FIITJEE ADMISSION TEST- 2019

for **students of**

Class 12

Paper 2

Time: 3 Hours (1:45 pm – 4:45 pm) **Code 1212** ***Maximum Marks: 234***

Instructions:

Caution: Class, Paper, Code as given above MUST be correctly marked on the answer OMR sheet before attempting the paper. Wrong Class, Paper or Code will give wrong results.

1. You are advised to devote 45 Minutes on Section-I and 135 Minutes on Section-II.

2. This Question paper consists of 2 sections. Marking scheme is given in table below:

Section	Subject		Question no.	Marking Scheme for each question	
				correct answer	wrong answer
SECTION – I	PHYSICS	(PART-A)	1 to 9	+2	–0.5
	CHEMISTRY	(PART-B)	10 to 18	+2	–0.5
	MATHEMATICS	(PART-C)	19 to 27	+2	–0.5
SECTION – II	PHYSICS	(PART-A)	28 to 41	+3	–1
	CHEMISTRY	(PART-B)	42 to 55	+3	–1
	MATHEMATICS	(PART-C)	56 to 69	+3	–1
	PHYSICS	(PART-D)	70 to 75	+3	0
	CHEMISTRY	(PART-E)	76 to 81	+3	0
	MATHEMATICS	(PART-F)	82 to 87	+3	0

3. Answers have to be marked on the OMR sheet. The Question Paper contains blank spaces for your rough work. No additional sheets will be provided for rough work.

4. Blank papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.

5. **Before attempting paper write your OMR Answer Sheet No., Registration Number, Name** and **Test Centre** in the space provided at the bottom of this sheet.

6. **See method of marking of bubbles at the back of cover page for question no. 70 to 87.**

Note: ***Please check this Question Paper contains all 87 questions in serial order. If not so, exchange for the correct Question Paper.***

OMR Answer Sheet No. : _____

Registration Number : _____

Name of the Candidate : _____

Test Centre : _____

For questions **70 to 87**

Numerical based questions single digit answer 0 to 9

Example 1:

If answer is 6.

Correct method:

⓪ ① ② ③ ④ ⑤ ❻ ⑦ ⑧ ⑨

Example 2:

If answer is 2.

Correct method:

⓪ ① ❷ ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

Recommended Time: 45 Minutes for Section – I

Section – I

PHYSICS – (PART – A)

*This part contains **9 Multiple Choice Questions** number **1 to 9.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

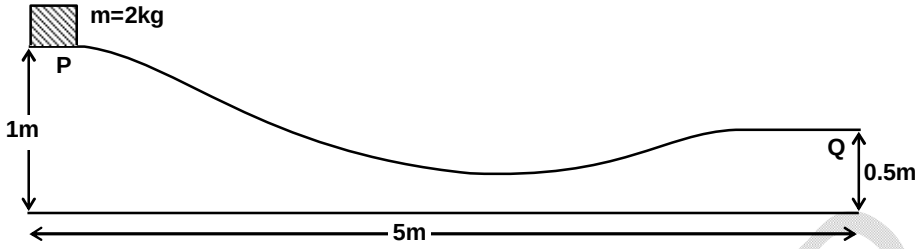
1. Percentage error in the measurement of mass and speed are 2% and 3% respectively. The error in the estimate of kinetic energy obtained by measuring mass and speed will be
   (A) 12% (B) 10%
   (C) 8% (D) 2%

2. A sphere of mass m moving with a constant velocity u hits another stationary sphere of the same mass. If e is the coefficient of restitution, then ratio of final velocity of the sphere moving initially to the final velocity of the sphere initially at rest is:
   (A) $\left(\frac{1-e}{1+e}\right)$ (B) $\left(\frac{1+e}{1-e}\right)$
   (C) $\left(\frac{e+1}{e+1}\right)$ (D) $\left(\frac{e-1}{e+1}\right)$

3. A moving body is covering the distance directly proportional to the square of time. The acceleration of the body is:
   (A) Increasing (B) decreasing
   (C) zero (D) constant

Space for Rough Work

4. A block is released from rest at point P and slides along the frictionless track as shown. Find the horizontal velocity of the block when it reach the point Q. Take g = 9.8 m/s^2.



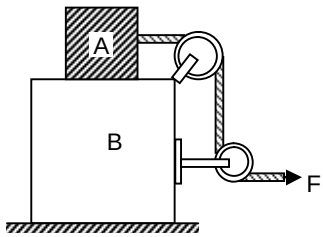
(A) 4 m/s (B) 5 m/s
(C) 3.13 m/s (D) 3.6 m/s

5. Which of the following equations is dimensionally correct?
(A) Pressure = energy per unit volume. (B) Pressure = energy per unit area.
(C) Pressure = force per unit volume. (D) Pressure = momentum per unit volume.

6. A car moving with a speed of 25 m/s take a U-turn in 5 seconds, without changing its speed. The magnitude of average acceleration during these 5 sec is
(A) 10 m/sec^2 (B) 5 m/sec^2
(C) 2.5 m/sec^2 (D) 7.5 m/sec^2

7. A uniform chain of length ℓ is placed on rough table, with length ℓ/n, where n > 1, hanging over the edge. If the chain just begins to slide off the table by itself from this position, the coefficient of friction between the chain and the table is
(A) $\frac{1}{n}$ (B) $\frac{1}{n-1}$ (C) $\frac{1}{n+1}$ (D) $\frac{n-1}{n+1}$

8. In the arrangement shown in figure $m_A = m_B = 2$kg. String is massless and pulley is frictionless. Block B is resting on a smooth horizontal surface, while friction coefficient between blocks A and B is $\mu = 0.5$. What maximum horizontal force F can be applied so that block A does not slip over the block B. (g = 10 m/s^2)



(A) 25 N (B) 40 N
(C) 30 N (D) 20 N

9. Power supplied to a particle of mass 2 kg varies with time as $P = \frac{3t^2}{2}$ watt. Here t is in second. If velocity of particle at t = 0 is v = 0. The velocity of particle at time t = 2s will be
(A) 1 m/s (B) 4 m/s (C) 2 m/s (D) $2\sqrt{2}$ m/s

Space for Rough Work

CHEMISTRY – (PART – B)

*This part contains **9 Multiple Choice Questions** number **10 to 18.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

10. A monovalent metal carbonate(M_2CO_3) forms CO_2 gas when treated with dil. HCl. If 10.6 g of the carbonate evolves 4.4 g of CO_2 gas, what is the atomic mass of the metal?
(A) 7 (B) 39
(C) 23 (D) 55

11. The radius of the first orbit of hydrogen atom is equal to the radius of the
(A) first orbit of He^+ (B) second orbit of Be^{3+}
(C) fourth orbit of He^+ (D) third orbit of Be^{3+}

12. What is the electronic configuration of the atom which has the highest value of electron gain enthalpy in the periodic table?
(A) $[Ne]_{10}3s^2 3p^4$ (B) $[Ne]_{10}3s^2 3p^5$
(C) $[He]_2 2s^2 2p^4$ (D) $[He]_2 2s^2 2p^5$

13. Which has the largest bond angle?
(A) NH_3 (B) NF_3
(C) $N(CH_3)_3$ (D) $NH(CH_3)_2$

14. If the average translational kinetic energy of 'N_2' gas is E_1 kJ mol^{-1} at 1400 K, what will be the average kinetic energy of 'N' gas at 700 K in kJ mol^{-1}?
(A) $2E_1$ (B) E_1
(C) $\frac{E_1}{2}$ (D) $\frac{E_1}{4}$

15. In which two compounds, nitrogen has same oxidation number?
(A) HNO_2 and KNO_3 (B) NH_2OH and NH_2SH
(C) NH_2OH and NH_2F (D) NO_2 and N_2O_2

16. $KMnO_4 + Na_2C_2O_4 + H_2SO_4 \longrightarrow MnSO_4 + K_2SO_4 + Na_2SO_4 + CO_2 + H_2O$
How much sodium oxalate can be completely oxidized by 400 mL of 0.1 M acidified $KMnO_4$ solution?
(A) 0.5 mole (B) 13.4 g
(C) 2g-molecule (D) 1.34 g

17. What is the magnetic quantum number of the valence electron of sodium?
(A) +1 (B) zero
(C) -1 (D) +2

18. How many unpaired electron(s) is/are present in a molecule of O_2^+?
(A) 1 (B) 2
(C) zero (D) 3

Space for Rough Work

MATHEMATICS – (PART – C)

*This part contains **9 Multiple Choice Questions** number **19 to 27.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

19. $\lim\limits_{x\to 1} \dfrac{\sum\limits_{k=1}^{35} x^k - 25}{x-1}$

(A) 325 (B) 210
(C) 275 (D) 415

20. If $A = \{x : x = n^2, n = 1,2,3\}$ then number of proper subsets is

(A) 3 (B) 8
(C) 7 (D) none of these

21. Sum of all real values of x satisfying the equation $2^{(x-1)(x^2+5x-50)} = 1$ is

(A) –5 (B) 14
(C) –4 (D) 16

22. Solution of $5x - 1 < 24$ and $5x + 1 > -29$ is

(A) (–7, 5) (B) (–5, 6)
(C) (–6, 5) (D) (–6, –5)

23. $4 + \log_2 \sin\dfrac{\pi}{5} + \log_2 \sin\dfrac{2\pi}{5} + \log_2 \sin\dfrac{3\pi}{5} + \log_2 \sin\dfrac{4\pi}{5} =$

(A) $\log_2 3$ (B) 2
(C) 3 (D) $\log_2 5$

Space for Rough Work

24. If the sum of the first n terms of the series $\sqrt{3}+\sqrt{75}+\sqrt{243}+\sqrt{507}+.....$ is $435\sqrt{3}$, then n equals
(A) 29 (B) 18
(C) 15 (D) 13

25. $\dfrac{3+\cot 76^o \cot 16^o}{\cot 76^o + \cot 16^o} =$
(A) $\tan 44^o$ (B) $\cot 44^o$
(C) $\tan 48^o$ (D) $\cot 48^o$

26. The sides of a triangle are $x=2, y+1=0$ and $x+2y=4$. Its circumcentre is
(A) (4, 0) (B) (2, –1)
(C) (0, 4) (D) (2, 3)

27. A ray of light through B (3, 2) is reflected at the point A (0, β) on the y – axis and passes through C (4, 3). Then β is
(A) $\dfrac{7}{11}$ (B) $\dfrac{13}{7}$
(C) $\dfrac{17}{7}$ (D) $\dfrac{8}{11}$

Space for Rough Work

Recommended Time: 135 Minutes for Section – II

Section – II

PHYSICS – (PART – A)

*This part contains **14 Multiple Choice Questions** number **28 to 41.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

28. A block A is able to slide on the frictionless incline of angle θ and length ℓ, kept inside an elevator going up with uniform velocity v. Find the time taken by the block to slide down the length of the incline if released from rest. What would be the time taken if the elevator is accelerated at a ms^{-2}.

(A) $\sqrt{\frac{2\ell}{g\sin\theta}}, \sqrt{\frac{2\ell}{(g+a)\sin\theta}}$ (B) $\sqrt{\frac{2\ell}{g\sin\theta}}, \sqrt{\frac{2\ell}{(g-a)\sin\theta}}$

(C) $\sqrt{\frac{2\ell}{g\sin\theta}}, \sqrt{\frac{2\ell}{g\sin\theta}}$ (D) none of these

29. A particle moves in x-y plane such that it's velocity $\vec{v}$ is given by:
$\vec{v} = k(y\hat{i} + x\hat{j})$, equation of it's path will be

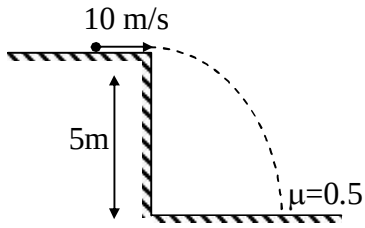
(A) $y = x^2$ + constant (B) $y^2 = x$ + constant
(C) xy = constant (D) $y^2 = x^2$ + constant

30. A body (solid sphere) of mass m makes an elastic collision with another identical body at rest. Just after collision the angle between the velocity vector of one body with the initial line of motion is 15° then the angle between velocity vector of the other body with the initial line of motion is

(A) 75^0 (B) 60^0
(C) 45^0 (D) 30^0

Space for Rough Work

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



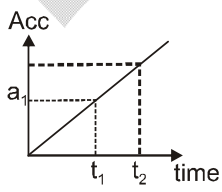
(A) 10 m/s (B) 8 m/s
(C) 3 m/s (D) 4 m/s

32. The magnitude of a vector '$\vec{a}$' is constant, but its direction is not constant then

(A) $\frac{d\vec{a}}{dt}$ and $\vec{a}$ are in same direction. (B) $\frac{d\vec{a}}{dt}$ is opposite to $\vec{a}$

(C) $\frac{d\vec{a}}{dt}$ is perpendicular to $\vec{a}$ (D) none of these

33. Acceleration time graph of a particle is shown. Work done by all the forces acting on the particle on the particle of mass m in time interval from t_1 to t_2 while a_1 is the acceleration at time t_1, is given by :

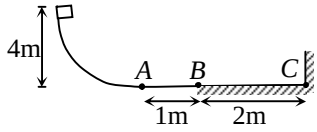


(A) $\frac{ma_1^2}{4t_1}(t_2^3 - t_1^3)$ (B) $\frac{ma_1^2}{8t_1^2}(t_2^4 - t_1^4)$

(C) $\frac{ma_1^2}{4t_1^2}(t_2^4 - t_1^4)$ (D) $\frac{ma_1}{2t_1}(t_2^2 - t_1^2)$

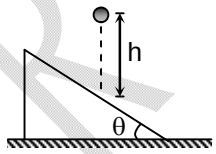
Space for Rough Work

34. A block of mass m = 0.1 kg is released from a height of 4 m on a curved smooth surface. On the horizontal surface, path AB is smooth and path BC is frictional with coefficient of friction μ = 0.1. If the impact of block with the vertical wall at C be perfectly elastic, the total distance covered by the block on the horizontal surface before coming to rest will be: (take g = 10 m/s^2)



(A) 29 m (B) 49 m
(C) 40 m (D) 109 m

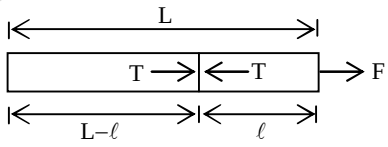
35. A ball after falling through a distance h collides with an inclined plane of inclination θ as shown. It moves horizontally after the impact. The co-efficient of restitution between inclined plane and ball is (inclined surface is friction less)



(A) 1 (B) $\tan^2\theta$
(C) $\cot^2\theta$ (D) $\sin^2\theta$

36. A particle is projected from ground at a height of 0.4 m from the ground, the velocity of a projectile in vector form is $\vec{v} = (6\hat{i} + 2\hat{j})$ m/s (the x-axis is horizontal and y-axis is vertically upwards). The angle of projection is (g = 10 m/s^2) :
(A) 45° (B) 60°
(C) 30° (D) $\tan^{-1}(3/4)$

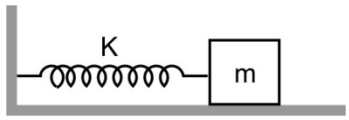
37. A uniform rope of length L, resting on frictionless horizontal surface is pulled at one end by a force F. Find the tension in the rope at distance ℓ from the end where force F is applied.



(A) $\frac{F\ell}{L}$
(B) $\frac{F(L-\ell)}{L}$
(C) $\frac{F\ell}{L+\ell}$
(D) $\frac{F\ell}{L-1}$

Space for Rough Work

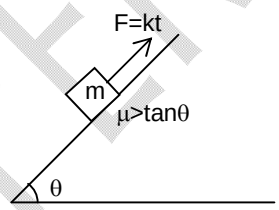
38. A block of mass m is attached to one end of a massless spring of spring constant K. The other end of the spring is fixed to a wall. The block can move on a horizontal rough surface. The coefficient of friction between the block and the surface is μ. The block is released when the spring has a compression of $\frac{2\mu mg}{K}$. Then the maximum speed of the block is



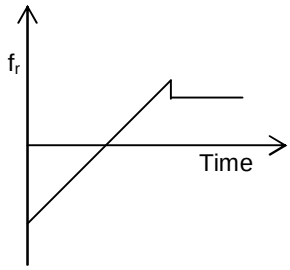
(A) $2\mu g\sqrt{\frac{m}{K}}$ (B) $\mu g\sqrt{\frac{m}{K}}$

(C) $\mu g\sqrt{\frac{2m}{K}}$ (D) $\mu g\sqrt{\frac{m}{2K}}$

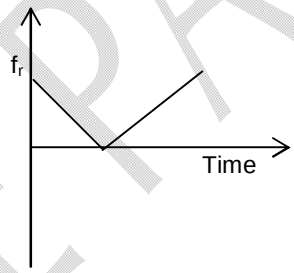
39. A block of mass m is placed on an inclined surface. Coefficient of friction between plane and block is $\mu > \tan\theta$. A force F = kt is applied on block at t = 0. Then which of the following represents variation of magnitude of frictional force with time.



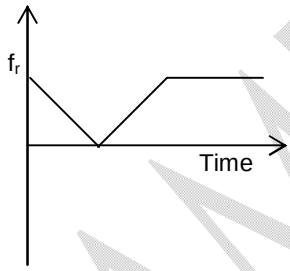
(A)



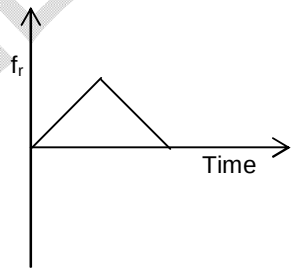
(B)



(C)

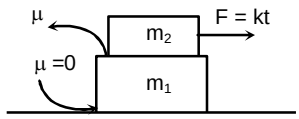


(D)



Space for Rough Work

40. If the arrangement shown find the minimum value of t so that there is a relative motion between m_1 and m_2



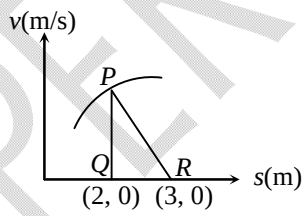
(A) $\dfrac{m_2 k}{m_1 + m_2}$

(B) $\dfrac{\mu m_2 g(m_1 + m_2)}{m_1 k}$

(C) $\dfrac{m_2}{m_1}$

(D) none of these

41. Velocity versus displacement curve of a particle moving in straight line is shown in the figure. From a point *P*, a line is drawn perpendicular to displacement axis and line *PR* is drawn normal to the curve at *P*. The magnitude of tangential acceleration of the particle at point *P* is



(A) 1 m/s^2 (B) 2 m/s^2

(C) 3 m/s^2 (D) 2.5 m/s^2

Space for Rough Work

CHEMISTRY – (PART – B)

*This part contains **14 Multiple Choice Questions** number **42 to 55.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

42. The value of $\frac{RT}{P}$ of an ideal gas is 100 L mol^{-1}. The density of the gas is 0.8 g/L. What is the vapour density of the gas?
(A) 160 (B) 80
(C) 40 (D) 20

43. What is the energy of the third orbit of hydrogen atom?
(A) -1.511 J (B) -1.511 eV
(C) +1.511 J (D) +1.511 eV

44. Which of the following orbital exerts the most poor shielding towards the valence electron(s)?
(A) $3p_x$ (B) $2p_x$
(C) 3s (D) $4d_{xy}$

45. Which of the following is a paramagnetic compound?
(A) K_2O (B) K_2S
(C) KO_2 (D) KOH

46. The velocity possessed by the maximum number of ideal gas molecules in a container can be expressed as:
(A) $\sqrt{\frac{3RT}{M}}$ (B) $\sqrt{\frac{2RT}{M}}$
(C) $\sqrt{\frac{8RT}{\pi M}}$ (D) $\sqrt{\frac{3RT}{\pi M}}$

Space for Rough Work

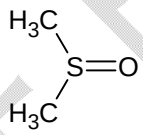
47. Equal mass of NaOH, Na_2CO_3 and $NaHCO_3$ mixture required one litre of 2 N HCl solution for neutralization reaction in presence of methyl orange indicator. What is the approximate mass of NaOH?
(A) 30.9 g (B) 36.3 g
(C) 38.2 g (D) 31.07 g

48. The orbital angular momentum of an electron in an orbital is $\frac{h}{\sqrt{2\pi}}$. How many angular node(s) or nodal plane(s) is/are possible for that orbital?
(A) 1 (B) 2
(C) zero (D) 3

49. Which has the highest value of second ionization energy?
(A) Li (B) Mg
(C) Na (D) Ca

50. Which of the following bond angle is **NOT** observed in PCl_5 molecule?
(A) 180^o (B) 120^o
(C) 72^o (D) 90^o

51. Which of the following symbol is assumed to be zero for a real gas under very high pressure?
(A) R(universal gas constant) (B) k(Boltzman constant)
(C) a(van der Waal's constant) (D) b(van der Waal's constant)

52. What is the oxidation number of sulphur in 
(A) +4 (B) -2
(C) zero (D) +2

53. Which of the following change is neither oxidation nor reduction?
(A) $MnO_4^- \longrightarrow MnO_4^{2-}$ (B) $Cr_2O_7^{2-} \longrightarrow CrO_4^{2-}$
(C) $S_2O_3^{2-} \longrightarrow S_4O_6^{2-}$ (D) $NO_3^- \longrightarrow NO_2^-$

54. Which of the following molecule is formed by 2p-2p overlapping according to valence bond theory?
(A) F_2 (B) HCl
(C) H_2 (D) H_2O

55. If the circumference of the third orbit of hydrogen atom is x m, what will be the wavelength of the electron motion along this orbit?
(A) $\frac{x}{3}m$ (B) $\frac{x}{9}m$
(C) 3 xm (D) 9 xm

Space for Rough Work

MATHEMATICS – (PART – C)

*This part contains **14 Multiple Choice Questions** number **56 to 69.** Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

56. $\lim\limits_{n\to\infty} \dfrac{(1+2+3+....+n)\left(1^3+2^3+3^3+....+n^3\right)}{\left(1^2+2^2+3^2+....+n^2\right)^2} =$

(A) $\dfrac{3}{8}$ (B) $\dfrac{5}{8}$

(C) $\dfrac{7}{8}$ (D) $\dfrac{9}{8}$

57. A set A has 3 elements and another set B has 6 elements. Then

(A) $3 \le n(A \cup B) \le 6$ (B) $3 \le n(A \cup B) \le 9$

(C) $6 \le n(A \cup B) \le 9$ (D) $0 \le n(A \cup B) \le 9$

58. If the difference between the roots of $x^2 + ax + b = 0$ is same as that of $x^2 + bx + a = 0,\ a \ne b$, then

(A) $a + b + 4 = 0$ (B) $a + b - 4 = 0$

(C) $a - b - 4 = 0$ (D) $a - b + 4 = 0$

59. The value $\left(\dfrac{1}{\sqrt{27}}\right)^{2-\left(\log_5 16/2\log_5 9\right)} =$

(A) $\dfrac{2\sqrt{2}}{27}$ (B) $\dfrac{4}{27}$

(C) $\dfrac{4\sqrt{2}}{27}$ (D) $\dfrac{8}{27}$

Space for Rough Work

60. Let $a_1, a_2, ..., a_{10}$ be in A.P. and $h_1, h_2, ..., h_{10}$ be in H.P. If $a_1 = h_1 = 2$ and $a_{10} = h_{10} = 3$, then $a_4 . h_7$ is

(A) 2 (B) 3
(C) 5 (D) 6

61. $3\tan^6 10^o - 27\tan^4 10^o + 33\tan^2 10^o =$

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

62. The point Q is the image of the point P (a, b) in the line $x - y = 0$. Then the foot of perpendicular from Q on the line $x + y = 0$ is

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

63. For all values of a and b the lines $(a + 2b)x + (a - b)y + a + 5b = 0$ pass through the point

(A) $(-1, 2)$ (B) (2, –1)
(C) (–2, 1) (D) (1, –2)

64. $\lim\limits_{x \to \frac{\pi}{2}} \frac{\cot x - \cos x}{(\pi - 2x)^3}$ equals

(A) $\frac{1}{16}$ (B) $\frac{1}{8}$
(C) $\frac{1}{4}$ (D) $\frac{1}{24}$

Space for Rough Work

65. Let p(x) be a quadratic polynomial such that $p(0)=1$. If p(x) leaves remainder 4 when divided by $x-1$ and it leaves remainder 6 when divided by $x+1$; then

(A) $p(-2)=11$ (B) $p(2)=11$

(C) $p(2)=19$ (D) $p(-2)=19$

66. If $\sum_{n=1}^{5}\frac{1}{n(n+1)(n+2)(n+3)}=\frac{k}{3}$, then k is equal to

(A) $\frac{55}{336}$ (B) $\frac{17}{105}$

(C) $\frac{1}{6}$ (D) $\frac{19}{112}$

67. If $\cos\alpha+\cos\beta=\frac{3}{2}$ and $\sin\alpha+\sin\beta=\frac{1}{2}$ and θ is the arithmetic mean of α and β, then $\sin 2\theta+\cos 2\theta$ is equal to

(A) $\frac{3}{5}$ (B) $\frac{4}{5}$

(C) $\frac{7}{5}$ (D) $\frac{8}{5}$

68. If α,β be the roots of $x^2+x+2=0$ and γ,δ be the roots of $x^2+3x+4=0$ then $(\alpha+\gamma)(\alpha+\delta)(\beta+\gamma)(\beta+\delta)=$

(A) –18 (B) 18

(C) 24 (D) 44

69. $\frac{2\sin x}{\sin 3x}+\frac{\tan x}{\tan 3x}=$

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

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

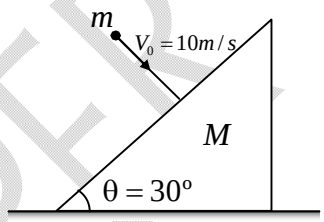
Space for Rough Work

PHYSICS – (PART – D)

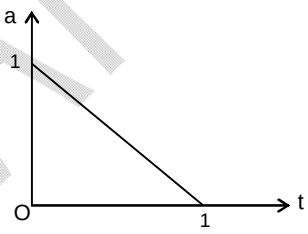
This part contains ***6 Numerical Based Questions*** *number* ***70 to 75.*** *Each question has* ***Single Digit Answer 0 to 9.***

70. A monkey of mass m is sitting on a platform of mass M. Monkey can jump with a velocity of 5 m/s making an angle 37^0 with the horizontal with respect to platform. If value of m/M is 0.7x, for the monkey to jump 1 meter with respect to the ground. Find out the value of 'x'. (take g = 10 m/s^2)

71. A ball of mass 1 kg moving with velocity 10 m/s collides perpendicularly on a smooth stationary wedge of mass 2kg. If the coefficient of restitution is e = 7/20 then find the velocity (in ms^{-1}) of ball after the collision.



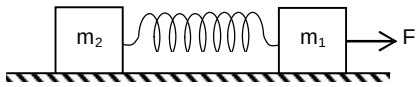
72. A particle starting from rest moves in a straight line with acceleration as shown in the a–t graph. Find the distance travelled by the particle in the first four seconds from start of its motion.



73. Eight men are standing at the vertices of a regular octagon of side length $(\sqrt{2}-1)$ m if each man starts moving towards man standing next to himself along the line joining them with velocity $\sqrt{2}$ m/s. Then find out time in which he will catch the other man.

74. Potential energy of a particle moving along x-axis is given by U = $\frac{x^3}{3}-\frac{9x^2}{2}+20x$. Find out position of stable equilibrium state.

75. Two blocks of masses m_1 = 1kg and m_2 = 2kg are connected by a non deformed light spring. They are lying on a rough horizontal surface. The coefficient of friction between the blocks and the surface is 0.4, what minimum constant force F (In N) has to be applied in horizontal direction to the block of mass m_1 in order to shift the other block? (g = 10 m/s^2)



Space for Rough Work

CHEMISTRY – (PART – E)

*This part contains **6 Numerical Based Questions** number **76 to 81.** Each question has **Single Digit Answer 0 to 9.***

76. How many moles of carbon atom(s) is/are present in 88 g of carbon dioxide?

77. The principal quantum number of an orbital is four. If this orbital experiences three radial nodes, what will be it's azimuthal quantum number?

78. How may electron(s) is/are present in the outermost orbit of the atom which has the lowest value of first ionization energy in the periodic table?

79. If the bond order of carbonate ion $\left(CO_3^{2-}\right)$ is expressed by the simple ratio x : y, the value of (x + y) will be

80. The root mean square velocity of NO at 400 K is equal to the most probable velocity of an unknown gas at 80 K. What is the molar mass of the unknown gas in gram unit?

81. Reaction of cuprous sulphide(Cu_2S) with oxygen (O_2) produces cupric oxide(CuO) and sulphur dioxide(SO_2) gas. If the equivalent mass of Cu_2S in the above reaction is expressed as $\frac{M}{n}$, where M is the molecular mass of Cu_2S, then the value of 'n' is

Space for Rough Work

MATHEMATICS – (PART – F)

*This part contains **6 Numerical Based Questions** number **82 to 87.** Each question has **Single Digit Answer 0 to 9.***

82. Sides of a triangle are $2x + y = 0,\ x + py = q,\ x - y = 3$. If $(2,3)$ is centroid of triangle then $p + q - 70 =$ _____

83. The sum of the infinite series $\frac{3}{1^2} + \frac{5}{1^2 + 2^2} + \frac{7}{1^2 + 2^2 + 3^2} + \ldots.$ is

84. Let α and β be the roots of equation $x^2 - 6x - 2 = 0$. If $a_n = \alpha^n - \beta^n$, for $n \geq 1$, then the value of $\frac{a_{10} - 2a_8}{2a_9}$ is equal to

85. The maximum value of the expression $\frac{1}{\sin^2\theta + 3\sin\theta\cos\theta + 5\cos^2\theta}$ is

86. If $a^x = bc,\ b^y = ca,\ c^z = ab$, then $\frac{x}{1+x} + \frac{y}{1+y} + \frac{z}{1+z} =$

87. The length, breadth and height of a rectangular box are in G.P. The volume is 27. If the total surface area is 78, then the length is

Space for Rough Work

FIITJEE ADMISSION TEST

CLASS – XII (PAPER – 2)

ANSWERS

1.	**C**	2.	**A**	3.	**D**	4.	**C**
5.	**A**	6.	**A**	7.	**B**	8.	**D**
9.	**C**	10.	**C**	11.	**B**	12.	**B**
13.	**C**	14.	**C**	15.	**C**	16.	**B**
17.	**B**	18.	**A**	19.	**A**	20.	**C**
21.	**C**	22.	**C**	23.	**D**	24.	**C**
25.	**B**	26.	**A**	27.	**C**	28.	**A**
29.	**D**	30.	**A**	31.	**C**	32.	**C**
33.	**B**	34.	**C**	35.	**B**	36.	**C**
37.	**B**	38.	**B**	39.	**C**	40.	**B**
41.	**A**	42.	**C**	43.	**B**	44.	**D**
45.	**C**	46.	**B**	47.	**B**	48.	**A**
49.	**A**	50.	**C**	51.	**C**	52.	**C**
53.	**B**	54.	**A**	55.	**A**	56.	**D**
57.	**C**	58.	**A**	59.	**A**	60.	**D**
61.	**B**	62.	**D**	63.	**C**	64.	**A**
65.	**D**	66.	**A**	67.	**C**	68.	**D**
69.	**D**	70.	**2**	71.	**2**	72.	**4**
73.	**1**	74.	**5**	75.	**8**	76.	**2**
77.	**0**	78.	**1**	79.	**7**	80.	**4**
81.	**8**	82.	**4**	83.	**6**	84.	**3**
85.	**2**	86.	**2**	87.	**9**		