DRONACHARYA

360° DIAGNOSTIC & SCHOLARSHIP EXAM

Sample Paper

for Students presently in Class XI

Paper 2 Basic School, CUET, JEE Main

Duration : 90 minutes *Maximum Marks : 240*

Please read the instructions and guidelines carefully :

Important Note : Please ensure to accurately input the details for the Class and Paper No. as indicated at the top of this sheet into the corresponding columns / fields on the OMR sheet before proceeding with the paper. Incorrectly filled information regarding the class or paper may result in inaccurate outcomes or results.

"This paper has been scientifically designed to evaluate your potential – manifested and hidden for the target examinations mentioned in various sections of the paper. Thus, your adherence to the instructions is critical in the evaluation of the same"

1. This Question paper consists of 3 sections.
2. **Student should devote allotted time for each section. If a section is easy, then it is easy for everyone & was meant to be like that with a goal in mind. Do not switch over to another section if you find the section to be easy. If a section is tough, then it is tough for everyone.** You are advised to spend 30 Minutes on Section-I, 30 Minutes on Section-II and 30 Minutes on Section-III. Dedicating the required time to finish each section successfully is essential. Opening the next section before completing the allotted time for the preceding section is not permitted. This adherence is crucial for assessing your true potential, as each section is meticulously crafted to evaluate your potential for the corresponding competitive examinations.
3. Candidate should open the seal of Section-II only after devoting 30 minutes on Section-I and Seal for Section-III is to be opened only after devoting 30 minutes on Section-II.
4. Sheets will be given to each candidate for rough work. Candidate must fill all details on the rough sheet and submit the same to invigilator along with OMR sheet. Candidate must mention the Question No. while doing the rough work in the sheet.
5. Please note candidates are not allowed to bring any prohibited items into the exam hall such as electronic devices, mobile phones, smart watch, earphones, calculators, books, notes, formula sheets, and bags.
6. Marking scheme is given in table below:

Section	Subject		Question no.	Marking Scheme for each question	
				Correct answer	Wrong answer
SECTION – I (Basic School) **Time Allotted: 30 Minutes**	PHYSICS	(PART-A)	1 to 10	**+1**	**0**
	CHEMISTRY	(PART-B)	11 to 20	**+1**	**0**
	MATHEMATICS	(PART-C)	21 to 30	**+1**	**0**
SECTION – II (CUET) **Time Allotted: 30 Minutes**	PHYSICS	(PART-A)	31 to 40	**+5**	**–1**
	CHEMISTRY	(PART-B)	41 to 50	**+5**	**–1**
	MATHEMATICS	(PART-C)	51 to 60	**+5**	**–1**
SECTION – III (JEE Main) **Time Allotted: 30 Minutes**	PHYSICS	(PART-A)	61 to 65	**+4**	**–1**
	CHEMISTRY	(PART-B)	66 to 70	**+4**	**–1**
	MATHEMATICS	(PART-C)	71 to 75	**+4**	**–1**

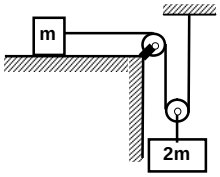
Section – I

Time: 30 Minutes

PHYSICS – (PART – A)

*This part contains **10 Multiple Choice Questions** number **1 to 10.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

1. Find the acceleration of blocks of mass m. Assume pulleys are massless and frictionless.



(A) g/3 (B) 2g/3
(C) g/2 (D) g/6

2. If $\vec{A}$ and $\vec{B}$ are two mutually perpendicular vectors, where $\vec{A} = 5\vec{i} + 7\hat{j} + 3\hat{k}$ and $\vec{B} = 2\vec{i} + 2\hat{j} - a\hat{k}$, then the value of a is

(A) –2 (B) 8
(C) –7 (D) –8

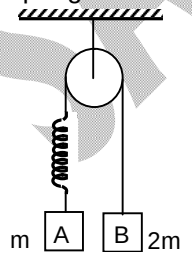
3. Two wires *A* and *B* are of the same material. Their lengths are in the ratio 1 : 2 and the diameters are in the ratio 2 : 1. If they are pulled by the same force their increase in length will be in the ratio

(A) 2 : 1 (B) 1 : 4
(C) 1 : 8 (D) 8 : 1

4. What is the value of linear velocity, if $\vec{\omega} = 3\vec{i} - 4\hat{j} + \hat{k}$ and $\vec{r} = 5\vec{i} - 6\hat{j} + 6\hat{k}$?

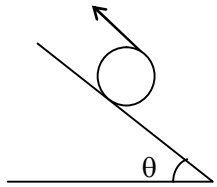
(A) $6\vec{i} + 2\hat{j} - 3\hat{k}$ (B) $-18\hat{i} - 13i + 2\hat{k}$
(C) $4\vec{i} - 13\hat{j} + 6\hat{k}$ (D) $6\vec{i} - 2\hat{j} + 8\hat{k}$

5. There are blocks A and B of masses m and 2 m respectively. These are held at rest such that the spring is in natural length. Find out the accelerations of both the blocks just after release.



(A) $g\downarrow, g\downarrow$ (B) $\frac{g}{3}\downarrow, \frac{g}{3}\downarrow$
(C) $0, 0$ (D) $g\downarrow, g\uparrow$

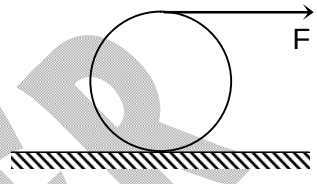
6. A sphere kept on a rough inclined plane is in equilibrium by a string wrapped over it. If the angle of inclination is θ, the tension in the string will be equal to



(A) $mg\sin\theta$ (B) $2/mg$

(C) $\frac{mg\sin\theta}{2}$ (D) None of these

7. A force 'F' is applied at the top of a ring of mass 'M' and radius 'R' placed on a rough horizontal surface as shown in the figure. Friction is sufficient to prevent slipping. The friction force acting on the ring is



(A) $\frac{F}{2}$ towards right (B) $\frac{F}{3}$ towards right

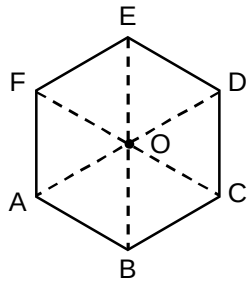
(C) $\frac{2F}{3}$ towards right (D) Zero

8. A bird flies for 6 sec with a velocity of |t – 4| m/sec in a straight line. Where t is in sec. It covers a distance of

(A) 16 m (B) 10 m

(C) 8 m (D) 6 m

9. In the regular hexagon shown in figure, $\overrightarrow{AB}+\overrightarrow{AC}+\overrightarrow{AD}+\overrightarrow{AE}+\overrightarrow{AF}$ can be expressed as



(A) $4\overrightarrow{AO}$

(B) $3\overrightarrow{AD}$

(C) $8\overrightarrow{AD}$

(D) zero

10. If a particle is fired vertically upwards from the surface of earth and reaches a height of 6400 km, the initial velocity of the particle is (Assume R = 6400 km and g = 10 ms^{-2})

(A) 4 km/sec (B) 2 km/sec

(C) 8 km/sec (D) 16 km/sec

CHEMISTRY – (PART – B)

*This part contains **10 Multiple Choice Questions** number **11 to 20.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

11. For which of the following species, Bohr's theory is not applicable

(A) Be^{+3} (B) Li^{+2}

(C) He^{+2} (D) H

12 For the configuration $\boxed{1\downarrow}\ \boxed{1\downarrow}\ \boxed{1}\ \boxed{1}\ \boxed{1}$ which rule is violated ?

(A) Aufbau principle (B) (n + ℓ) Rule

(C) Pauli's Rule (D) Hund's Rule

13. 6.02×10^{20} molecules of urea are present in 200 mL of its solution. The concentration of urea solution is

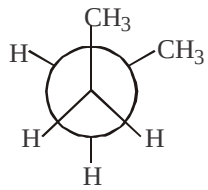
(A) 0.001 M (B) 0.01 M

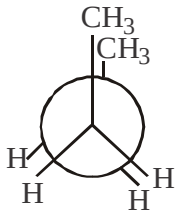
(C) 0.005 M (D) 0.10 M

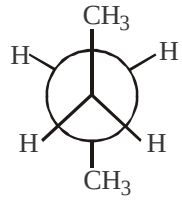
14. The oxidation state of iodine in $H_2IO_6^-$ is :

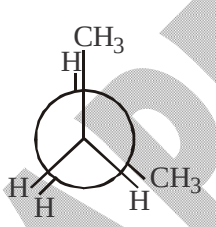
(A) +7 (B) –1
(C) +5 (D) +1

15. Which one is most stable conformers of n-butane?

(A) 

(B) 

(C) 

(D) 

16. The mass of Mg_3N_2 produced if 48 g of Mg metal is reacted with 34 g NH_3 gas is
$Mg + NH_3 \rightarrow Mg_3N_2 + H_2$

(A) (200/3) g (B) (100/3) g
(C) (400/3) g (D) (150/3) g

17. $P_4 + 3NaOH + 3H_2O \rightarrow 3NaH_2PO_2 + PH_3$ is an example of :-

(A) Inter molecular Redox reaction (B) Intra molecular Redox reaction
(C) Disproportionation Redox reaction (D) None of these

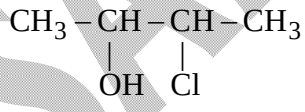
18 The correct order in which the C–O bond length in CO, CO_3^{-2} and CO_2 is :

(A) $CO_3^{-2} < CO_2 < CO$ (B) $CO_2 < CO_3^{-2} < CO$
(C) $CO < CO_3^{-2} < CO_2$ (D) $CO < CO_2 < CO_3^{-2}$

19 The covalent character of the following chlorides follows the order

(A) $HgCl_2 < CdCl_2 < ZnCl_2$ (B) $ZnCl_2 < CdCl_2 < HgCl_2$
(C) $CdCl_2 < ZnCl_2 < HgCl_2$ (D) $HgCl_2 < ZnCl_2 < CdCl_2$

20. The number of optical isomers for the given compound:



(A) 2 (B) 3
(C) 4 (D) 5

MATHEMATICS – (PART – C)

*This part contains **10 Multiple Choice Questions** number **21 to 30.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

21. Which of the following is a null set?
(A) {0}
(B) {x: x > 0 or x < 0}
(C) {x : $x^2 = 4$ or x = 3}
(D) {x : $x^2 + 1 = 0, x \in R$}

22. The number of the real roots of the equation $|x+1|^2 + |x-5|^2 = \frac{27}{4}$ is
(A) 2
(B) 4
(C) 6
(D) 0

23. If $\log_4 (x^2 + x) - \log_4 (x+1) = 2$, then the value of x is :
(A) 1
(B) 2
(C) 4
(D) 16

24. If $y = \log\left\{\frac{x + \sqrt{(a^2 + x^2)}}{a}\right\}$, then the value of $\frac{dy}{dx}$ is
(A) $\sqrt{a^2 - x^2}$
(B) $a\sqrt{a^2 + x^2}$
(C) $\frac{1}{\sqrt{a^2 + x^2}}$
(D) $x\sqrt{a^2 + x^2}$

25. If $y = \ln(\sin\sqrt{x})$, then its first derivative is
(A) $\frac{1}{2}\frac{\cot\sqrt{x}}{\sqrt{x}}$
(B) $\frac{1}{2}\frac{\tan\sqrt{x}}{\sqrt{x}}$
(C) $\frac{1}{2}\frac{\cos ec\sqrt{x}}{\sqrt{x}}$
(D) $\frac{1}{2}\frac{\cos\sqrt{x}}{\sqrt{x}}$

26. If $a_i \in R$ and a_1, a_2, a_3 are in A.P., a_2, a_3, a_4 are in G.P. and a_3, a_4, a_5 are in H.P. then $\frac{a_1 - a_3}{a_3 - a_5}$ is equal to
(A) $\frac{a_1}{a_3}$
(B) $\frac{a_3}{a_1}$
(C) $\frac{a_5}{a_1}$
(D) 1

27. The absolute integral value of the solution of the equation $\sqrt{7^{2x^2 - 5x - 6}} = \left(\sqrt{2}\right)^{3\log_2 49}$
(A) 4
(B) 2
(C) 6
(D) None of these

28. Number of integers satisfying $\left|x^2-3x+2\right|=3x-2-x^2$ is

(A) 0 (B) 2
(C) 6 (D) None of these

29. If points corresponding to the complex numbers z_1, z_2, z_3 and z_4 are the vertices of a rhombus, taken in order, then for a non-zero real number k
(A) $z_1 - z_3 = i\,k(z_2 - z_4)$ (B) $z_1 - z_2 = i\,k(z_3 - z_4)$
(C) $z_1 + z_3 = k(z_2 + z_4)$ (D) $z_1 + z_2 = k(z_3 + z_4)$

30. If z be any complex number such that $|3z-2| + |3z+2| = 4$, then locus of z is
(A) an ellipse (B) a circle
(C) a line-segment (D) None of these

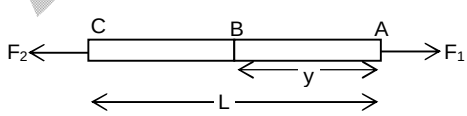
Section – II

Time: 30 Minutes

PHYSICS – (PART – A)

*This part contains **10 Multiple Choice Questions** number **31 to 40.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

31. A uniform rod of length L and mass M is acted on by two unequal forces F_1 and F_2 $(F_2 < F_1)$ as shown in the figure. The tension in the rod at a distance y from the end A is given by



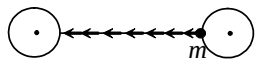
(A) $F_1\left(1-\frac{y}{L}\right)+F_2\left(\frac{y}{L}\right)$ (B) $F_2\left(1-\frac{y}{2}\right)+F_1\left(\frac{y}{L}\right)$
(C) $(F_1-F_2)\frac{y}{L}$ (D) $\frac{(F_2+F_1)\,y}{L}$

32. Kinetic energy is the energy possessed by the body by virtue of its
(A) position (B) gravity
(C) mass (D) motion

33. A projectile is projected at an angle α (>45°) with an initial velocity u. The time t, at which its horizontal velocity will equal the vertical velocity, is
(A) $t = \frac{u}{g}(\cos\alpha - \sin\alpha)$ (B) $t = \frac{u}{g}(\cos\alpha + \sin\alpha)$
(C) $t = \frac{u}{g}(\sin\alpha - \cos\alpha)$ (D) $t = \frac{u}{g}(\sin^2\alpha - \cos^2\alpha)$

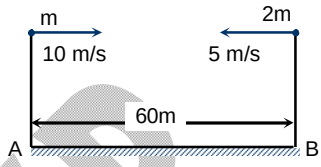
34. A projectile is fired with a velocity *u* at right angle to a slope, which is inclined at an angle θ with the horizontal. The range of the projectile on the incline is
(A) $\frac{2u^2\sin\theta}{g}$ (B) $\frac{2u^2}{g}\tan\theta\sec\theta$
(C) $\frac{u^2}{g}\sin 2\theta$ (D) $\frac{2u^2}{g}\tan\theta$

35. Two identical spherical masses are kept at some distance as shown. Potential energy when a mass *m* is taken from surface of one sphere to the other



(A) increases continuously
(B) decreases continuously
(C) first increases then decreases
(D) first decreases then increases

36. Two particles, one of mass m and the other of mass 2m, are projected horizontally towards each other from the same level above the ground with velocities 10 m/s and 5 m/s, respectively. They collide in air and stick to each other. The distance of the combined mass where they fall from point A is



(A) 40 m
(B) 20 m
(C) 30 m
(D) zero

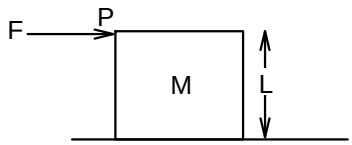
37. A wheel of radius R rolls on the ground with a uniform velocity v. The relative acceleration of topmost point of the wheel with respect to the bottom most point is

(A) $\frac{v^2}{R}$
(B) $\frac{2v^2}{R}$
(C) $\frac{v^2}{2R}$
(D) $\frac{4v^2}{R}$

38. A swimmer wishes to reach directly opposite point on the other bank of a river, flowing with velocity 8 m/s. The swimmer can swim 10 m/s in still water. The width of the river is 480 m. Time taken by him to do so
(A) 60 sec
(B) 48 sec
(C) 80 sec
(D) 100 sec

39. A bus is beginning to move with an acceleration of 1 m/s^2. A boy who is 48 m behind the bus starts running with constant speed of 10 m/s. The earliest time when the boy can catch the bus is
(A) 8 sec
(B) 10 sec
(C) 12 sec
(D) 14 sec

40. A cubical block of side L rests on a rough horizontal surface with coefficient of friction μ. A horizontal force F is applied on the block as shown. If the co efficient of friction is sufficiently high so that the block does not slide before toppling, the minimum force F required to topple the block is



(A) Infinitesimal
(B) Mg/4
(C) Mg/2
(D) $Mg(1-\mu)$

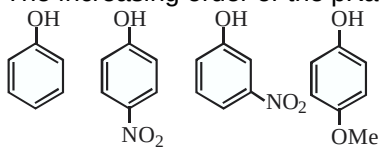
CHEMISTRY – (PART – B)

*This part contains **10 Multiple Choice Questions** number **41 to 50.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

41. Which bond angle θ gives maximum dipole moment for triatomic molecule XY_2:
(A) $\theta = 90°$
(B) $\theta = 120°$
(C) $\theta = 180°$
(D) $\theta = 109.5°$

42. The correct set of oxidation number of N in NH_4NO_2 is :
(A) –3, +5
(B) +5, –3
(C) –3, –3
(D) –3, +3

43. The increasing order of the pKa values of the following compounds is :



A B C D

(A) D < A < C < B
(B) B < C < D < A
(C) C < B < A < D
(D) B < C < A < D

44. Correct order of bond angle is :-
(A) $OF_2 < H_2O < NH_3 < Cl_2O$
(B) $OF_2 < NH_3 < Cl_2O < H_2O$
(C) $OF_2 < Cl_2O < H_2O < NH_3$
(D) $Cl_2O < OF_2 < H_2O < NH_3$

45. The solubility of AgCl is minimum in:
(A) $AgNO_3$ (0.1 M)
(B) H_2O (ℓ)
(C) NaCl (0.4 M)
(D) $BaCl_2$ (0.3 M)

46. The oxidation number of sulphur in S_8, S_2F_2 and H_2S respectively are :
(A) 0, +1, –2
(B) +2, +1, –2
(C) 0, +1, +2
(D) –2, +1, –2

47. The relative stability of the following radicals is

(i) $CH_3CH = CH - \dot{C}H_2$

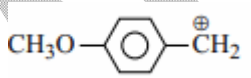
(ii) $\dot{C}H = CHCH_3$

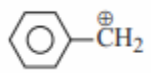
(iii) $CH_3\dot{C}HCH_3$

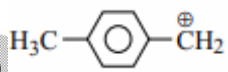
(A) i > ii > iii
(B) ii > iii > I
(C) i > iii > ii
(D) iii > i > ii

48. Stability of trivalent and monovalent cation of group III A (boron family) will be in the order
(A) $Ga^{3+} < In^{3+} < Tl^{3+}$
(B) $Ga^{3+} > In^{3+} > Tl^{3+}$
(C) $Ga^{+} > In^{+} > Tl^{+}$
(D) $Ga^{+} > In^{+} < Tl^{+}$

49. Relative stabilities of the following carbocations will be in the order

(i) 

(ii) 

(iii) 

(iv) $CH_3\overset{\oplus}{C}H_2$

(A) i < ii < iii < iv
(B) iv < iii < ii < i
(C) iv < ii < iii < i
(D) ii < iv < iii < i

50. Among the following ions, the $p_\pi - d_\pi$ overlap will be present in
(A) NO_3^-
(B) SO_3^{2-}
(C) CO_3^{2-}
(D) NO_2^-

MATHEMATICS – (PART – C)

*This part contains **10 Multiple Choice Questions** number **51 to 60.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

51. If a – b, b – c, c – a are in A.P., then the straight line (a –b)x + (b – c)y +(c –a) = 0 will pass through
(A) (1, –2) (B) (2, 1)
(C) (2, 3) (D) (3, 1)

52. The equations of the lines representing the sides of a triangle are $3x – 4y = 0$, $x + y = 0$ and $2x – 3y = 7$. The line $3x + 2y = 0$ always passes through the
(A) incentre (B) centroid
(C) circumcentre (D) orthocentre

53. The range of values of α for which the line $2y = gx + \alpha$ is a normal to the circle $x^2 + y^2 + 2gx + 2gy - 2 = 0$ for all values of g is
(A) $[1, \infty)$ (B) $[-1, \infty)$
(C) (0, 1) (D) $(-\infty, 1]$

54. The circle drawn with variable chord $x + ay – 5 = 0$ (a being a parameter) of the parabola $y^2 = 20x$ as diameter will always touch the line
(A) $x + 5 = 0$ (B) $y + 5 = 0$
(C) $x + y + 5 = 0$ (D) $x – y + 5 = 0$

55. If $A=\{x|x^2 = 4\}$ and $B=\{x \mid x^2-5x + 6 = 0\}$ then $A \cup B$
(A) {2, 3} (B) {–2, 3}
(C) {2} (D) {–2, 2, 3}

56. A and B are two sets having 3 and 4 elements respectively and having 2 elements in common. The number of relations which can be defined from A to B is
(A) 2^5 (B) $2^{10} - 1$
(C) $2^{12} - 1$ (D) none of these

57. For any real θ, the maximum value of $\cos^2(\cos\theta) + \sin^2(\sin\theta)$
(A) is 1 (B) is $1 + \sin^2 1$
(C) is $1 + \cos^2 1$ (D) does not exist

58. The value of $\lim\limits_{x\to 0} \dfrac{\sin^3 x - x^3 \operatorname{sgn}\left(1-\left[\dfrac{x}{\sin^{-1}x}\right]\right)}{x\cdot\tan^2 x.\sin(\pi\cos x)}$ is equal to $([\bullet]\text{denotes g.I.F})$

(A) $\dfrac{1}{\pi}$ (B) $\dfrac{-6}{\pi}$

(C) $\dfrac{-1}{\pi}$ (D) $\dfrac{1}{6\pi}$

59. Number of complex number z which satisfy the equations $\left|\dfrac{z-12}{z-8i}\right| = \dfrac{5}{3}$ and $\left|\dfrac{z-4}{z-8}\right| = 1$ simultaneously is/are
(A) 0 (B) 1
(C) 2 (D) 3

60. If α and β are the roots of the equation $x^2 - x + 11 = 0$, then the value of $3\alpha^3 - 3\alpha^2 + 2\beta^3 - 2\beta^2 + 11\alpha$ is equal to
(A) 33 (B) – 33
(C) 22 (D) – 22

Section – III

Time: 30 Minutes

PHYSICS – (PART – A)

*This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **THREE (03)** questions in Comprehension-1 & **TWO (02)** questions in Comprehension-2 of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

Comprehension–1 for Q. No. 61 to 63

We generally ignore the kinetic energy of the moving coil of a spring but consider a spring of mass *M,* equilibrium length *L* and spring constant *k.* Consider a spring, as described above, that has one end fixed and the other end moving with speed *v.* Assume that the speed of points along the length of the spring varies linearly with distance *L* from the flxed end. Assume also that the mass *M* of the spring is distributed uniformly along the length of the spring. Assume further that the force applied by the spring is spring constant times its deformation. In a spring gun, such a spring of mass 0.243 kg and force constant 3200 N/m is compressed 2.50 cm from its unstretched length. When the trigger is pulled, the spring pushes horizontally the ball of mass of 0.053 kg.

61. Kinetic energy of the spring

(A) $\frac{1}{2}Mv^2$ (B) $\frac{1}{6}Mv^2$

(C) Mv^2 (D) $\frac{1}{4}Mv^2$

62. Ball's speed when the spring reaches its uncompressed length is

(A) 3.9 m/s (B) 6.1 m/s

(C) 14 m/s (D) 1.62 m/s

63. The speed of small length *(dx)* at a distance *x* from fixed end is

(A) $\frac{x}{L}v$ (B) v

(C) $\frac{L}{x}v$ (D) xv

Comprehension–2 for Q. No. 64 to 65

The minimum and maximum distances of a satellite from the centre of earth are 2R and 4R, where R is radius of earth. If mass of earth be M:

64. Minimum and maximum speeds of the satellite are:

(A) $\sqrt{\frac{GM}{5R}}, \sqrt{\frac{3GM}{2R}}$ (B) $\sqrt{\frac{GM}{6R}}, \sqrt{\frac{2}{3}\frac{GM}{R}}$

(C) $\sqrt{\frac{GM}{6R}}, \sqrt{\frac{2GM}{R}}$ (D) $\sqrt{\frac{GM}{3R}}, \sqrt{\frac{5GM}{2R}}$

65. Angular momentum of the satellite about centre of earth:

(A) $\left(2GMm^2R\right)^{1/2}$ (B) $\left(4GMm^2R\right)^{1/2}$

(C) $\left(3GMm^2R\right)^{1/2}$ (D) $\left(\frac{8}{3}GMm^2R\right)^{1/2}$

CHEMISTRY – (PART – B)

*This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **THREE (03)** questions in Comprehension-1 & **TWO (02)** questions in Comprehension-2 of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

Comprehension–1 for Q. No. 66 to 68

Vitamin C (M = 176) is a compound of C, H and O found in many natural source, especially citrus fruits. When a 1.0 g sample of vitamin C is placed in a combustion chamber and burned, the following data are obtained

Mass of CO_2 absorber after combustion = 85.35 g
Mass of CO_2 absorber before combustion = 83.85 g
Mass of H_2O absorber after combustion = 37.96 g
Mass of H_2O absorber before combustion = 37.55 g

66. What is the percentage of carbon, by wt. in vitamin C?
(A) 66.67% (B) 40.8%
(C) 20% (D) 60%

67. What is the empirical formula of vitamin C?
(A) CH_2O (B) $C_3H_4O_3$
(C) $C_6H_4O_6$ (D) CHO

68. What is the percentage of hydrogen, by weight in vitamin C?
(A) 4.55% (B) 41%
(C) 20.5% (D) 9.11%

Comprehension–2 for Q. No. 69 to 70

In a vessel, the equilibria: $N_2(g)+3H_2(g)\rightleftharpoons 2NH_3(g)$ and $N_2(g)+2H_2(g)\rightleftharpoons N_2H_4(g)$ are achieved simultaneously. Initially the vessel contains N_2 and H_2 in molar ratio of 9: 13. The equilibrium pressure is $7P_o$ in which due to ammonia, the pressure is P_o and due to hydrogen, pressure is $2P_o$.

69. The value of K_P for the reaction: $N_2(g)+3H_2(g)\rightleftharpoons 2NH_3(g)$ is

(A) $20\,P_o^2$ (B) $\frac{20P_o^2}{3}$

(C) $\frac{1}{20P_o^2}$ (D) $\frac{3}{20P_o^2}$

70. The value of K_P for the reaction: $N_2(g) + 2H_2(g) \rightleftharpoons N_2H_4(g)$ is

(A) $20\,P_o^2$ (B) $\frac{20P_o^2}{3}$

(C) $\frac{1}{20P_o^2}$ (D) $\frac{3}{20P_o^2}$

MATHEMATICS – (PART – C)

*This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **THREE (03)** questions in Comprehension-1 & **TWO (02)** questions in Comprehension-2 of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

Comprehension–1 for Q. No. 71 to 73

Consider a fixed point P(5, 2) and also Q and R be two distinct variable points moving on x – y =0 and y = 0 respectively.

71. Coordinates of Q for which |PQ + QR + PR| is minimum

(A) $\left(\frac{29}{10}, \frac{29}{10}\right)$ (B) $\left(\frac{1}{5}, \frac{1}{5}\right)$

(C) (5, 0) (D) None of these

72. The coordinates of R for which |PQ + QR + QR| is minimum

(A) $\left(\frac{1}{7}, 0\right)$ (B) $\left(\frac{29}{10}, 0\right)$

(C) $\left(\frac{29}{7}, 0\right)$ (D) None of these

73. The minimum distance of point P from Q is

(A) $\frac{1}{\sqrt{2}}$ (B) $\frac{2}{\sqrt{2}}$

(C) $\frac{3}{\sqrt{2}}$ (D) $\frac{4}{\sqrt{2}}$

Comprehension–2 for Q. No. 74 to 75

For the equation $(2x^2-1)^2 + 2ax(2x^2-1) + x^2(4a^2-1) = 0$

74. The values of a which above equation has all roots positive

(A) $(-\infty, -1)$ (B) $(-1, 2)$

(C) $(2, \infty)$ (D) None of these

75. The values of a for which above equation has two positive and two negative roots

(A) $(-\infty, -4)$ (B) $(5, \infty)$

(C) $\left[-\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}\right]$ (D) None of these

DRONACHARYA

360° DIAGNOSTIC & SCHOLARSHIP EXAM

Sample Paper

for Students presently in Class XI

Paper 2 Basic School, CUET, JEE Main

ANSWER KEY

1.	**B**	2.	**B**	3.	**C**	4.	**B**
5.	**A**	6.	**C**	7.	**D**	8.	**B**
9.	**B**	10.	**C**	11.	**C**	12.	**C**
13.	**C**	14.	**A**	15.	**C**	16.	**A**
17.	**C**	18.	**D**	19.	**A**	20.	**C**
21.	**D**	22.	**D**	23.	**D**	24.	**C**
25.	**A**	26.	**A**	27.	**A**	28.	**B**
29.	**A**	30.	**C**	31.	**A**	32.	**D**
33.	**C**	34.	**B**	35.	**C**	36.	**A**
37.	**B**	38.	**C**	39.	**A**	40.	**C**
41.	**A**	42.	**D**	43.	**D**	44.	**A**
45.	**D**	46.	**A**	47.	**C**	48.	**B**
49.	**C**	50.	**B**	51.	**A**	52.	**D**
53.	**B**	54.	**A**	55.	**D**	56.	**D**
57.	**B**	58.	**C**	59.	**C**	60.	**D**
61.	**B**	62.	**B**	63.	**A**	64.	**B**
65.	**D**	66.	**B**	67.	**B**	68.	**A**
69.	**C**	70.	**D**	71.	**A**	72.	**C**
73.	**C**	74.	**D**	75.	**C**		