FIITJEE – JEE (Main)

Batches: 12th Studying & 12th Pass
PHYSICS, CHEMISTRY & MATHEMATICS
Mock Test – II
QP Code:

Time Allotted: 3 Hours **Maximum Marks: 300**

- Do not open this Test Booklet until you are asked to do so.
- Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

Important Instructions:

A. General Instructions

1. Immediately fill in the particulars on this page of the Test Booklet with *Blue / Black Ball Point Pen. Use of pencil is strictly prohibited.*
2. The Answer Sheet is kept inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars carefully.
3. The test is of **3 hours** duration.
4. The Test Booklet consists of 75 questions. The maximum marks are 30**0**.
5. This question paper contains **Three Parts**.
6. Part-**I** is Physics, Part-**II** is Chemistry and Part-**III** is Mathematics.
7. Each Part has only one section: Section - A.
8. Rough spaces are provided for rough work inside the question paper. No additional sheets will be provided for rough work.
9. Blank Papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.
10. Use ***Blue / Black Ball Point Pen only*** for writing particulars / marking responses on ***Side-1*** and ***Side-2*** of the Answer Sheet. ***Use of pencil is strictly prohibited.***
11. No candidate is allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, any electronic device, etc. except the Admit Card inside the examination hall / room.
12. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room / Hall. ***However, the candidates are allowed to take away this Test Booklet with them.***
13. **Do not fold or make any stray marks on the Answer Sheet.**

B. Marking Scheme For All Three Parts.

(i) **Section-A (01 – 20, 26 – 45, 51 – 70)** *contains 60 multiple choice questions which have* ***only one correct answer****. Each question carries* ***+4 marks*** *for correct answer and* ***–1 mark*** *for wrong answer.*

Section-A (21 – 25, 46 – 50, 71 – 75) *contains 15* Numerical based questions, the answer of which maybe positive or negative numbers or decimals and each question carries **+4 marks** for correct answer. **There is no negative marking.**

Name of the Candidate (in Capital Letters) :_____

Enrolment Number :_____

Batch :_____ **Date of Examination :** _____

PART – I: PHYSICS

Section – A: Single Correct Answer Type

This section contains **20 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE is correct.**

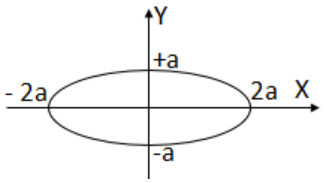
1. A given object takes m times as much time to slide down a 45^0 rough incline as it takes to slide down a perfectly smooth 45^0 incline. The coefficient of kinetic friction between the object and the incline is given by

(A) $u_k = \frac{1}{1-m^2}$ (B) $u_k = 1-\frac{1}{m^2}$ (C) $u_k = \sqrt{1-\frac{1}{m^2}}$ (D) $u_k = \sqrt{\frac{1}{1-m^2}}$

2. 10^{-3} W of 5000 A light is directed on a photoelectric cell. If the current in the cell is 0.16 μA, the percentage of incident photons which produce photoelectrons, is

(A) 0.4% (B) 0.04% (C) 20% (D) 10%

3. A particle under the influence of two SHM's moves in XY plane along a path shown in the adjacent figure.



4 statements are given below:

(i) the motion has the same frequency in X and Y direction

(ii) phase difference between X and Y motions is $\frac{\pi}{4}$

(iii) its maximum velocity in Y direction is twice that in X direction

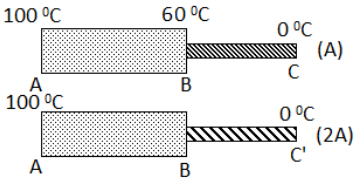
(iv) its total energy due to motion in X direction is four times that due to motion in Y direction.

Choose the **correct** option related to which statement(s) is/are correct?

(A) only (i) and (iv) are correct (B) only (ii) and (iii) are correct

(C) only (i) and (ii) are correct (D) all statements are correct

4. Two metallic rods AB and BC of different materials are joined together at the junction B (see figure). It is observed that if the ends A and C are kept at 100 ^{0}C and 0 ^{0}C respectively, the temperature of the junction B is 60 ^{0}C. there is no loss of heat to the surroundings. The rod BC is replaced by another rod BC' of the same material and length (BC = BC'). If the area of cross – section of BC' is twice that of BC and the ends A and C' are maintained at 100 ^{0}C and 0 ^{0}C respectively, the temperature of the junction B will be nearly



(A) 29 ^{0}C (B) 33 ^{0}C (C) 60 ^{0}C (D) 43 ^{0}C

5. A small charged ball of mass m and charge q is suspended from the highest point of a ring of radius R by means of an insulated cord of negligible mass. The ring is made of a rigid wire of negligible cross – section and lies in a vertical plane. On the ring, there is uniformly distributed charge Q of the same sign as that of q. Determine the length of the cord so as the equilibrium position of the ball lies on the symmetry axis, perpendicular to the plane of the ring.

(A) $\left(\frac{2kQqR}{mg}\right)^{1/3}$ (B) $\left(\frac{kQqR}{mg}\right)^{1/3}$ (C) $\left(\frac{kQqR}{2mg}\right)^{1/3}$ (D) $\left(\frac{kQqR}{mg}\right)^{3}$

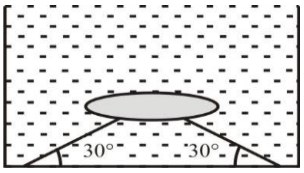
Space for rough work

6. An unpolarised light of intensity 32 W/m^2 passes through three polarisers, such that the transmission axis of last polariser is crossed with that of that of the first.
If the intensity of emergent light is 3 W/m^2, then the angle between the teansmission axes of the first two polarisers is
(A) 30^0 (B) 19^0 (C) 45^0 (D) 90^0

7. An organ pipe of length L is open at one end and closed at other end. The air column in the pipe is vibrating in second overtone. The minimum distance from the open end where the pressure amplitude is half of the maximum value is
(A) L/4 (B) L/8 (C) L/12 (D) L/15

8. A string of length 2L, obeying Hooke's Law, is stretched so that its extension is L. The speed of the transverse wave travelling on the string is v. If the string is further stretched so that the extension in the string becomes 4L. The speed of transverse wave travelling on the string will be.
(A) $\sqrt{2}v$ (B) v (C) $2\sqrt{2}v$ (D) 2v

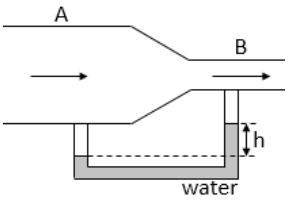
9. A hollow object of volume V is immersed in a tank. The object is tied to the bottom of the tank by two wires which make an angle $30°$ with the horizontal as shown in figure. The object would float if it was set free and one fourth volume is immersed in liquid of density ρ_0 .The tension in the wire is



(A) $\frac{V\rho_o g}{4}$ (B) $\frac{3V\rho_o g}{4}$

(C) $\frac{5V\rho_o g}{4}$ (D) $V\rho_o g$

10. Air is blown through a pipe AB at a rate of 15 liters per minute. The cross – sectional area of the broad portion of the pipe is 2 cm^2 and that of the narrow portion is 0.5 cm^2. The difference in water level h is (ρ_{air} = 1.32 kg/m^3)

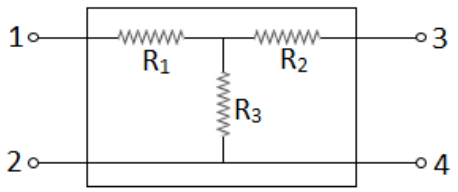


(A) 16 mm (B) 1.6 mm
(C) 10 mm (D) 3.2 mm

11. A parallel plate capacitor has plate area A and separation d. It is charged to a potential difference V_0. The charging battery is disconnected and the plates are pulled apart to three times the initial separation. The work required to separate the plates is
(A) $\frac{3\varepsilon_o AV_0^2}{d}$ (B) $\frac{\varepsilon_o AV_0^2}{2d}$ (C) $\frac{\varepsilon_o AV_0^2}{3d}$ (D) $\frac{\varepsilon_o AV_0^2}{d}$

Space for rough work

12. If voltage is applied between terminals 1 and 2 when terminals 3 and 4 are open, the power liberated is P_1 = 40W and when terminals 3 and 4 are connected, the power liberated is P_2 = 80W. If the same source isc onnected to the terminals 3 and 4, the power liberated in the circuit when terminals 1 and 2 are open is P_3 = 20W. Determine the power P_4 consumed in the circuit when the terminals 1 and 2 are connected and the same voltage is applied between the terminals 3 and 4.

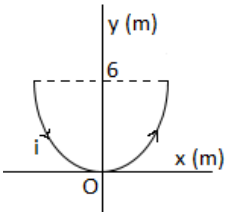


(A) 40 W (B) 80 W (C) 20 W (D) zero

13. The magnetic field at a point midway between 2 parallel long wires carrying currents in the same direction is 10 μT. If the direction of the smaller current is reversed, the field becomes 30 μT. The ratio of the larger current to the smaller current is

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

14. A wire bent as a parabolic curve and placed in the x – y plane. The curve can be described by the equation $x^2 = 6y$. The wire carries a current I = 2A. If a uniform magnetic field $\vec{B} = 2\times10^{-3}\,\hat{k}$ Tesla is now applied, force experienced by the wire is nearly (in Newton)?



(A) $-0.05\,\hat{j}$ (B) $-0.5\,\hat{j}$

(C) $-0.05\,\hat{i}$ (D) $-0.5\,\hat{k}$

15. An equiconvex lens of refractive index $\frac{3}{2}$ and focal length 10 cm is held with its axis vertical and its lower surface immersed in water $\left(\mu = \frac{4}{3}\right)$, the upper surface being in air. At what distance from the lens, will a vertical beam of parallel light incident on the lens be focused?

(A) 20 cm (B) 30 cm (C) 10 cm (D) 5 cm

16. A parallel beam of sodium light of wavelength 5890 Å is incident on a thin glass plate of refractive index 1.5 such that the angle of refraction in the plate is 60^0. The smallest thickness of the plate which will make it dark by reflection is

(A) 5980 Å (B) 7856 Å (C) 1964 Å (D) 3928 Å

17. The electron in a hydrogen atom make a transition from an excited state to the ground state. Which of the following statement is true?

(A) Its kinetic energy increases and its potential and total energies decrease

(B) Its kinetic energy decreases, potential energy increases and its total energy remains the same.

(C) Its kinetic and total energies decrease and its potential energy increases.

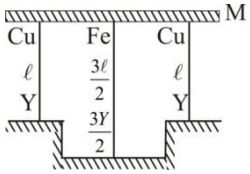
(D) Its kinetic potential and total energies decreases

Space for rough work

18. The radioactive sources A and B of half-lives of2 hr and 4 hr respectively, initially contain the same number of radioactive atoms. At the end of 2 hours, their rates of disintegration are in the ratio:
(A) $4:1$ (B) $2:1$ (C) $\sqrt{2}:1$ (D) $1:1$

19. In a Coolidge tube experiment, the minimum wavelength of the continuous X-ray spectrum is equal to 66.3 pm, then
(A) electrons accelerate through a potential difference of 12.75 kV in the Coolidge tube
(B) electrons accelerate through a potential difference of 18.75 kV in the Coolidge tube
(C) de-Broglie wavelength of the electrons reaching the anti-cathode is of the order of 10 μm.
(D) de-Broglie wavelength of the electrons reaching the anticathode is 0.01 Å.

20. A heavy, uniform metallic bar of mass M is being supported by three rods as shown. Area of cross – section of all the three rods are same and equal to A. the lengths and Young's modulus of the rods are indicated. Assuming that the bar always remains horizontal, find the stress developed in each rod



(A) $\frac{Mg}{3A}$ (B) $\frac{Mg}{A}$ (C) $\frac{2Mg}{3A}$ (D) $\frac{3Mg}{A}$

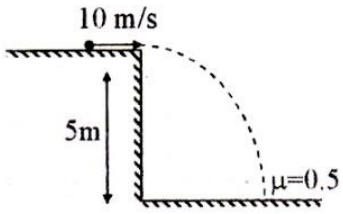
Section – A
Numerical based questions

21. A point mass is projected from origin with certain speed at a certain angle with horizontal. When the particle is at point (8m, 6m), its velocity is perpendicular to direction of initial velocity. If the initial speed of projection is $k \times \pi$, then value of 'k' is [given $g = \pi^2$ m/s^2]

22. A charged particle is projected in a magnetic field $\vec{B} = (x\hat{i} + 4\hat{j}) \times 10^{-2}$ T. The acceleration of the particle is found to be $\vec{a} = \left(\frac{8}{3}\hat{i} - 2\hat{j}\right) m/s^2$. Find the value of x. (Assume gravity free space).

23. An experiment measures quantities a, b, c and x is calculates from $x = ab/c^3$. If the maximum percentage error in a, b and c are 1 %, 1 % and 2 % respectively, the maximum percentage error in x will be

24. A small ball moving with a velocity 10m/s. horizontally (as shown in figure) strikes a rough horizontal surface having μ = 0.5. If the coefficient of restitution is e = 0.4. Horizontal component of velocity of ball after first impact will be ($g=10m/s^2$)



25. In an LCR circuit, the frequency of ac voltage source is adjusted such that X_L = 15 Ω and X_C = 11 Ω. The rms voltage of ac mains is 10 volt. If R = 3 Ω, the potential difference across the series combination of L and C is found to be?

Space for rough work

PART – II: CHEMISTRY

Section – A: Single Correct Answer Type

This section contains **20 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE is correct.**

26. The root mean square speed at STP for the gases H_2, N_2, O_2 and HBr are in the order
(A) $H_2 < N_2 < O_2 < HBr$ (B) $HBr < O_2 < N_2 < H_2$
(C) $H_2 < N_2 = O_2 < HBr$ (D) $HBr < O_2 < H_2 < N_2$

27. In a closed insulated container a liquid is stirred with a paddle to increase the temperature, which of following is true?
(A) $\Delta E = W \neq 0, q = 0$ (B) $\Delta E = W = 0, q \neq 0$
(C) $\Delta E = 0, W = q \neq 0$ (D) $W = 0, \Delta E = q \neq 0$

28. From the given reactions

$$S(s) + \frac{3}{2}O_2(g) \longrightarrow SO_3(g) + 2x\,kcal$$

$$SO_2(g) + \frac{1}{2}O_2(g) \longrightarrow SO_3(g) + y\,kcal$$

the heat of formation of SO_2 is
(A) (x + y) (B) (x – y)
(C) (2x + y) (D) (2x – y)

29. If the concentration of OH^- ions in the reaction, $Fe(OH)_3(s) \rightleftharpoons Fe^{3+}(aq) + 3OH^-(aq)$ is decreased by ¼ times, then equilibrium concentration of Fe^{3+} will increase by
(A) 8 times (B) 16 times
(C) 64 times (D) 4 times

30. Which one of the following salts will have the same value of van't Hoff factor (i) as that of $K_4[Fe(CN)_6]$?
(A) $Al_2(SO_4)_3$ (B) NaCl
(C) $Al(NO_3)_3$ (D) Na_2SO_4

31. For adsorption of a gas on a solid, the plot of $\log \frac{x}{m}$ vs log p is linear with slope equal to (n being a whole numbers)
(A) k (B) log k
(C) n (D) 1/n

32. Which of the following has $p\pi - d\pi$ bonding?
(A) NO_3^- (B) SO_3^{2-}
(C) BO_3^{3-} (D) CO_3^{2-}

space for rough work

33. The correct order of increasing thermal stability of $K_2CO_3, MgCO_3, CaCO_3$ and $BeCO_3$ is

(A) $BeCO_3 < MgCO_3 < K_2CO_3 < CaCO_3$ (B) $BeCO_3 < MgCO_3 < CaCO_3 < K_2CO_3$

(C) $MgCO_3 < BeCO_3 < CaCO_3 < K_2CO_3$ (D) $K_2CO_3 < MgCO_3 < CaCO_3 < BeCO_3$

34. Name the type of the structure of silicate in which one oxygen atom of $[SiO_4]^{4-}$ is shared?

(A) Sheet silicate (B) Pyrosilicate

(C) Three dimensional silicate (D) Linear chain silicate

35. Which of the following complex ions is diamagnetic in nature?

(A) $\left[Ni(CN)_4\right]^{2-}$ (B) $\left[CuCl_4\right]^{2-}$

(C) $\left[CoF_6\right]^{3-}$ (D) $\left[NiCl_4\right]^{2-}$

36. Which set gives yellow ppt.?

(A) KO_3, Sb_2S_3, CdS (B) Sb_2S_3, CdS, $PbCrO_4$

(C) $PbCrO_4$, As_2S_3, CdS (D) SnS_2, As_2S_3, $PbCrO_4$, PbO

37. Which of the following pair of metals are purified by van-Arkel method?

(A) Zr & Ti (B) Ag & Au

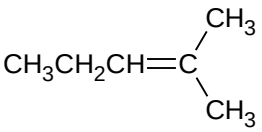
(C) Ni & Fe (D) Ga & In

38. The correct order of decreasing acidic strength of trichloroacetic acid (A), trifluoroacetic acid (B), acetic acid (C), formic acid (D) is

(A) B > A > D > C (B) B > D > C > A

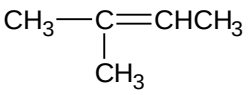
(C) A > B > C > D (D) A > C > B > D

39. Which alkene on ozonolysis gives CH_3CH_2CHO & $CH_3\overset{\overset{O}{\|}}{C}CH_3$?

(A) 

(B)

(C)

(D) 

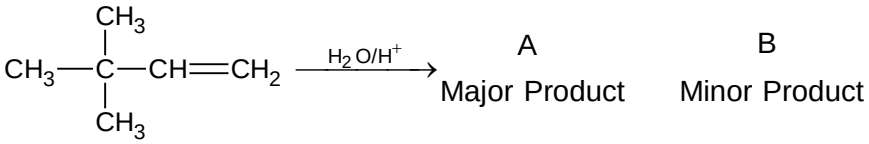
40. 2-bromopentane is heated with potassium ethoxide in ethanol. The major product obtained is

(A) 2-ethoxypentane (B) pentene – 1

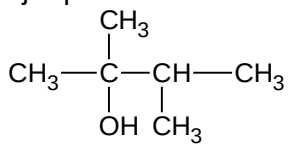
(C) trans-pentene -2 (D) cis-pentene-2

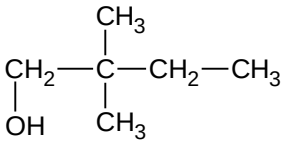
space for rough work

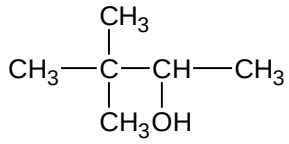
41. In the following reaction

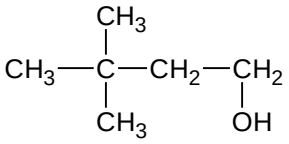


The major product A is

(A) 

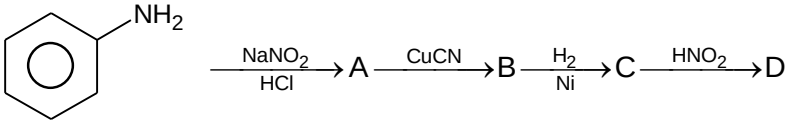
(B) 

(C) 

(D) 

42. Aldol condensation will not take place in
(A) HCHO (B) CH_3CHO (C) CH_3COCH_3 (D) CH_3CH_2CHO

43. Aniline in a set of reactions yielded a product



The structure of the product D would be
(A) $C_6H_5CH_2NH_2$ (B) $C_6H_5NHCH_2CH_3$ (C) C_6H_5NHOH (D) $C_6H_5CH_2OH$

44. Nylon-6,6 is a polyamide obtained by the reaction of
(A) $COOH(CH_2)_4COOH + H_2NC_6H_4NH_2$ – (p)
(B) $COOH(CH_2)_4COOH + NH_2(CH_2)_6NH_2$
(C) $COOH(CH_2)_6COOH + NH_2(CH_2)_4NH_2$
(D) $COOHC_6H_4COOH$ – (p) + $NH_2(CH_2)_6NH_2$

45. Which one of the following is employed as a tranquiliser?
(A) Equanil (B) Naproxen (C) Tetracycline (D) Chlorpheninamine

Section – A
Numerical based questions

46. The number of oxygen atoms in 4.4 g of CO_2 is $x \times 10^{23}$. Find the value of x.

47. In the fluorite structure, the coordination number of Ca^{2+} ions is

48. Reduction potential for the following half/cell reaction

$Zn \longrightarrow Zn^{2+} + 2e^-, \left(E^o_{(Zn^{2+}/Zn)} = -0.76V\right)$, $Fe \longrightarrow Fe^{2+} + 2e^-, \left(E^o_{Fe^{2+}/Fe} = -0.44V\right)$.

The standard EMF for the cell reaction $Fe^{2+} + Zn \longrightarrow Zn^{2+} + Fe$ will be

49. If 60% of a first order reaction was completed in 60 min, 50% of the same reaction would be completed in approximately (log 4 = 0.60, log 5 = 0.69) (in minutes)

50. Number of chiral carbon atoms in β - D – (+) – glucose is

space for rough work

PART – III: MATHEMATICS

Section – A: Single Correct Answer Type

This section contains **20 multiple choice questions.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE is correct.**

51. Let A = {1, 2, 3, 4} and R be a relation in A given by R = {(1, 1), (2, 2), (3,3), (4,4), (1,2),(3,1), (1,3)}. Then R is :
(A) Reflexive and transitive only (B) Transitive and symmetric only
(C) equivalence (D) reflexive only

52. Area bounded by the curves $y = x\ell nx$ and $y = 2x - 2x^2$ is
(A) $\frac{1}{12}$ (B) $\frac{5}{12}$ (C) $\frac{7}{12}$ (D) $\frac{11}{12}$

53. If $\int_0^1 \cot^{-1}(1 - x + x^2)\,dx = \lambda \int_0^1 \tan^{-1} x\,dx$ then 'λ' is equal to -
(A) 1 (B) 2 (C) 3 (D) 4

54. If $f(x) = \frac{1}{x^2 - 17x + 66}$, then $f\left(\frac{2}{x-2}\right)$ is discontinuous at x is equal to –
(A) $2, \frac{7}{3}, \frac{25}{11}$ (B) $2, \frac{8}{3}, \frac{24}{11}$ (C) $2, \frac{7}{3}, \frac{24}{11}$ (D) None of these

55. If a, b, c, are positive and system of equations ax + by+ cz = 0, bx + cy + az = 0, cx + ay + bz = 0 has non trival solutions. Then roots of the equation $at^2 + bt + c = 0$ are
(A) real and opposite in sign (B) both positive
(C) at least one positive (D) imaginary

56. If the centroid of a tetrahedron OABC where A, B, C are given by (a, 2,3), (1,b,2), (2,1, c) respectively be (1, 2,–1) then the distance of P(a, b, c) from the the origin O is
(A) $\sqrt{107}$ (B) $\sqrt{14}$ (C) $\frac{\sqrt{107}}{14}$ (D) $\frac{107}{\sqrt{14}}$

57. Let P(x) $P(x) = a_0 + a_1x^2 + a_2x^4 + ... + a_nx^{2n}$ be a polynomial in a real variable x with $0 < a_0 < a_1 < a_2 < .....a_n$. The function P(x) has
(A) neither a maxima nor minima (B) only one maxima
(C) only one maxima & minima (D) None of these

58. If $\vec{a}' = \hat{i} + \hat{j},\ \vec{b}' = \hat{i} - \hat{j} + 2\hat{k}$ & $\vec{c}' = 2\hat{i} + \hat{j} + \hat{k}$. The altitude of the parallelepiped formed by the vectors $\vec{a}, \vec{b}, \vec{c}$ having base formed by
$\vec{b}$ & $\vec{c}$ is ($\vec{a}, \vec{b}, \vec{c}$ and ($\vec{a}', \vec{b}', \vec{c}'$ are reciprocal systems of vectors)
(A) 1 (B) $\frac{3\sqrt{2}}{2}$ (C) $\frac{1}{\sqrt{6}}$ (D) $\frac{1}{\sqrt{2}}$

Space for rough work

59. The line $2x - y + 1 = 0$ is a tangent to the circle at the point (2,5) and the centre of the circle lies on $x - 2y = 4$. Then radius of the circle is

(A) $5\sqrt{3}$ (B) $3\sqrt{5}$ (C) $2\sqrt{5}$ (D) $5\sqrt{2}$

60. On the ellipse $4x^2 + 9y^2 = 1$, the point at which the tangent is parallel to the line $8x = 9y$ is

(A) $\left(\frac{2}{5}, \frac{1}{5}\right)$ (B) $\left(-\frac{2}{5}, \frac{1}{5}\right)$ (C) $\left(-\frac{2}{5}, -\frac{1}{5}\right)$ (D) $\left(\frac{2}{5}, \frac{2}{5}\right)$

61. A (–6, 0), B(0,6) and C(–7,7) are the vertices of ΔABC. The incircle of the triangle has the equation

(A) $x^2 + y^2 - 9x - 9y + 36 = 0$ (B) $x^2 + y^2 + 9x - 9y + 36 = 0$

(C) $x^2 + y^2 + 9x + 9y - 39 = 0$ (D) $x^2 + y^2 + 18x - 18y + 36 = 0$

62. If two points P and Q on $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ such that CP is perpendicular to CQ where a < b (C=Centre). Then $\frac{1}{CP^2} + \frac{1}{CQ^2}$ is –

(A) $\frac{b^2 - a^2}{2ab}$ (B) $\frac{1}{a^2} + \frac{1}{b^2}$ (C) $\frac{2ab}{b^2 - a^2}$ (D) $\frac{1}{a^2} - \frac{1}{b^2}$

63. If the roots of the equation $ax^2 - bx + c = 0$ are α, β then the roots of the equations $b^2cx^2 - ab^2x + a^3 = 0$ are –

(A) $\frac{1}{\alpha^2 + \alpha\beta}, \frac{1}{\beta^3 + \alpha\beta}$ (B) $\frac{1}{\alpha^2 + \alpha\beta}, \frac{1}{\beta^2 + \alpha\beta}$ (C) $\frac{1}{\alpha^4 + \alpha\beta}, \frac{1}{\beta^4 + \alpha\beta}$ (D) None of these

64. The value of ${}^{20}C_0 + {}^{20}C_1 + {}^{20}C_2 + {}^{20}C_3 + {}^{20}C_4 + {}^{12}C_{12} + {}^{20}C_{13} + {}^{20}C_{14} + {}^{20}C_{15}$ equal to –

(A) $2^{19} - \frac{\left({}^{20}C_{10} + {}^{20}C_9\right)}{2}$ (B) $2^{19} - \frac{\left({}^{20}C_{10} + 2\,{}^{20}C_9\right)}{2}$

(C) $2^{19} - \frac{{}^{20}C_{10}}{2}$ (D) None of these

65. Two players P_1 and P_2 play a series of 2n games. Each game can result in either a win or a loss for P_1. The total number of ways in which P_1 can win the series of these games in equal to –

(A) $\frac{1}{2}\left(2^{2n} - {}^{2n}C_n\right)$ (B) $\frac{1}{2}\left(2^{2n} - 2^{2n}C_n\right)$ (C) $\frac{1}{2}\left(2^n - {}^{2n}C_n\right)$ (D) None of these

66. If $|z| = 1, z \neq \pm 1$ then all the values of $\frac{z}{1 - z^2}$ lie on

(A) a line not passing through the origin (B) $|z| = \sqrt{2}$

(C) the x-axis (D) the y-axis

Space for rough work

67. Statement –1: the equation $x^2+(2m+1)x+(2n+1)=0$ where m and n are integers cannot have any rational roots.
Statement – 2:The quantity $(2m + 1)^2 – 4 (2n +1)$ where m, n, $\in I$ can never be a perfect square.
(A) Statement –1 is true, Statement -2 is True, statement -2 is a correct explanation for statement -1.
(B) Statement – 1 is True, Statement -2 is True, Statement – 2 is NOT a correct explanation for statement – 1
(C) Statement – 1 is True, Statement – 2 is False]
(D) Statement – 1 is False, Statement -2 is True

68. The angle between the tangents to the parabola $y^2=4ax$ at the points where it intersects with the line x – y – a = 0, is
(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{2}$

69. If $p\Rightarrow(\sim p\vee q)$ is false, the truth values of p & q are respectively :
(A) F, T (B) F, F (C) T,T (D) T.F

70. The one which is the measure of central tendency is –
(A) Mode (B) Mean deviation
(C)standard deviation (D) Coefficient of variance

Section – A
Numerical based questions

71. $L=\lim_{x\to 3}([x-3]+[3-x]-x)$ where [.] denotes the greatest integer function then L + 10 equals

72. the greatest value of $f(x)=(x+1)^{1/3}-(x-1)^{1/3}$ on $[0,1]$ is–

73. If $f(x)=\frac{k\sin x+2\cos x}{\sin x+\cos x}$ is strictly increasing for all x then smallest integral value of k is

74. If $f(x)=x^2+x^5+2x^3+8x,$ then find number of real roots of f(x) = 0

75. If number of irrational terms in expansion of $(5^{1/6}+2^{1/8})^{100}$ is N then $\frac{3+N}{20}$

Space for rough work

FIITJEE – JEE (Mains)

Batches: 12th Studying & 12th Pass

Mock Test – II

QP Code:

ANSWER KEY

SECTION – I (PHYSICS)

PART-A

1.	**B**	2.	**B**	3.	**A**	4.	**D**
5.	**B**	6.	**A**	7.	**D**	8.	**C**
9.	**B**	10.	**B**	11.	**D**	12.	**A**
13.	**B**	14.	**A**	15.	**A**	16.	**D**
17.	**A**	18.	**C**	19.	**B**	20.	**A**

PART-C

21.	**4**	22.	**3**	23.	**8**	24.	**3**
25.	**8**						

SECTION – II (CHEMISTRY)

PART-A

26.	**B**	27.	**A**	28.	**D**	29.	**C**
30.	**A**	31.	**D**	32.	**B**	33.	**B**
34.	**B**	35.	**A**	36.	**C**	37.	**A**
38.	**A**	39.	**A**	40.	**C**	**4**1.	**A**
42.	**A**	43.	**D**	44.	**B**	45.	**A**

PART-C

46.	**1.2**	47.	**8**	48.	**0.32**	49.	**45**
50.	**5**						

SECTION – III (MATHEMATICS)

PART-A

51.	D	52.	C	53.	B	54.	C
55.	D	56.	A	57.	D	58.	D
59.	B	60.	B	61.	B	62.	D
63.	B	64.	B	65.	A	66.	D
67.	A	68.	D	69.	D	70.	A

PART-C

71.	6	72.	2	73.	3	74.	1
75.	5						