}^{-}$
- (D) $MnO\{4\}^{-}$

Q31. The solubility of calcium phosphate (molecular mass, M) in water is W g per 100 mL at a temperature of $25^\circ C$. The solubility product at this temperature will be approximately.

10 7 W M 3 10 7 W M 5 10 3 W M 5 10 5 W M 5

When phenol is reacted with chloroform in the presence of sodium hydroxide, which is then hydrolyzed in the presence of an acid, the resulting product is

- (A) Salicyclic acid
- (B) Benzene-1,2-diol
- (C) Benzene-1, 3-diol
- (D) 2-Hydroxybenzaldehyde

The method of purification that relies on the following physical change is:

- (A) Distillation
- (B) Extraction
- (C) Sublimation
- (D) Crystallization

Among the following solutions, the one that exhibits the greatest depression in freezing point or the lowest freezing point is

- (A) 180 g of acetic acid dissolved in 1 L of aqueous solution.
- (B) 180 g of acetic acid dissolved in benzene
- (C) 180 g of benzoic acid dissolved in benzene
- (D) 180 g of glucose dissolved in water

What is the IUPAC designation for the hydrocarbon provided below?

- (A) 2-Ethyl-3,6-dimethylheptane
- (B) 2,5,6-Trimethyloctane
- (C) 3,4,7-Trimethyloctane
- (D) 2-Ethyl-2,6-diethylheptane

The atomic mass of $^{12}_6C$ is 12.000000 u, while that of $^{13}_6C$ is 13.003354 u. The energy required to remove a neutron from $^{13}_6C$, given that the mass of a neutron is 1.008665 u, will be:

- (A) 62.5 MeV

- (B) 6.25MeV
- (C) 4.95MeV
- (D) 49.5MeV

The translational degrees of freedom and rotational degrees of freedom of a diatomic molecule are:

- (A) 3
- (B) 2
- (C) 1
- (D) 0

The characteristic that is consistent for molecules of all gases at a specific temperature is:

- (A) kinetic energy
- (B) momentum
- (C) mass
- (D) speed

Identify the four quantum numbers corresponding to the electron located in the outermost orbital of potassium (atomic number 19).

- (A) $n = 4, l = 2, m = -1, s = + \frac{1}{2}$
- (B) $n = 4, l = 0, m = 0, s = + \frac{1}{2}$
- (C) $n = 3, l = 0, m = -1, s = + \frac{1}{2}$
- (D) $n = 2, l = 0, m = 0, s = + \frac{1}{2}$

The following two statements are provided: Statement I: Aniline reacts with concentrated H_2SO_4 and is subsequently heated at $453 - 473\text{ K}$ to produce p-aminobenzene sulfonic acid, which exhibits a blood red color in the 'Lassaigne's test'. Statement II: In Friedel-Craft's alkylation and acylation processes, aniline forms a salt with the $AlCl_3$ catalyst. Consequently, the nitrogen in aniline gains a positive charge and behaves as a deactivating group. Based on the statements above, select the correct answer from the options listed below:

- (A) Statement I is false but statement II is true
- (B) Both statement I and statement II are false
- (C) Statement I is true but statement II is false
- (D) Both statement I and statement II are true

The following two statements are presented: Statement (I): The fusion of a certain compound with an oxidizing agent results in a dark green product. Statement (II): The manganate ion undergoes electrolytic oxidation in an alkaline environment to produce the permanganate ion. Based on the statements above, select the accurate answer from the options provided 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

The yellow compound of lead chromate dissolves when treated with a hot solution. The resulting lead product is a:

- (A) Tetraanionic complex with coordination number six
- (B) Neutral complex with coordination number four
- (C) Dianionic complex with coordination number six
- (D) Dianionic complex with coordination number four

The quantity of moles of methane needed to generate after complete combustion is: (Given the molar mass of methane in)

- (A) 0.35
- (B) 0.5
- (C) 0.75
- (D) 0.25

Below are two assertions: Assertion (I): An aqueous solution of ammonium carbonate exhibits basic properties. Assertion (II): The acidic or basic characteristics of a salt solution derived from a weak acid and a weak base are influenced by the values of the acid and the base that form it. Based on the statements above, select the most suitable answer from the choices provided below:

- (A) Both Statement I and Statement II are correct
- (B) Statement I is correct but Statement II is incorrect
- (C) Both Statement I and Statement II are incorrect
- (D) Statement I is incorrect but Statement II is correct

Which of the following oxidation reactions are performed by both species in an acidic environment? A. B. C. D. E. Select the correct answer from the options provided below:

- (A) C, D and E Only
- (B) B, C and D Only
- (C) A, D and E Only
- (D) A, B and C Only

The accurate statement concerning the nucleophilic substitution reaction in a chiral alkyl halide is;

- (A) Retention occurs in reaction and inversion occurs in reaction.
- (B) Racemisation occurs in reaction and retention occurs in reaction.
- (C) Racemisation occurs in both and reactions.
- (D) Racemisation occurs in reaction and inversion occurs in reaction.

The element that does not exhibit a variable oxidation state is:

- (A) Bromine
- (B) Iodine
- (C) Chlorine
- (D) Fluorine

The scent of blossoms is attributed to the existence of certain steam volatile organic compounds known as essential oils. Typically, these compounds are insoluble in water at ambient temperature, yet they can mix with water vapor in the vapor phase. An appropriate technique for extracting these oils from the flowers is:

- (A) crystallisation
- (B) distillation under reduced pressure
- (C) distillation
- (D) steam distillation

Determine the quantity of complexes from the list below that possess an even count of unpaired electrons. [Provided atomic numbers:]

- (A) 2
- (B) 1
- (C) 4
- (D) 5

Section B: Integer Type Questions

Q50. In the Claisen-Schmidt reaction to prepare dibenzalacetone using acetone, the amount of benzaldehyde required is _____ g. (Nearest integer)

Q51. The number of species from the following in which the central atom uses sp^3 hybrid orbitals in its bonding is _____. NH_3 , SO_2 , SiO_2 , $BeCl_2$, CO_2 , H_2O , CH_4 , BF_3

Q52. was taken in a 1 L reaction vessel and allowed to undergo the following reaction at 600 K. The total pressure at equilibrium was found to be 22.45 bar. Then, _____ [nearest integer] Assume to behave ideally under these conditions. Given: bar

Q53. The total number of hydrogen atoms in product A and product B is

Q54. The molar mass of the water insoluble product formed from the fusion of chromite ore with sodium carbonate in the presence of air is _____.

Q55. The total number of carbon atoms present in tyrosine, an amino acid, is _____. Tyrosine has the molecular formula $C_9H_{11}N_1O_3$.

Q56. The number of oxygen atoms present in the chemical formula of fuming sulphuric acid, which is represented as $H_2S_2O_7$, is

Q57. A single Faraday of electric charge releases $x \times 10^{-1}$ gram atoms of copper from copper sulfate, where x is

Q58. The total count of essential amino acids from the provided list of amino acids is _____ Arginine, Phenylalanine, Aspartic acid, Cysteine, Histidine, Valine, Proline

Q59. What is the total count of optical isomers present in the compound given below? _____

Mathematics

Section A: Multiple Choice Questions (MCQ)

Q60. If the domain of the function is $[0, 10]$, then $f(5)$ is equal to:

- (A) 25
- (B) 50
- (C) 20
- (D) 30

Q61. Consider a point in the $-plane$ that is equidistant from three points A and B and C. Let D and E be defined as well. Among the following statements, (S1): triangle ABE is an isosceles right angled triangle, and (S2): the area of triangle ABE is A.

- (A) both are true
- (B) only (S2) is true
- (C) only (S1) is true
- (D) both are false

Q62. Let a be the term of an A.P. If $a_5 = 98$, and $d = 14$, then a_{10} is equal to

- (A) 126
- (B) 112
- (C) 140
- (D) 154

Q63. Let the area of the region enclosed by the curves be $A = 154$. Then A is equal to

- (A) 154
- (B) 144
- (C) 134
- (D) 164

Q64. If the value of x is 5, where x and y are natural numbers and $y = 10$, then $x + y$ is equal to :

- (A) 15
- (B) 12
- (C) 14
- (D) 17

Q65. Let $f(x) = x + 5 \cdot 2x - \frac{1}{2}, x \in [-5, 5]$. If M and m are the maximum and minimum values of f , respectively in $[-5, 5]$, then the value of $M - m$ is:

- (A) 850
- (B) 700
- (C) 900
- (D) 150

Q66. If the set of equations possesses an infinite number of solutions, then it is equal to:

- (A) 51
- (B) 45
- (C) 47
- (D) 49

Q67. Consider the function $f(x) = 2x^2 + 5x - 3$, where $x \in R$. If m and n represent the count of points at which f is neither continuous nor differentiable, what is the value of $m + n$?

- (A) 5
- (B) 2
- (C) 0
- (D) 3

Q68. Let the circles with centers at points A and B touch each other externally at the point P . If the point P divides the line segment joining the centers of the circles A and B internally in the ratio $m : n$, where $m = 1$ and $n = 2$, then the length of the line segment AB equals

- (A) 125
- (B) 130
- (C) 110

(D) 145

Q69. If $x = 2$ and $y = 4$, then what is the value of $\frac{y}{x}$?

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

Q70. Examine the matrix. Below are two assertions: Statement I: is the inverse of the matrix. Statement II: . Based on the aforementioned assertions, select the correct option from those provided below.

- (A) Statement I is false but Statement II is true
- (B) Both Statement I and Statement II are false
- (C) Statement I is true but Statement II is false
- (D) Both Statement I and Statement II are true

Q71. Consider the functions $f : R \rightarrow R$ and $g : R \rightarrow R$ defined as $f(x) = \begin{cases} \log_e x, & x > 0 \\ e^{-x}, & x \leq 0 \end{cases}$ and $g(x) = \begin{cases} x, & x \geq 0 \\ e^x, & x < 0 \end{cases}$. Then, the composition $g \circ f : R \rightarrow R$ is:

- (A) one-one but not onto
- (B) neither one-one nor onto
- (C) onto but not one-one
- (D) both one-one and onto

Q72. Given that the domain of the function is defined, what is the value of the function?

- (A) 100
- (B) 95
- (C) 97
- (D) 98

Q73. Consider the equation, where represents the constant of integration. Then the value of is:

- (A) 7
- (B) 4
- (C) 1
- (D) 3

Q74. If $\pi \int_0^\pi \cos(4x) dx = a\pi + b\sqrt{3}$, where a and b are rational numbers, what is the value of $9a + 8b$?

- (A) 2
- (B) 1
- (C) 3
- (D) 3/2

Q75. Consider the function $g(x) = 3fx^3 + f(3-x)$, where $f''(x) > 0$ for all $x \in (0, 3)$. If g is decreasing on the interval $(0, \alpha)$ and increasing on the interval $(\alpha, 3)$, then the value of 8α is

- (A) 24
- (B) 0
- (C) 18
- (D) 20

Q76. Evaluate the limit as x approaches 0 for the expression $\frac{e^{2 \sin x} - 2 \sin x - 1}{x^2}$.

- (A) is equal to -1
- (B) does not exist
- (C) is equal to 1
- (D) is equal to 2

Q77. How many critical points does the function possess?

- (A) 1
- (B) 2
- (C) 0
- (D) 3

Q78. If the variance of the frequency distribution is 225, then the value of is 15

- (A) 15
- (B) 14
- (C) 16
- (D) 13

Q79. The result of the integral $\int_0^1 (2x^3 - 3x^2 - x + 1) dx$ is equal to:

- (A) 0
- (B) 1
- (C) 2
- (D) -1

Section B: Integer Type Questions

Q80. Consider the vertices $A(-2, -1), B(1, 0), C(\alpha, \beta)$, and $D(\gamma, \delta)$ of a parallelogram $ABCD$. If point C satisfies the equation $2x - y = 5$ and point D satisfies the equation $3x - 2y = 6$, what is the sum of $\alpha + \beta + \gamma + \delta$?

Q81. Consider a line passing through the points $(2, 3)$ and $(4, 7)$. If the mirror image of the point $(6, 5)$ in the line is (x, y) , then x is equal to

Q82. If the function $f(x) = 3x + 2$ is evaluated at $x = 155$, then the result is equal to

Q83. Let a, b, c be in an arithmetic progression of positive terms. Let $a = 10$ and $c = 30$. If b is the middle term, then b is equal to _____.

Q84. Given that , and , where , what is equal to _____

Q85. If r_1 and r_2 are the roots of the quadratic equation $x^2 - 7x + 6 = 0$, then $r_1 + r_2$ is equal to

Q86. If $f(x) = \int(3x^2 + 2) dx + C$, where C is the constant of integration, then the value of $f(2)$ is

Q87. If the variance σ^2 of the data $x_i = 0, 1, 5, 6, 10, 12, 17$ with frequencies $f_i = 3, 2, 3, 2, 6, 3, 3$ is k , then the value of k is $\lfloor k \rfloor$ where $\lfloor . \rfloor$ denotes the greatest integer function.

Q88. Let a be the first term and d be the common difference of an Arithmetic Progression (AP) such that the sum of the first n terms is $S_n = n \frac{a}{2} (2a + (n-1)d)$. If the sum of the first 20 terms is 11132, then the common difference d is equal to

Answer Key

Physics

Section A (MCQ):

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

Section B (Integer):

Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29
58	1	30	6	10	144	4	12	60	32

Chemistry

Section A (MCQ):

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

Section B (Integer):

Q51	Q52	Q53	Q54	Q55	Q56	Q57	Q58	Q59	Q60
318	4	962	10	160	9	7	5	4	32

Mathematics

Section A (MCQ):

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

Section B (Integer):

Q81	Q82	Q83	Q84	Q85	Q86	Q87	Q88	Q89
32	6	465	20	3660	6	7	29	400