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. The relation between time ' t ' and distance ' x ' is t= αx 2 + βx , where α and β are constants. The relation between acceleration a and velocity v is:

(A) a= - 2αv 3

(B) a= - 5αv 5

(C) a= - 3αv 2

(D) a= - 4αv 4

Q2. The speed of sound in oxygen at S.T.P. will be approximately: (Given, R= 8.3 J K -1 , γ= 1.4)

(A) 310 m s^-1

(B) 333 m s^-1

(C) 341 m s^-1

(D) 325 m s^-1

Q3. In the given electromagnetic wave , intensity of the associated light beam is (in : (Given)

(A) 243

(B) 729

(C) 972

(D) 486

Q4. The position of the image formed by the combination of lenses is :

(A) (right of second lens)

(B) (left of third lens)

(C) (left of second lens)

(D) (right of third lens)

Q5. 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

Q6. Monochromatic light of frequency 6 x 10^{14} Hz is produced by a laser. The power emitted is 2×10^{-3} W . How many photons per second on an average, are emitted by the source? (Given h = 6.63×10^{-34} J s)

(A) $9 \times 10/18$

(B) $6 \times 10/15$

(C) $5 \times 10/15$

(D) $7 \times 10/16$

Q7. For the thin convex lens, the radii of curvature are at and respectively. The focal length the lens is . The refractive index of the material is :

(A) 1.2

(B) 1.8

(C) 1.5

(D) 1.4

Q8. A coil is placed perpendicular to a magnetic field of 5000 T . When the field is changed to 3000 T in 2 s , an induced emf of 22 V is produced in the coil. If the diameter of the coil is 0.02 m , then the number of turns in the coil is:

(A) 7

(B) 70

(C) 35

(D) 140

Q9. The de Broglie wavelengths of a proton and an α particle are λ and 2λ respectively. The ratio of the velocities of proton and α particle will be :

(A) 1 : 8

(B) 1 : 2

(C) 4 : 1

(D) 8 : 1

Q10. A transformer has an efficiency of 80% and works at 10 V and 4 kW . If the secondary voltage is 240 V, then the current in the secondary coil is:

(A) 1.59 A

(B) 13.33 A

(C) 1.33 A

(D) 15.1 A

Q11. In an experiment with photoelectric effect, the stopping potential,

(A) increases with increase in the intensity of the incident light

(B) decreases with increase in the intensity of the incident light

(C) increases with increase in the wavelength of the incident light

(D) is times the maximum kinetic energy of the emitted photoelectrons

Q12. The dimensional formula of angular impulse is :

(A) [M L - 2 T - 1]

(B) [M L 2 T - 2]

(C) [M L T - 1]

(D) [M L 2 T - 1]

Q13. A ball suspended by a thread swings in a vertical plane so that its magnitude of acceleration in the extreme position and lowest position are equal. The angle (θ) of thread deflection in the extreme position will be :

(A) tan(-1) ($\sqrt{}$2)

(B) 2tan -11/2

(C) tan(-11)/2

(D) 2tan -1 1 $\sqrt{}$ 5

Q14. 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

Q15. The minimum energy required by a hydrogen atom in ground state to emit radiation in Balmer series is nearly :

(A) 1.5 eV

(B) 13.6 eV

(C) 1.9 eV

(D) 12.1 eV

Q16. A coin is placed on a disc. The coefficient of friction between the coin and the disc is μ . If the distance of the coin from the center of the disc is r , the maximum angular velocity which can be given to the disc, so that the coin does not slip away, is :

(A) μg r

(B) $\sqrt{}$ r μg

(C) $\sqrt{}$ μg r

(D) μ $\sqrt{}$ rg

Q17. The width of one of the two slits in Young's double slit experiment is d while that of the other slit is . If the ratio of the maximum to the minimum intensity in the interference pattern on the screen is then what is the value of ? (Assume that the field strength varies according to the slit width.)

(A) 4

(B) 5

(C) 3

(D) 2

Q18. In a plane EM wave, the electric field oscillates sinusoidally at a frequency of 5 x 10^{10} Hz and an amplitude of 50 V m - 1 . The total average energy density of the electromagnetic field of the wave is : [Use ε 0 = 8.85 × 10 - 12 C 2 N^{-}1m^{-}2]

1.106 × 10 - 8 J m - 3 4.425 × 10 - 8 J m - 3 2.212 × 10 - 8 J m - 3 2.212 × 10 - 10 J m - 3

Given below are two statements: Statement I : If a capillary tube is immersed first in cold water and then in hot water, the height of capillary rise will be smaller in hot water. Statement II : If a capillary tube is immersed first in cold water and then in hot water, the height of capillary rise will be smaller in cold water. In the light of the above statements, choose the most appropriate from the options given below

(A) Both Statement I and Statement II are true

(B) Both Statement I and Statement II are false

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

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

When a polaroid sheet is rotated between two crossed polaroids then the transmitted light intensity will be maximum for a rotation of :

(A) 60°

(B) 30°

(C) 90°

(D) 45°

Section B: Integer Type Questions

Q21. The displacement and the increase in the velocity of a moving particle in the time interval of to are and , respectively. The distance travelled by the particle in is _____ .

Q22. A horizontal straight wire long extending from east to west falling freely at right angle to horizontal component of earth's magnetic field . The instantaneous value of emf induced in the wire when its velocity is is _____ .

Q23. Small water droplets of radius are formed in the upper atmosphere and falling with a terminal velocity of . Due to condensation, if 8 such droplets are coalesced and formed a larger drop, the new terminal velocity will be _____ .

Q24. A force displaces a body from to . Work done by this force is _____ .

Q25. A body starts falling freely from height H hits an inclined plane in its path at height . As a result of this perfectly elastic impact, the direction of the velocity of the body becomes horizontal. The value of H for which the body will take the maximum time to reach the ground is .

Q26. Two coherent monochromatic light beams of intensities I and are superimposed. The difference between maximum and minimum possible intensities in the resulting beam is . The value of is

.

Q27. The electric field between the two parallel plates of a capacitor of capacitance drops to one third of its initial value in when the plates are connected by a thin wire. The resistance of this wire is _____ . (Given,)

Q28. A coil having 100 turns, area of , carrying current of is placed in uniform magnetic field of such a way that plane of coil is perpendicular to the magnetic field. The work done in turning the coil through is _____ .

Q29. A body of mass thrown horizontally with velocity from the top of the tower of height touches the ground at a distance of from the foot of the tower. A body of mass thrown at a velocity from the top of the tower of height will touch the ground at a distance of _____ .

Q30. A body falling under gravity covers two points A and B separated by 80 m in 2 s . The distance of upper point A from the starting point is _____ m . Use g = 10 m s^-2

Chemistry

Section A: Multiple Choice Questions (MCQ)

Q31. The metal atom present in the complex MABXL (where A, B, X and L are unidentate ligands and is metal) involves hybridization. The number of geometrical isomers exhibited by the complex is:

(A) 2

(B) 0

(C) 4

(D) 3

Q32. Match List - I with List - II. Choose the correct answer from the options given below :

(A) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)

(B) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)

(C) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)

(D) (A)-(II), (B)-(IV), (C)-(III), (D)-(I)

Q33. 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

Q34. A diatomic gas (γ= 1.4) does 200 J of work when it is expanded isobarically. The heat given to the gas in the process is :

(A) 850 J

(B) 800 J

(C) 600 J

(D) 700 J

Q35. The correct sequence of electron gain enthalpy of the elements listed below is A. Ar B. Br C. F D. S Choose the most appropriate from the options given below:

(A) C > B > D > A

(B) A > D > B > C

(C) A > D > C > B

(D) D > C > B > A

Q36. Choose the correct statements about the hydrides of group 15 elements. A. The stability of the hydrides decreases in the order NH 3 > PH 3 > AsH 3 > SbH 3 > BiH 3 B. The reducing ability of the hydrides increases in the order NH 3 < PH 3 < AsH 3 < SbH 3 < BiH 3 C. Among the hydrides, NH 3 is strong reducing agent while BiH 3 is mild reducing agent. D. The basicity of the hydrides increases in the order NH 3 < PH 3 < AsH 3 < SbH 3 < BiH 3 Choose the most appropriate from the option given below:

(A) B and C only

(B) C and D only

(C) A and B only

(D) A and D only

Q37. Number of Complexes with even number of electrons in orbitals is -

(A) 2

(B) 3

(C) 1

(D) 5

Q38. 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

Q39. If (diamond (graphite diamond C (graphite) at constant temperature. Then

(A) X=-Y+Z

(B) -X=Y+Z

(C) X=Y+Z

(D) X=Y-Z

Q40. The equation of state of a real gas is given by P+ a V 2 (V- b) = RT , where P, V and T are pressure, volume and temperature respectively and R is the universal gas constant. The dimensions of a b 2 is similar to that of :

(A) PV

(B) P

(C) RT

(D) R

Q41. Methods used for purification of organic compounds are based on :

(A) nature of compound and presence of impurity.

(B) neither on nature of compound nor on the impurity present.

(C) nature of compound only.

(D) presence of impurity only.

Q42. Given below are two statements : Statement (I) : On nitration of m-xylene with followed by oxidation, 4-nitrobenzene-1,3-dicarboxylic acid is obtained as the major product. Statement (II) : group is o/p-directing while group is m-directing group. In the light of the above statements, choose the correct answer from the options given below : 2025 (29 Jan Shift 2)

(A) Both Statement I and Statement II are false

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

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

(D) Both Statement I and Statement II are true

Q43. Total number of nucleophiles from the following is :

(A) 7

(B) 4

(C) 6

(D) 5

Q44. Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R). Assertion (A) : and molecule have pyramidal shape with a lone pair of electrons on nitrogen atom. The resultant dipole moment of is greater than that of . Reason (R) : In , the orbital dipole due to lone pair is in the same direction as the resultant dipole moment of the bonds. is the most electronegative element. In the light of the above statements, choose the correct answer from the options given below :

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

(B) (A) is false but (R) is true

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

(D) (A) is true but is false

Q45. IUPAC name of following compound is

(A) 2 - Aminopentanenitrile

(B) 2 - Aminobutanenitrile

(C) 3 - Aminobutanenitrile

(D) 3 - Aminopropanenitrile

Q46. The reaction follows the mechanism The overall order of the reaction is :

(A) 2

(B) 2.5

(C) 3

(D) 1.5

Q47. The functional group that shows negative resonance effect is:

(A) -NH 2

(B) -OH

(C) -COOH

(D) -OR

Q48. Integrated rate law equation for a first order gas phase reaction is given by (where $P\ i$ is initial pressure and P t is total pressure at time t)

(A) k= 2.303 t $\times$ log $P\ i\ 2P\ i$ - P t

(B) k= 2.303 t $\times$ log $2P\ i\ 2P\ i$ - P t

(C) k= 2.303 t $\times$ log $2P\ i$ - P t $P\ i$

(D) k= 2.303 t $\times$ $P\ i\ 2P\ i$ - P t

Q49. 1.24 g of (molar mass) is dissolved in 1 kg of water to form a solution with boiling point of , while of (molar mass) in 2 kg of water constitutes a solution with a boiling point of . Which of the following is correct ?

(A) is fully ionised while is completely unionised.

(B) is completely unionised while is fully ionised.

(C) and (both) are completely unionised.

(D) and (both) are fully ionised.

Q50. 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

Section B: Integer Type Questions

Q51. Total number of electrons present in molecular orbitals of and is _ _ _ _ _ _ _ _.

Q52. The ionization energy of sodium in kJ mol - 1 . If electromagnetic radiation of wavelength 242 nm is just sufficient to ionize sodium atom is _ _ _ _ _ _.(nearest integer)

Q53. If of aniline is reacted with one equivalent of benzenediazonium chloride, the maximum amount of aniline yellow formed will be _ _ _ _ _ _ _ g. (nearest integer) (consider complete conversion).

Q54. Total number of optically active compounds from the following is _ _ _ _ _ _

Q55. Phthalimide is made to undergo following sequence of reactions. Total number of bonds present in product 'P' is/are _ _ _ _ _ _

Q56. Molality of solution (density) is _ _ _ _ _ _ _ . Round off your answer to the nearest integer.

Q57. Consider the following sequence of reactions. Total number of hybridised carbon atoms in the major product C formed is_ _ _ _ _ _ _ _ 2025 (23 Jan Shift 2)

Q58. Wavenumber for a radiation having wavelength is . The value of is _ _ _ _ _ _ _ _ (Integer answer)

Q59. Consider the following redox reaction: MnO 4 - + H + + H 2 C 2 O 4 Mn 2 + + H 2 O + CO 2 The standard reduction potentials are given as below E red ° E 0 MnO 4 - / Mn 2 + = + 1.51 V ; E 0 CO 2 / H 2 C 2 O 4 = - 0.49 V If the equilibrium constant of the above reaction is given as K eq = 10 x , then the value of x = $_{(nearestinteger)}$

Q60. Consider the following reactions The number of protons that do not involve in hydrogen bonding in the product is _ _ _ _ _ _.

Mathematics

Section A: Multiple Choice Questions (MCQ)

Q61. Let a be the sum of all coefficients in the expansion of (1 - $2x$+ $2x$ 2) 2023 (3 - $4x$ 2 + $2x$ 3) 2024 and b= lim x→0 $\int$ 0 x log1 + t t 2024 + 1 dt x 2 . If the equations cx 2 + dx+ e= 0 and 2bx 2 + ax+ 4 = 0 have a common root, where c, d, eR , then d : c : e equals

(A) 2 : 1 : 4

(B) 4 : 1 : 4

(C) 1 : 2 : 4

(D) 1 : 1 : 4

Q62. Consider the following two statements : Statement I : For any two non-zero complex numbers , Statement II : If are three distinct complex numbers and are three positive real numbers such that , then Between the above two statements,

(A) Statement I is correct but Statement II is incorrect.

(B) both Statement I and Statement II are correct.

(C) both Statement I and Statement II are incorrect.

(D) Statement I is incorrect but Statement II is correct.

Q63. Let fx= x-1, x is even, 2x, x is odd, xN . If for some aN, $fffa$= 21 , then lim x→a - x 3 a - x a , where t denotes the greatest integer less than or equal to t , is equal to:

(A) 121

(B) 144

(C) 169

(D) 225

Q64. Let α= (4!) ! (4!) 3! and β= (5!) ! (5!) 4! . Then :

(A) αN and βN

(B) αN and βN

(C) αN and βN

(D) αN and βN

Q65. Let a line pass through two distinct points and , and be parallel to the vector . If the distance of the point Q from the point is 5 , then the square of the area of is equal to :

(A) 148

(B) 136

(C) 144

(D) 140

Q66. Let and . Then the minimum value of is :

(A) 13

(B) 10

(C) 3

(D) 7

Q67. Let 3, a, b, c be in $A.$ $P.$ and 3, a-1, b+ 1, c+ 9 be in $G.$ $P.$ Then, the arithmetic mean of a, b and c is:

(A) -4

(B) -1

(C) 13

(D) 11

Q68. A software company sets up number of computer systems to finish an assignment in 17 days. If 4 computer systems crashed on the start of the second day, 4 more computer systems crashed on the start of the third day and so on, then it took 8 more days to finish the assignment. The value of is equal to:

(A) 150

(B) 180

(C) 160

(D) 125

Q69. Let be a function given by where . If is continuous at , then is equal to :

(A) 3

(B) 12

(C) 48

(D) 6

Q70. The least value of n for which the number of integral terms in the Binomial expansion of is 183, is :

(A) 2184

(B) 2196

(C) 2148

(D) 2172 2025 (29 Jan Shift 1)

Q71. Let P and Q be the points on the line $x+ 3\ 8 = y\text{-}4\ 2 = z+ 1\ 2$ which are at a distance of 6 units from the point R(1, 2, 3) . If the centroid of the triangle PQR is α, β, γ, then $\alpha\ 2 + \beta\ 2 + \gamma\ 2$ is:

(A) 26

(B) 36

(C) 18

(D) 24

Q72. If the value of is , where are natural numbers and , then is equal to :

(A) 40

(B) 52

(C) 50

(D) 54

Q73. Let $fx= 2x\ 2 + 5x\text{-}\ 3$, 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

Q74. Let $S= zC$: $z\text{-}1 = 1$ and $\sqrt{}2\ \text{-}1z+ \bar{}\ z\text{-}\ iz\text{-}\ \bar{}\ z= 2\sqrt{}2$. Let $z\ 1$, $z\ 2$ S be such that $z\ 1$ = max zs z and $z\ 2$ = min zs z . Then $\sqrt{}2z\ 1\ \text{-}z\ 2\ 2$ equals:

(A) 1

(B) 4

(C) 3

(D) 2

Q75. The function is

(A) one-one but not onto.

(B) both one-one and onto.

(C) onto but not one-one.

(D) neither one-one nor onto.

Q76. Let . Define a relation on as : Statement I : is an equivalence relation. Statement II : For some , the set represents a line parallel to . In the light of the above statements, choose the correct answer from the options given below :

(A) Both Statement I and Statement II are false

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

(C) Both Statement I and Statement II are true

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

Q77. Let . Let be a relation on defined by if and only if . Let be the number of elements in and be the minimum number of elements from that are required to be added to to make it a symmetric relation. Then is equal to :

(A) 25

(B) 24

(C) 26

(D) 23

Q78. Let be the term of an A.P. If for some , and , then is equal to

(A) 98

(B) 126

(C) 142

(D) 112

Q79. Let . If the system of equations has infinitely many solutions, then is equal to :

(A) 24

(B) 25

(C) 22

(D) 27

Q80. Let , where is the constant of integration. Then is equal to :

(A) 7

(B) 4

(C) 1

(D) 3

Section B: Integer Type Questions

Q81. The number of distinct real roots of the equation is_ _ _ _ _ _ _

Q82. Let the set of all positive values of , for which the point of local minimum of the function satisfies , be . Then is equal to _ _ _ _ _ _ _ _ _

Q83. Remainder when is divided by is equal to _ _ _ _ _.

Q84. If , where is the constant of integration, then the value of is_ _ _ _ _ _ _ _ _ _ _

Q85. If , where denotes the greatest integer less than or equal to and represents the fractional part of , then is equal to _ _ _ _ _ _

Q86. Let M denote the set of all real matrices of order and let . Let If , then equals _ _ _ _ _ _ _

Q87. Let the maximum and minimum values of be and , respectively. Then is equal to _ _ _ _ _ _ _ _ _

Q88. If , then is equal to _ _ _ _ _ _

Q89. Let be the lines passing through the point and touching the parabola . Let and be the points on the lines and such that the is an isosceles triangle with base . If the slopes of the lines are and , then is equal to _ _ _ _ _ _ _

Q90. Number of integral terms in the expansion of is equal to _ _ _ _ _ _.

Answer Key

Physics

Section A (MCQ):

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

Section B (Integer):

Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
175	3	40	58	2	8	4	100	100	45

Chemistry

Section A (MCQ):

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

Section B (Integer):

Q51	Q52	Q53	Q54	Q55	Q56	Q57	Q58	Q59	Q60
6	494	591	1	8	815	4	1724	338	12

Mathematics

Section A (MCQ):

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

Section B (Integer):

Q81	Q82	Q83	Q84	Q85	Q86	Q87	Q88	Q89	Q90
3	39	1	7	18	1613	1600	465	68	138