FIITJEE PET – VII (REG_1ST YEAR)

MAINS_SET–A

DATE: 04.08.2018

Time: 3 hours **Maximum Marks: 360**

INSTRUCTIONS:

Instructions to the Candidates

1. This Test Booklet consists of **90 questions**.

   Use **Blue/Black ball Point Pen only** for writing particulars and bubbling of OMR.

2. For each correct answer **4 Marks** will awarded and for each wrong answer **1 Mark** will be deducted.

3. Attempt all questions.

4. In case you have not darkened any bubble you will be awarded 0 mark for that question.

5. Use of calculator/logarithmic table is not permitted.

Don't write / mark your answers in this question booklet.
If you mark the answers in question booklet, you will not be allowed to continue the exam.

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ENROLLMENT NO.: ☐☐☐☐☐☐☐☐☐☐☐☐

1. If the sum of the distance of a point from two perpendicular lines in a planes is 1, then its locus is
(A) square (B) circle (C) a straight line (D) two intersecting line

2. The straight line 4ax + 3by + c = 0, where a + b + c = 0, are concurrent at the point
(A) (4, 3) (B) $\left(\frac{1}{4},\frac{1}{3}\right)$ (C) $\left(\frac{1}{2},\frac{1}{3}\right)$ (D) none of these

3. Given the points A(0, 4) and B(0, –4), the equation of the locus of the point P(x, y) such that |AP – BP| = 6 is
(A) $9x^2 – 7y^2 + 63 = 0$ (B) $9x^2 – 7y^2 – 63 = 0$ (C) $7x^2 – 9y^2 + 63 = 0$ (D) $7x^2 – 9y^2 – 63 = 0$

4. If the equations y = mx + c and x cos α + y sin α = p represent the same straight line, then
(A) p = $c\sqrt{1+m^2}$ (B) c = $p\sqrt{1+m^2}$ (C) cp = $\sqrt{1+m^2}$ (D) $p^2 + c^2 + m^2 = 1$

5. The equation of the bisector of the acute angle between the lines 2x – y + 4 = 0 and x – 2y = 1 is
(A) x + y + 5 = 0 (B) x – y + 1 = 0 (C) x – y = 5 (D) none of these

6. Find the obtuse angle bisector of lines x + y + 1 = 0 and 4y + 2x – 1 = 0
(A) 7y + 5x + 2 = 0 (B) x – y + 4 = 0 (C) x – y + 2 = 0 (D) none of these

7. Find the angle bisector of lines x + y + 1 = 0 and 4y + 2x – 1 = 0 which contains point (1, 1)
(A) x – y + 2 = 0 (B) x – y + 4 = 0 (C) 7y + 5x + 2 = 0 (D) none of these

8. Find the fixed point through which the given family of lines always passes (a + b)x + (b + a)y = 0
(A) (0, 0) (B) (1, 1) (C) (2, 3) (D) (0, 1)

9. Consider a family of straight lines (x + y) + λ(2x – y) = 0 find the equation of the straight line belonging to this family that is farthest from (5, 2)
(A) 2y = 5x (B) 2x = 5y (C) 5y + 2x = 0 (D) 2y + 5x = 0

10. The family of straight lines (a + 3b)x + (b + a)y = a + 2b passes through a fixed point, that point is
(A) $\left(\frac{1}{2},\frac{1}{2}\right)$ (B) $\left(\frac{1}{2},\frac{2}{3}\right)$ (C) $\left(\frac{2}{3},\frac{1}{2}\right)$ (D) none of these

Space for rough work

11. The general solution of $\sin 4x = \frac{1}{2}$ is ($x \in I$)

(A) $\frac{n\pi}{4} + (-1)^n \frac{\pi}{12}$ (B) $n\pi + (-1)^n \frac{\pi}{6}$ (C) $\frac{n\pi}{4} + (-1)^n \frac{\pi}{24}$ (D) $n\pi \pm \frac{\pi}{6}$

12. The general solution of $\cos 3x = \frac{\sqrt{3}}{2}$ is, ($n \in I$)

(A) $2n\pi \pm \frac{\pi}{6}$ (B) $\frac{2n\pi}{3} \pm \frac{\pi}{18}$ (C) $2n\pi \pm \frac{\pi}{9}$ (D) $\frac{2n\pi}{3} \pm \frac{\pi}{2}$

13. The general solution of $\sec\theta = 2$ is ($n \in I$)

(A) $2n\pi \pm \frac{\pi}{3}$ (B) $2n\pi \pm \frac{\pi}{6}$ (C) no solution (D) $2n\pi$

14. The general solution of $\cos x = -\frac{2}{3}$ is $n \in I$

(A) $2n\pi \pm \left(\pi - \cos^{-1}\left(\frac{2}{3}\right)\right)$ (B) no solution

(C) $2n\pi \pm \left(-\cos^{-1}\left(\frac{2}{3}\right)\right)$ (D) none of these

15. If $4\cos^2\theta = 3$, then the values of θ are $n \in I$

(A) $2n\pi \pm \frac{\pi}{6}$ (B) $n\pi \pm \frac{\pi}{6}$ (C) $2n\pi \pm \frac{\pi}{3}$ (D) $n\pi \pm \frac{\pi}{3}$

16. The principal value of $\sin\theta = -\frac{\sqrt{3}}{2}$ is

(A) $\frac{5\pi}{3}$ (B) $\frac{\pi}{3}$ (C) $-\frac{\pi}{3}$ (D) $-\frac{5\pi}{3}$

17. The lines $2x + y - 1 = 0$, $ax + 3y - 3 = 0$, $3x + 2y - 2 = 0$ are concurrent

(A) for all a (B) for a = 4 only (C) for $-1 \le a \le 3$ (D) for a > 0 only

18. The equation of the line passing through the point of intersection of $2x + 3y = 1$, $3x + 4y = 6$ and parallel to $5x - 2y = 7$ is

(A) $5x - 2y - 88 = 0$ (B) $4x + 3y + 3 = 0$ (C) $5x - 2y - 7 = 0$ (D) $2x + y - 5 = 0$

Space for rough work

19. The point of concurrence of the lines $(3k + 1)x – (2k + 3)y + (9 – k) = 0$ is
(A) (1, 1) (B) (1, –1) (C) (3, 4) (D) (–2, 1)

20. If $3a + 2b + 4c = 0$, then the line $ax + by + c = 0$ pass through the fixed point is
(A) (3/4, 1/2) (B) (–3/4, 1/2) (C) (3/4, –1/2) (D) (–3/4, –1/2)

21. The equation of the line which passes through the point of intersection of the liens $x + 2y + 2 = 0$ and $2x + 5y + 3 = 0$ and which is at the maximum distance from the point (–2, –3) is
(A) $2x + y + 7 = 0$ (B) $x – 2y + 6 = 0$ (C) $x + 3y + 4 = 0$ (D) $2x – y + 3 = 0$

22. Let P = (–1, 0), Q = (0, 0) and R = $(3, 3\sqrt{3})$ be three points. Then the equation of the bisector of angle PQR is
(A) $\frac{\sqrt{3}}{2}x + y = 0$ (B) $x + \sqrt{3}y = 0$ (C) $\sqrt{3}x + y = 0$ (D) $x + \frac{\sqrt{3}}{2}y = 0$

23. The equation of the bisector of the acute angle between the lines $2x - y + 4 = 0$ and $x - 2y = 1$ is
(A) $x + y + 5 = 0$ (B) $x - y + 1 = 0$ (C) $x - y = 5$ (D) none of these

24. Slope of the line equally inclined to the lines $3x = 4y + 7$ and $5y = 12x + 6$ is
(A) 3/5 (B) 9/7 (C) 7/9 (D) 5/3

25. The acute angle bisector between the lines $3x – 4y – 5 = 0$, $5x + 12y – 26 = 0$ is
(A) $7x – 56y + 32 = 0$ (B) $9x – 3y + 13 = 0$
(C) $14x – 112y + 65 = 0$ (D) $7x – 13y + 9 = 0$

26. The line $3x – 3y + 17 = 0$ bisects the angle between a pair of lines of which one line is $2x + y + 4 = 0$, then the equation to the other line is
(A) $3x + 6y – 5 = 0$ (B) $3x + 6y – 7 = 0$ (C) $7x – y + 14 = 0$ (D) $4x – y + 3 = 0$

27. The line $(p + 2q)x + (p – 3q)y = p – q$ for different values of p and q passes through the fixed point
(A) $\left(\frac{3}{2}, \frac{5}{2}\right)$ (B) $\left(\frac{2}{5}, \frac{2}{5}\right)$ (C) $\left(\frac{3}{5}, \frac{3}{5}\right)$ (D) $\left(\frac{2}{5}, \frac{3}{5}\right)$

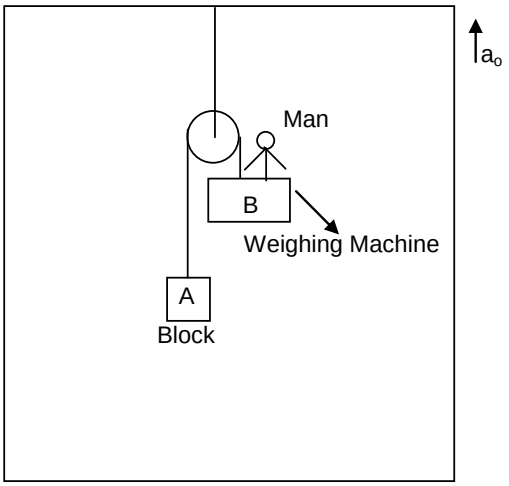
Space for rough work

28. The point on the line $x+y+3=0$ whose distance from $x+2y+2=0$ is $\sqrt{5}$ is
(A) (6, 9) (B) (–6, 9) (C) (9, 6) (D) (–9, 6)

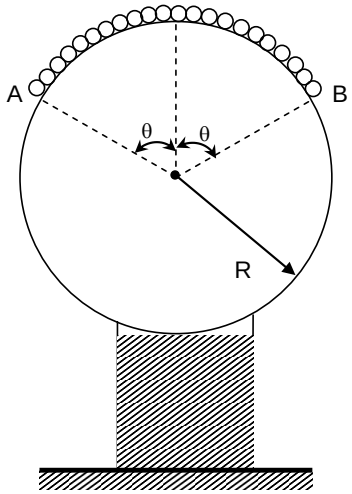
29. The bisector of the acute angle between the lines 3x – 4y + 7 = 0 and 12x + 5y – 2 = 0 is
(A) 11x + 3y – 9 = 0 (B) 21x + 77y – 101 = 0 (C) 11x – 3y + 9 = 0 (D) none of these

30. The equation of the bisector of the angle between two lines 3x – 4y + 12 = 0 and 12x – 5y + 7 = 0 which contains the points (–1, 4) is
(A) 21x + 27y – 121 = 0 (B) 21x – 27y + 121 = 0
(C) 21x + 27y + 191 = 0 (D) $\frac{-3x+4y-12}{5}=\frac{12x-5y+7}{13}$

31. A lift is moving upward with an acceleration of $a_0=5m/s^2$. In the shown fig. A is a block of mass 25 kg and B is massless weighing machine. A man of mass 50 kg is standing on the weighing machine and system is released. Then the weight shown by the weighing machine is _____. Take g = 10 m/s^2
(A) 500 N (B) 750 N
(C) 250 N (D) None of these



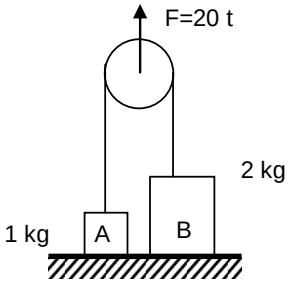
32. A chain AB having mass per unit Length λ kg/m is placed as shown in fig then normal reaction between chain and fixed sphere having radius R is _____
(A) $2\lambda R\theta g$ (B) $2\lambda R\theta.\sin\theta g$
(C) $2\lambda R\theta\cos\theta g$ (D) None of these



Space for rough work

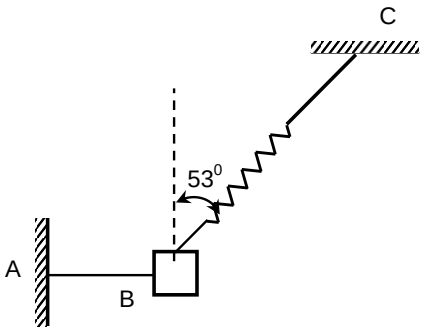
33. In the shown fig, both the blocks are resting on a horizontal floor and the pulley is held such that string remains just taut. At moment t = 0, a force F = 20 t Newton starts acting on the pulley along vertically upward direction as shown in fig. Then velocity of block A when block B loses contact with the floor _____

(A) 5 m/s (B) 10 m/s
(C) 15 m/s (D) 2.5 m/s



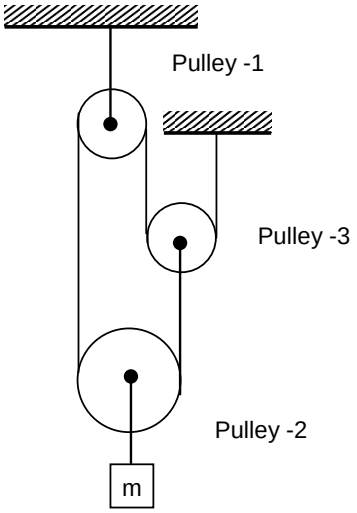
34. Initially the block shown in fig is in equilibrium. Find acceleration of the block just after the string AB burns

(A) g downward (B) $\frac{4g}{3}$ along the line BC
(C) $\frac{4g}{3}$ Right wards (D) $\frac{4g}{3}$ left wards



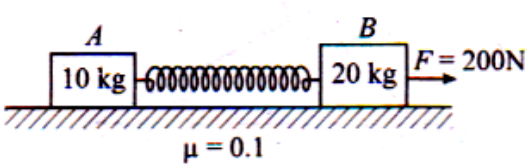
35. Initially the system is held such that all the strings are just taut. Now system is released then acceleration of pulley – 3 with respect to ground will be _____

(A) g downward (B) 2g downward
(C) 2g upward (D) None of these



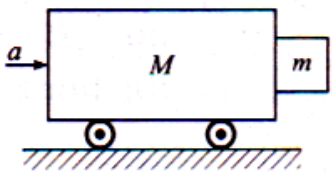
Space for rough work

36. Two blocks A and B, attached to each other by a massless springs, are kept on a rough horizontal surface (μ=0.1) and pulled by a force F = 200 N as shown in figure. If at some instant, the 10 kg has acceleration of 12 m/s^2, what is the acceleration of 20 kg mass ?



(A) 2.5 m/s^2 (B) 4.0 m/s^2
(C) 3.6 m/s^2 (D) 1.2 m/s^2

37. A car of mass M has a block of mass m in contact with it as shown in the figure. The coefficient of friction between the block and the cart is μ. What is the minimum acceleration of the cart so that the block m does not fall ?

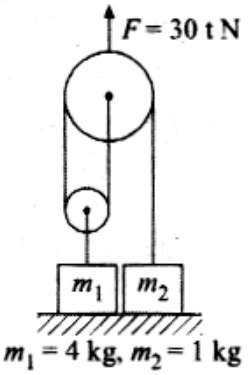


(A) μg (B) g/μ
(C) μ/g (D) $M\mu g/m$

38. A body of mass m is kept stationary on a rough inclined plane of angle of inclination θ. The magnitude of force acting on the body by the inclined plane is equal to
(A) mg (B) $mg\sin\theta$ (C) $mg\cos\theta$ (D) None

39 A ball weighing 10 gm hits a hard surface vertically with a speed of 5 m/s and rebounds with the same speed. The ball remains in contact with the surface for (0.01) sec. The average force exerted by the surface on the ball is.
(A) 100 N (B) 10 N (C) 1 N (D) 150 N

40. Force F is applied on upper pulley. If F = 30 t where t is time in second. Find the time when m_1 loses contact with floor: (take g = 10 m/s^2)
(A) 1 sec (B) 1.66 sec
(C) 2 sec (D) None of these

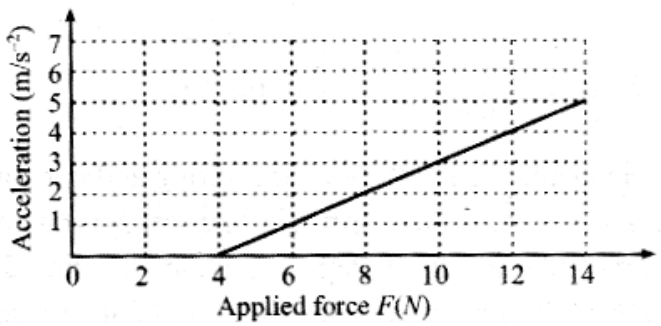


Space for rough work

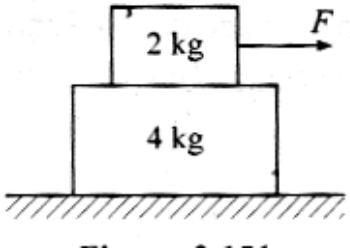
41. A spring of force constant k is cut into two pieces such that one piece is double the length of the other. Then the long piece will have a force constant of :
(A) (2/3) k (B) (3/2)k (C) 3k (D) 6k

42. A car starts from rest to cover a distance ***s***. The coefficient of friction between the road and the tyres is μ. The minimum time in which the car can cover the distance is proportional to:
(A) μ (B) $\sqrt{\mu}$ (C) $1/\mu$ (D) $1/\sqrt{\mu}$

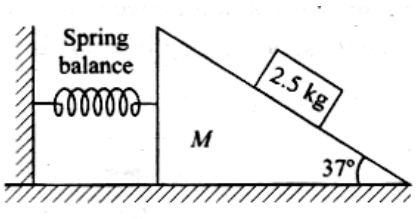
43. A block of unknown mass is at rest on a rough, horizontal surface. A horizontal force F is applied to the block. The graph in the figure shows the acceleration of the block with respect to the applied force. The mass of the block is
(A) 1.0 kg (B) 0.1 kg
(C) 2.0 kg (D) 0.2 kg



44. Consider the shown arrangement, the coefficient of friction between the two block is 0.5. There is no friction between 4 kg block and horizontal surface. If a horizontal force of 12 N is applied on 2kg block as shown in figure, acceleration of 4 kg block would be. (Take g = 10 m/s^2)
(A) 2.5 m/s^2 (B) 2 m/s^2
(C) 5 m/s^2 (D) None of these



45. Find the reading of spring balance as shown in figure. Assume that mass M is in equilibrium (There is no friction between wedge and small block)
(A) 8 N (B) 9 N
(C) 12 N (D) zero



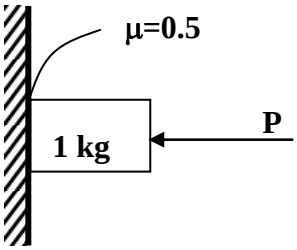
Space for rough work

46. A mass of 0.5 kg is just able to slide down the slope of an inclined rough surface when the angle of inclination is 60^0. The minimum force necessary to pull the mass up the incline along the line of greatest slope is (Take g = 10 m/s^2)

(A) 20 N (B) $5\sqrt{3}$ N (C) $\frac{5\sqrt{3}}{2}$N (D) 1 N

47. Minimum force required to keep a block of mass 1 kg at rest against a rough vertical wall is P. If a force P/2 is applied then the acceleration of the block will be(Take g = 10 m/s^2)

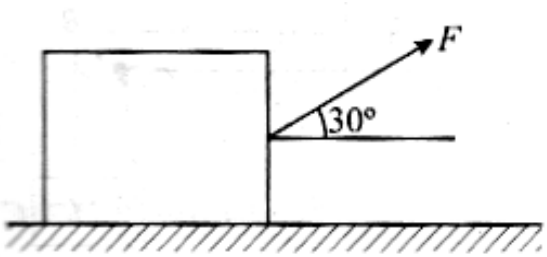
(A) 5 m/s^2 (B) 2.5 m/s^2
(C) 2 m/s^2 (D) 0.9 m/s^2



48. A mass m rests under the action of a force F as shown in the figure on a horizontal surface. The coefficient of friction between the mass and the surface is μ. The force of friction between the mass and the surface is

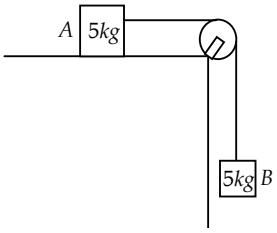
(A) μmg (B) $\mu\left[mg+\frac{F}{2}\right]$

(C) $\frac{F\sqrt{3}}{2}$ (D) $\mu\left[mg-\frac{F}{2}\right]$



49. A block of mass 5kg resting on a horizontal surface is connected by a cord, passing over a light frictionless pulley to a hanging block of mass 5 kg. The coefficient of kinetic friction between the block and the surface is 0.5. Tension in the cord is $\left(g=10m/s^2\right)$

(A) 49 N (B) zero
(C) 37. 5 N (D) None of these



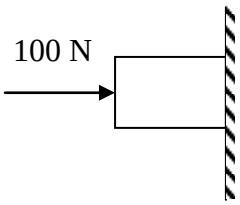
50. A 100 N force acts horizontally on a block of mass 10 kg placed on a horizontal rough table of co-efficient of friction $\mu=0.5$. If g at the place is $10m/s^2$, The velocity of the block after 4 seconds if it starts from rest is _____

(A) 20 m/s (B) 40 m/s (C) 5 m/s (D) None of these

Space for rough work

51. A car starts from rest. It has to come to rest after covering distance of 1000 m. The coefficient of friction between the road and the tyre is 1/4. The minimum time in which the car can cover this distance is($g = 10\ m/s^2$)
(A) 20 s (B) 10 s (C) 30 s (D) 40 s

52. A horizontal force of 100 N is necessary to just hold a block stationary against a wall. The co-efficient of friction between the block and wall is 0.2. The weight of the block is



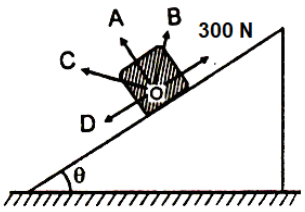
(A) 20 N (B) 50 N (C) 100 N (D) 2 N

53. A horizontal force, just sufficient to move a body of mass 4 kg lying on a rough horizontal surface is applied on it. The coefficients of static and kinetic friction between the body and the surface are 0.8 and 0.4 respectively. If the force continuous to act even after the block has started moving, the acceleration of the block in ms^{-2} is ($g = 10\ ms^{-2}$)
(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) 2 (D) 4

54. A homogeneous chain of length 12 m lies on a table. The coefficient of friction between the chain and the table is 0.2. The maximum length which can hang over the table in equilibrium is
(The vertical portion of table is smooth)
(A) 4 m (B) 6 m (C) 8 m (D) 2 m

55. The coefficient of friction of a surface is $\sqrt{3}$. What should be the angle of inclination so that a body placed on the surface just begins to slide down?
(A) 30° (B) 45° (C) 60° (D) 90°

56. A block of mass 10 kg lies on a rough inclined plane of inclination $\theta = \sin^{-1}(3/5)$ with the horizontal when a force of 300 N is applied on the block parallel to and upward the plane, the total force exerted by the plane on the block is nearly along (coefficient of friction is $\mu = 3/4$) ($g = 10\ m/s^2$)
(A) OA (B) OB
(C) OC (D) None of these



Space for rough work

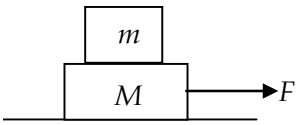
57. A block of mass 2kg is on a horizontal surface. The coefficient of static and kinetic frictions are 0.6 and 0.2. The minimum horizontal force required to start the motion is applied and if it is continued, the velocity acquired by the body at the end of the 1st second is $\left(g = 10 ms^{-2}\right)$.

(A) $8 ms^{-1}$ (B) $4 ms^{-1}$ (C) $2 ms^{-1}$ (D) zero

58. A man slides down on a telegraphic pole with an acceleration equal to half the acceleration due to gravity. The frictional force between man and pole is equal to in terms of man's weight w

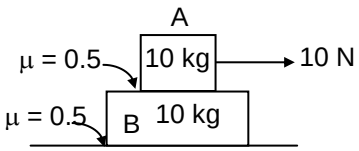
(A) $\frac{W}{4}$ (B) $\frac{W}{2}$ (C) $\frac{3W}{4}$ (D) w

59. A block of mass m = 8 kg is placed on another block of mass M= 2kg which itself is lying on a horizontal surface. The co-efficient of friction between two blocks is μ_1 = 0.8 and that between the block of mass M and horizontal surface is μ_2 = 0.2. What maximum horizontal force can be applied to the lower block, so that the two blocks move without separation?



(A) 100 N (B) 50 N (C) 120 N (D) None of these

60. F = 10 N, $m_A = m_B$ = 10 kg
(A) the force of friction acting on the block B by ground is 10 N
(B) the force of friction acting on the block A by block B is 20 N
(C) the block B will move with an acceleration of 0.5 m/s^2
(D) all the above



61. The reaction,
$3ClO^-(aq) \rightarrow ClO_3^-(aq) + 2Cl^-(aq)$ is an example of
is an example of
(A) oxidation reaction (B) reduction reaction
(C) disproportionation reaction (D) decomposition reaction

62. Carbon combines with hydrogen to form two compounds A and B. The percentage of hydrogen in A and B are 25% and 7.7% respectively. The empirical formula of A and B are respectively.
(A) CH_4, CH_2 (B) CH_2, CH (C) CH_4, CH (D) CH, CH_4

Space for rough work

63. The molarity of NO_3^- ion in the solution after 2.0 L of 3M $AgNO_3$ is mixed with 3L of 1.0 M $BaCl_2$ is
(A) 1.6 M (B) 1.2 M (C) 3.0 M (D) 1.0 M

64. The equivalent mass of an element is 4. Its chloride has vapour density 59.25. Then the valency of the element is
(A) 4 (B) 3 (C) 2 (D) 1

65. What weight of Na_2CO_3 of 95% purity would be required to neutralize 45.6 ml of 0.235 N H_2SO_4 acid ?
(A) 0.5679g (B) 0.6021g (C) 0.5978g (D) None

66. 1.82g of a metal required 32.5 ml of 1N HCl to dissolve it. What is equivalent weight of metal
(A) 42 (B) 48 (C) 56 (D) 63

67. In which of the following reactions, SO_2 behaves as an oxidizing agent ?
(A) $Cl_2 + SO_2 \rightarrow SO_2Cl_2$ (B) $2H_2S + SO_2 \rightarrow 3S + 2H_2O$
(C) $SO_2 + H_2O \rightarrow H_2SO_3$ (D) All the above

68. The normality of 0.5 M H_3PO_4 solution is
(A) 0 (B) 2 (C) 3 (D) 1.5

69. What volume of water should be added to 50 ml, 0.2 M HCl solution to make it 0.1 molar ?
(A) 100 ml (B) 150 ml (C) 50 ml (D) 250 ml

70. Calculate the total no. of oxygen atoms present in 18g of Glucose $(C_6H_{12}O_6)$
(A) 6.023×10^{23} (B) 36.13×10^{22} (C) $2 \times 6.023 \times 10^{23}$ (D) $4 \times 6.023 \times 10^{23}$

71. Two samples of HCl of 1.0 M and 0.25 M are mixed. Find volumes of these samples taken in order to prepare 0.75 M HCl solution. Assume no water is added
(I) 20 mL, 10 mL (II) 100 mL, 50 mL (III) 40 mL, 20 mL (D) 50 mL, 25 mL
(A) I, II, IV (B) I, II (C) II, II, IV (D) I, II, III, IV

72. The EW of H_3PO_4 in the reaction is $Ca(OH)_2 + H_3PO_4 \rightarrow CaHPO_4 + 2H_2O$
(A) 49 (B) 98 (C) 32.66 (D) 147

73. What is the normality of 10% $\frac{w}{v}$ of HNO_3 solution.
(A) 0.5 (B) 1.27 (C) 1.58 (D) 0.7

Space for rough work

74. For the reaction $N_2 + H_2 \rightarrow 2NH_3$, if molecular mass of NH_3 and N_2 are M_1 & M_2, their equivalent masses are E_1 & E_2, then $E_1 - E_2$ = ____

(A) $2M_1 - 2M_2$ (B) $\frac{2M_1 - M_2}{6}$ (C) $\frac{2M_1 - M_2}{4}$ (D) $2M_2 - M_1$

75. If 50 ml of 0.1 M $K_3[Fe(CN)_6]$ is reduced by some amount N_2H_4, then the no. of moles of N_2H_4 required for the above reaction is $K_3\left[Fe(CN)_6\right] + N_2H_4 \longrightarrow K_4\left[Fe(CN)_6\right] + N_2$.

(A) 1.25×10^{-3} (B) 10^{-2} (C) 5×10^{-3} (D) 2.5×10^{-3}

76. If 1 mole of ozone (O_3) is removed from a sample weighting 144g; then the number of gram molecules of ozone left is

(A) 2.5 (B) 2 (C) 2.9 (D) 1.5

77. Two elements P and Q form the compounds P_2Q_3 and PQ_2. If 0.15 mole of P_2Q_3 weighs 15.9 gr and 0.15 mole of PQ_2 weighs 9.3g, then the atomic weights of P and Q are respectively

(A) 24 and 18 (B) 24 and 20 (C) 26 and 18 (D) 26 and 20

78. 14 g of monovalent element X combines with 16 g of oxygen. On the basis of this information, which of the following is a correct statement?

(A) The element X could have an atomic weight of 14 and its oxide is XO_2
(B) The element X could have an atomic weight of 14 and its oxide is X_2O
(C) The element X could have an atomic weight of 7 and its oxide is XO
(D) The element X could have an atomic weight of 7 and its oxide is X_2O

79. Dehydration of sucrose by conc.H_2SO_4 gives purest form of carbon. The amount of carbon which can be obtained from 34.2 g of sucrose is

(A) 7.2 g (B) 14.4 g (C) 3.2 g (D) 12 g

80. 4.5×10^{-3} mole of a solution containing an ion AO_3^{-n} require 1.5×10^{-3} mole $Cr_2O_7^{2-}$ for the oxidation of AO_4^{-3} in acid medium. What is the value of n?

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

81. 0.25 gram atom of oxygen, 5.6 litres of nitrogen at STP and 1.5×10^{23} molecules of CO_2 are present in a vessel. The total mass of the above mixture is

(A) 26 g (B) 22 g (C) 24 g (D) 12 g

Space for rough work

82. 0.2 mol of Na_3PO_4 and 0.5 mol of $Ba(NO_3)_2$ are mixed in 1 litre of solution. Regarding this, wrong statement is
(A) 0.2 mol barium phosphate precipitate is obtained
(B) 0.1 mol barium phosphate precipitate is obtained
(C) Molarity of Ba^{+2} ions in the resulting solution is 0.2 M
(D) Molarities of Na^+ and NO_3^- ions are 0.6 M and 1 M respectively

83. $xMnO_4^- + H_2O + yI^- \longrightarrow MnO_2 + OH^- + I_2$. The ratio of coefficients x and y in the balanced equation of the above reaction is
(A) 1 : 3 (B) 1 : 1 (C) 2 : 3 (D) 1 : 2

84. Average oxidation number of nitrogen is ammonium nitrate is
(A) zero (B) –1 (C) +1 (D) +3

85. The molar ratio of Fe^{+2} to Fe^{+3} ions in a mixture of $FeSO_4$ and $Fe_2(SO_4)_3$ having equal number of sulphate ions in both ferrous and ferric sulphate
(A) 1 : 2 (B) 3 : 2 (C) 2 : 3 (D) None of these

86. Consider the unbalanced equation, $SbCl_3 + KIO_3 + HCl \rightarrow SbCl_5 + ICl + KCl + H_2O$. If coefficient of KIO_3 is maintained as 1, the sum of coefficients of all the products will be :
(A) 8.5 (B) 16 (C) 7 (D) none of these

87. Indicate the values of the coefficients p, q, r in the following equation in that order
$p\ K_3[Fe(CN)_6] + q\ KOH + r\ Cr_2O_3 \rightarrow p\ K_4[Fe(CN)_6] + 2r\ K_2CrO_4 + q/2\ H_2O$
(A) 6, 10, 2 (B) 6, 5, 1 (C) 6, 5, 2 (D) 6, 10, 1

88. The n–factor of Br_2 in the following reaction
$Br_2 + OH^- \longrightarrow Br^- + BrO_3^-$ is
(A) $\frac{4}{3}$ (B) $\frac{5}{3}$ (C) $\frac{7}{3}$ (D) $\frac{2}{3}$

89. The n–factor of HCl in the following reaction
$KMnO_4 + HCl \longrightarrow KCl + MnCl_2 + Cl_2 + H_2O$ is
(A) $\frac{8}{5}$ (B) 2 (C) $\frac{5}{8}$ (D) 1

90. Mole fraction of solute in aqueous HCl solution is 0.2. The molality of HCl solution is
(A) 13.88 (B) 1.388 (C) 0.138 (D) 0.0138

Space for rough work

FIITJEE PET – VII (REG_1ST YEAR)

MAINS_SET–A_ANSWERS

DATE: 04.08.2018

MATHEMATICS

1.	**A**	2.	**B**	3.	**A**	4.	**B**
5.	**B**	6.	**D**	7.	**D**	8.	**A**
9.	**D**	10.	**A**	11.	**C**	12.	**B**
13.	**A**	14.	**A**	15.	**B**	16.	**C**
17.	**A**	18.	**A**	19.	**C**	20.	**A**
21.	**B**	22.	**C**	23.	**B**	24.	**B**
25.	**C**	26.	**A**	27.	**D**	28.	**D**
29.	**C**	30.	**A**				

PHYSICS

31.	**A**	32.	**A**	33.	**A**	34.	**C**
35.	**C**	36.	**A**	37.	**B**	38.	**A**
39.	**B**	40.	**C**	41.	**B**	42.	**D**
43.	**C**	44.	**B**	45.	**C**	46.	**B**
47.	**A**	48.	**C**	49.	**C**	50.	**A**
51.	**D**	52.	**A**	53.	**D**	54.	**D**
55.	**C**	56.	**C**	57.	**B**	58.	**B**
59.	**A**	60.	**A**				

CHEMISTRY

61.	**C**	62.	**C**	63.	**B**	64.	**B**
65.	**C**	66.	**C**	67.	**B**	68.	**D**
69.	**C**	70.	**B**	71.	**D**	72.	**A**
73.	**C**	74.	**B**	75.	**A**	76.	**B**
77.	**C**	78.	**D**	79.	**B**	80.	**B**
81.	**B**	82.	**A**	83.	**A**	84.	**C**
85.	**B**	86.	**C**	87.	**D**	88.	**B**
89.	**C**	90.	**A**				

FIITJEE PET – VII (REG_1ST YEAR)

MAINS_SET–B

DATE: 04.08.2018

Time: 3 hours **Maximum Marks: 360**

INSTRUCTIONS:

Instructions to the Candidates

1. This Test Booklet consists of **90 questions**.

   Use **Blue/Black ball Point Pen only** for writing particulars and bubbling of OMR.

2. For each correct answer **4 Marks** will awarded and for each wrong answer **1 Mark** will be deducted.

3. Attempt all questions.

4. In case you have not darkened any bubble you will be awarded 0 mark for that question.

5. Use of calculator/logarithmic table is not permitted.

Don't write / mark your answers in this question booklet.
If you mark the answers in question booklet, you will not be allowed to continue the exam.

NAME: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

ENROLLMENT NO.: ☐☐☐☐☐☐☐☐☐☐

1. The point of concurrence of the lines $(3k + 1)x – (2k + 3)y + (9 – k) = 0$ is
(A) (1, 1) (B) (1, –1) (C) (3, 4) (D) (–2, 1)

2. If $3a + 2b + 4c = 0$, then the line $ax + by + c = 0$ pass through the fixed point is
(A) (3/4, 1/2) (B) (–3/4, 1/2) (C) (3/4, –1/2) (D) (–3/4, –1/2)

3. The equation of the line which passes through the point of intersection of the liens $x + 2y + 2 = 0$ and $2x + 5y + 3 = 0$ and which is at the maximum distance from the point (–2, –3) is
(A) $2x + y + 7 = 0$ (B) $x – 2y + 6 = 0$ (C) $x + 3y + 4 = 0$ (D) $2x – y + 3 = 0$

4. Let P = (–1, 0), Q = (0, 0) and R = $(3, 3\sqrt{3})$ be three points. Then the equation of the bisector of angle PQR is
(A) $\frac{\sqrt{3}}{2}x + y = 0$ (B) $x + \sqrt{3}y = 0$ (C) $\sqrt{3}x + y = 0$ (D) $x + \frac{\sqrt{3}}{2}y = 0$

5. The equation of the bisector of the acute angle between the lines $2x - y + 4 = 0$ and $x - 2y = 1$ is
(A) $x + y + 5 = 0$ (B) $x - y + 1 = 0$ (C) $x - y = 5$ (D) none of these

6. Slope of the line equally inclined to the lines $3x = 4y + 7$ and $5y = 12x + 6$ is
(A) 3/5 (B) 9/7 (C) 7/9 (D) 5/3

7. The general solution of $\sec\theta = 2$ is ($n \in I$)
(A) $2n\pi \pm \frac{\pi}{3}$ (B) $2n\pi \pm \frac{\pi}{6}$ (C) no solution (D) $2n\pi$

8. The general solution of $\cos x = -\frac{2}{3}$ is $n \in I$
(A) $2n\pi \pm \left(\pi - \cos^{-1}\left(\frac{2}{3}\right)\right)$ (B) no solution
(C) $2n\pi \pm \left(-\cos^{-1}\left(\frac{2}{3}\right)\right)$ (D) none of these

9. If $4\cos^2\theta = 3$, then the values of θ are $n \in I$
(A) $2n\pi \pm \frac{\pi}{6}$ (B) $n\pi \pm \frac{\pi}{6}$ (C) $2n\pi \pm \frac{\pi}{3}$ (D) $n\pi \pm \frac{\pi}{3}$

Space for rough work

10. The principal value of $\sin\theta = -\frac{\sqrt{3}}{2}$ is

(A) $\frac{5\pi}{3}$ (B) $\frac{\pi}{3}$ (C) $-\frac{\pi}{3}$ (D) $-\frac{5\pi}{3}$

11. The lines 2x + y – 1 = 0, ax + 3y – 3 = 0, 3x + 2y – 2 = 0 are concurrent
(A) for all a (B) for a = 4 only (C) for $-1 \le a \le 3$ (D) for a > 0 only

12. The equation of the line passing through the point of intersection of 2x + 3y = 1, 3x + 4y = 6 and parallel to 5x – 2y = 7 is
(A) 5x – 2y – 88 = 0 (B) 4x + 3y + 3 = 0 (C) 5x – 2y – 7 = 0 (D) 2x + y – 5 = 0

13. The acute angle bisector between the lines 3x – 4y – 5 = 0, 5x + 12y – 26 = 0 is
(A) 7x – 56 y + 32 = 0 (B) 9x – 3y + 13 = 0
(C) 14x – 112y + 65 = 0 (D) 7x –13y + 9 = 0

14. The line 3x – 3y + 17 = 0 bisects the angle between a pair of lines of which one line is 2x + y + 4 = 0, then the equation to the other line is
(A) 3x + 6y – 5 = 0 (B) 3x + 6y – 7 = 0 (C) 7x – y + 14 = 0 (D) 4x – y + 3 = 0

15. The line (p + 2q)x + (p – 3q)y = p – q for different values of p and q passes through the fixed point
(A) $\left(\frac{3}{2},\frac{5}{2}\right)$ (B) $\left(\frac{2}{5},\frac{2}{5}\right)$ (C) $\left(\frac{3}{5},\frac{3}{5}\right)$ (D) $\left(\frac{2}{5},\frac{3}{5}\right)$

16. The point on the line $x+y+3=0$ whose distance from $x+2y+2=0$ is $\sqrt{5}$ is
(A) (6, 9) (B) (–6, 9) (C) (9, 6) (D) (–9, 6)

17. The bisector of the acute angle between the lines 3x – 4y + 7 = 0 and 12x + 5y – 2 = 0 is
(A) 11x + 3y – 9 = 0 (B) 21x + 77y – 101 = 0 (C) 11x – 3y + 9 = 0 (D) none of these

18. The equation of the bisector of the angle between two lines 3x – 4y + 12 = 0 and 12x – 5y + 7 = 0 which contains the points (–1, 4) is
(A) 21x + 27y – 121 = 0 (B) 21x – 27y + 121 = 0
(C) 21x + 27y + 191 = 0 (D) $\frac{-3x+4y-12}{5} = \frac{12x-5y+7}{13}$

19. Find the angle bisector of lines x + y + 1 = 0 and 4y + 2x – 1 = 0 which contains point (1, 1)
(A) x – y + 2 = 0 (B) x – y + 4 = 0 (C) 7y + 5x + 2 = 0 (D) none of these

Space for rough work

20. Find the fixed point through which the given family of lines always passes (a + b)x + (b + a)y = 0
(A) (0, 0) (B) (1, 1) (C) (2, 3) (D) (0, 1)

21. Consider a family of straight lines (x + y) + λ(2x – y) = 0 find the equation of the straight line belonging to this family that is farthest from (5, 2)
(A) 2y = 5x (B) 2x = 5y (C) 5y + 2x = 0 (D) 2y + 5x = 0

22. The family of straight lines (a + 3b)x + (b + a)y = a + 2b passes through a fixed point, that point is
(A) $\left(\frac{1}{2},\frac{1}{2}\right)$ (B) $\left(\frac{1}{2},\frac{2}{3}\right)$ (C) $\left(\frac{2}{3},\frac{1}{2}\right)$ (D) none of these

23. The general solution of sin 4x = $\frac{1}{2}$ is (x ∈ I)
(A) $\frac{n\pi}{4}+(-1)^n\frac{\pi}{12}$ (B) $n\pi+(-1)^n\frac{\pi}{6}$ (C) $\frac{n\pi}{4}+(-1)^n\frac{\pi}{24}$ (D) $n\pi\pm\frac{\pi}{6}$

24. The general solution of cos 3x = $\frac{\sqrt{3}}{2}$ is, (n ∈ I)
(A) $2n\pi\pm\frac{\pi}{6}$ (B) $\frac{2n\pi}{3}\pm\frac{\pi}{18}$ (C) $2n\pi\pm\frac{\pi}{9}$ (D) $\frac{2n\pi}{3}\pm\frac{\pi}{2}$

25. If the sum of the distance of a point from two perpendicular lines in a planes is 1, then its locus is
(A) square (B) circle (C) a straight line (D) two intersecting line

26. The straight line 4ax + 3by + c = 0, where a + b + c = 0, are concurrent at the point
(A) (4, 3) (B) $\left(\frac{1}{4},\frac{1}{3}\right)$ (C) $\left(\frac{1}{2},\frac{1}{3}\right)$ (D) none of these

27. Given the points A(0, 4) and B(0, –4), the equation of the locus of the point P(x, y) such that |AP – BP| = 6 is
(A) $9x^2 – 7y^2 + 63 = 0$ (B) $9x^2 – 7y^2 – 63 = 0$ (C) $7x^2 – 9y^2 + 63 = 0$ (D) $7x^2 – 9y^2 – 63 = 0$

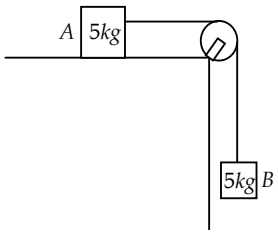
28. If the equations y = mx + c and x cos α + y sin α = p represent the same straight line, then
(A) $p = c\sqrt{1+m^2}$ (B) $c = p\sqrt{1+m^2}$ (C) $cp = \sqrt{1+m^2}$ (D) $p^2 + c^2 + m^2 = 1$

Space for rough work

29. The equation of the bisector of the acute angle between the lines $2x - y + 4 = 0$ and $x - 2y = 1$ is
(A) $x + y + 5 = 0$ (B) $x - y + 1 = 0$ (C) $x - y = 5$ (D) none of these

30. Find the obtuse angle bisector of lines $x + y + 1 = 0$ and $4y + 2x - 1 = 0$
(A) $7y + 5x + 2 = 0$ (B) $x - y + 4 = 0$ (C) $x - y + 2 = 0$ (D) none of these

31. A block of mass 5kg resting on a horizontal surface is connected by a cord, passing over a light frictionless pulley to a hanging block of mass 5 kg. The coefficient of kinetic friction between the block and the surface is 0.5. Tension in the cord is $\left(g = 10 m/s^2\right)$

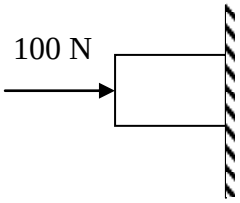


(A) 49 N (B) zero
(C) 37. 5 N (D) None of these

32. A 100 N force acts horizontally on a block of mass 10 kg placed on a horizontal rough table of co-efficient of friction $\mu = 0.5$. If g at the place is $10 m/s^2$, The velocity of the block after 4 seconds if it starts from rest is _____
(A) 20 m/s (B) 40 m/s (C) 5 m/s (D) None of these

33. A car starts from rest. It has to come to rest after covering distance of 1000 m. The coefficient of friction between the road and the tyre is 1/4. The minimum time in which the car can cover this distance is($g = 10\ m/s^2$)
(A) 20 s (B) 10 s (C) 30 s (D) 40 s

34. A horizontal force of 100 N is necessary to just hold a block stationary against a wall. The co-efficient of friction between the block and wall is 0.2. The weight of the block is



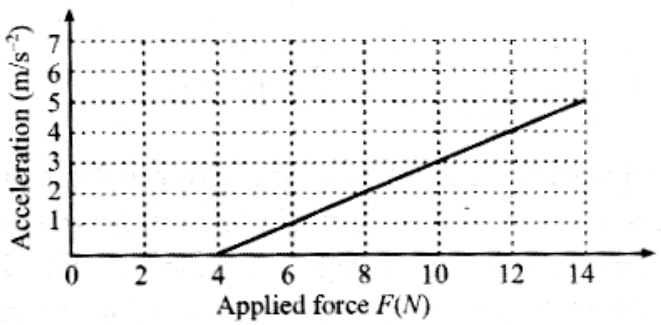
(A) 20 N (B) 50 N (C) 100 N (D) 2 N

35. A horizontal force, just sufficient to move a body of mass 4 kg lying on a rough horizontal surface is applied on it. The coefficients of static and kinetic friction between the body and the surface are 0.8 and 0.4 respectively. If the force continuous to act even after the block has started moving, the acceleration of the block in ms^{-2} is ($g = 10\ ms^{-2}$)
(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) 2 (D) 4

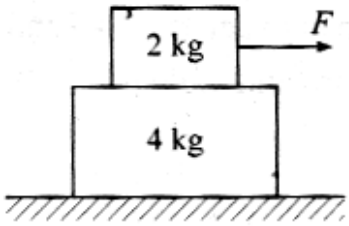
Space for rough work

36. A homogeneous chain of length 12 m lies on a table. The coefficient of friction between the chain and the table is 0.2. The maximum length which can hang over the table in equilibrium is
(The vertical portion of table is smooth)
(A) 4 m (B) 6 m (C) 8 m (D) 2 m

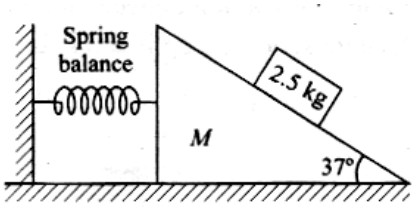
37. A block of unknown mass is at rest on a rough, horizontal surface. A horizontal force F is applied to the block. The graph in the figure shows the acceleration of the block with respect to the applied force. The mass of the block is
(A) 1.0 kg (B) 0.1 kg
(C) 2.0 kg (D) 0.2 kg



38. Consider the shown arrangement, the coefficient of friction between the two block is 0.5. There is no friction between 4 kg block and horizontal surface. If a horizontal force of 12 N is applied on 2kg block as shown in figure, acceleration of 4 kg block would be. (Take g = 10 m/s^2)
(A) 2.5 m/s^2 (B) 2 m/s^2
(C) 5 m/s^2 (D) None of these



39. Find the reading of spring balance as shown in figure. Assume that mass M is in equilibrium (There is no friction between wedge and small block)
(A) 8 N (B) 9 N
(C) 12 N (D) zero

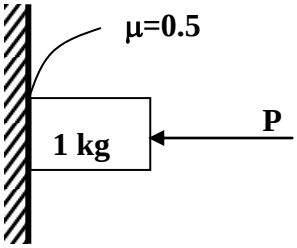


40. A mass of 0.5 kg is just able to slide down the slope of an inclined rough surface when the angle of inclination is 60^0. The minimum force necessary to pull the mass up the incline along the line of greatest slope is (Take g = 10 m/s^2)

(A) 20 N (B) $5\sqrt{3}$ N (C) $\frac{5\sqrt{3}}{2}$N (D) 1 N

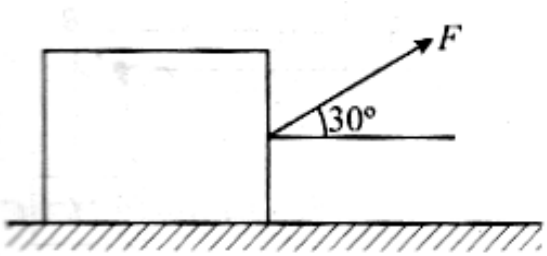
Space for rough work

41. Minimum force required to keep a block of mass 1 kg at rest against a rough vertical wall is P. If a force P/2 is applied then the acceleration of the block will be(Take g = 10 m/s^2)



(A) 5 m/s^2 (B) 2.5 m/s^2
(C) 2 m/s^2 (D) 0.9 m/s^2

42. A mass m rests under the action of a force F as shown in the figure on a horizontal surface. The coefficient of friction between the mass and the surface is μ. The force of friction between the mass and the surface is



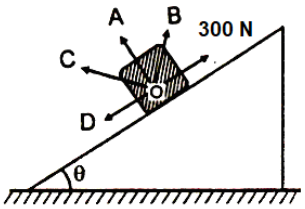
(A) μmg (B) $\mu\left[mg+\frac{F}{2}\right]$

(C) $\frac{F\sqrt{3}}{2}$ (D) $\mu\left[mg-\frac{F}{2}\right]$

43. The coefficient of friction of a surface is $\sqrt{3}$. What should be the angle of inclination so that a body placed on the surface just begins to slide down?

(A) 30° (B) 45° (C) 60° (D) 90°

44. A block of mass 10 kg lies on a rough inclined plane of inclination $\theta = \sin^{-1}(3/5)$ with the horizontal when a force of 300 N is applied on the block parallel to and upward the plane, the total force exerted by the plane on the block is nearly along (coefficient of friction is $\mu = 3/4$) (g = 10 m/s^2)



(A) OA (B) OB
(C) OC (D) None of these

45. A block of mass 2kg is on a horizontal surface. The coefficient of static and kinetic frictions are 0.6 and 0.2. The minimum horizontal force required to start the motion is applied and if it is continued, the velocity acquired by the body at the end of the 1st second is $\left(g=10ms^{-2}\right)$.

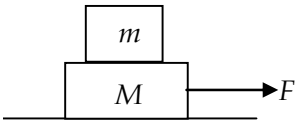
(A) $8ms^{-1}$ (B) $4ms^{-1}$ (C) $2ms^{-1}$ (D) zero

Space for rough work

46. A man slides down on a telegraphic pole with an acceleration equal to half the acceleration due to gravity. The frictional force between man and pole is equal to in terms of man's weight w

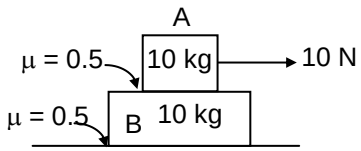
(A) $\frac{W}{4}$ (B) $\frac{W}{2}$ (C) $\frac{3W}{4}$ (D) w

47. A block of mass m = 8 kg is placed on another block of mass M= 2kg which itself is lying on a horizontal surface. The co-efficient of friction between two blocks is μ_1 = 0.8 and that between the block of mass M and horizontal surface is μ_2 = 0.2. What maximum horizontal force can be applied to the lower block, so that the two blocks move without separation?

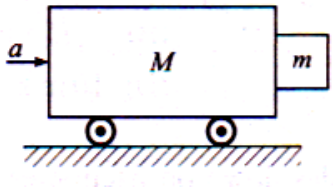


(A) 100 N (B) 50 N (C) 120 N (D) None of these

48. F = 10 N, $m_A = m_B$ = 10 kg
(A) the force of friction acting on the block B by ground is 10 N
(B) the force of friction acting on the block A by block B is 20 N
(C) the block B will move with an acceleration of 0.5 m/s^2
(D) all the above



49. A car of mass M has a block of mass m in contact with it as shown in the figure. The coefficient of friction between the block and the cart is μ. What is the minimum acceleration of the cart so that the block m does not fall ?



(A) μg (B) g/μ
(C) μ/g (D) Mμg/m

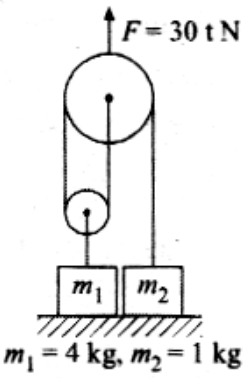
50. A body of mass m is kept stationary on a rough inclined plane of angle of inclination θ. The magnitude of force acting on the body by the inclined plane is equal to
(A) mg (B) mgsinθ (C) mgcosθ (D) None

51 A ball weighing 10 gm hits a hard surface vertically with a speed of 5 m/s and rebounds with the same speed. The ball remains in contact with the surface for (0.01) sec. The average force exerted by the surface on the ball is.
(A) 100 N (B) 10 N (C) 1 N (D) 150 N

Space for rough work

52. Force F is applied on upper pulley. If F = 30 t where t is time in second. Find the time when m_1 loses contact with floor: (take g = 10 m/s^2)

(A) 1 sec (B) 1.66 sec
(C) 2 sec (D) None of these



53. A spring of force constant k is cut into two pieces such that one piece is double the length of the other. Then the long piece will have a force constant of :

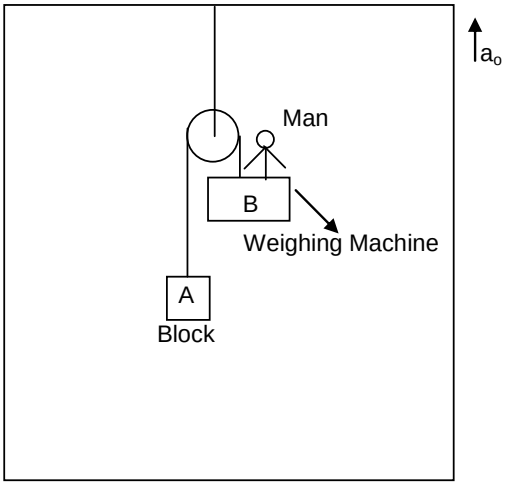
(A) (2/3) k (B) (3/2)k (C) 3k (D) 6k

54. A car starts from rest to cover a distance ***s***. The coefficient of friction between the road and the tyres is μ. The minimum time in which the car can cover the distance is proportional to:

(A) μ (B) $\sqrt{\mu}$ (C) 1/ μ (D) 1/$\sqrt{\mu}$

55. A lift is moving upward with an acceleration of $a_0 = 5 m/s^2$. In the shown fig. A is a block of mass 25 kg and B is massless weighing machine. A man of mass 50 kg is standing on the weighing machine and system is released. Then the weight shown by the weighing machine is _____. Take g = 10 m/s^2

(A) 500 N (B) 750 N
(C) 250 N (D) None of these

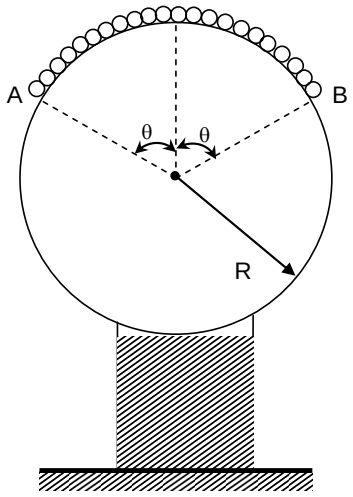


Space for rough work

56. A chain AB having mass per unit Length λ kg/m is placed as shown in fig then normal reaction between chain and fixed sphere having radius R is _____

(A) $2\lambda R\theta g$ (B) $2\lambda R\theta.\sin\theta g$

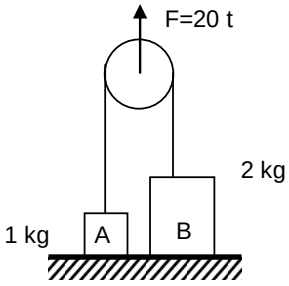
(C) $2\lambda R\theta\cos\theta g$ (D) None of these



57. In the shown fig, both the blocks are resting on a horizontal floor and the pulley is held such that string remains just taut. At moment t = 0, a force F = 20 t Newton starts acting on the pulley along vertically upward direction as shown in fig. Then velocity of block A when block B loses contact with the floor _____

(A) 5 m/s (B) 10 m/s

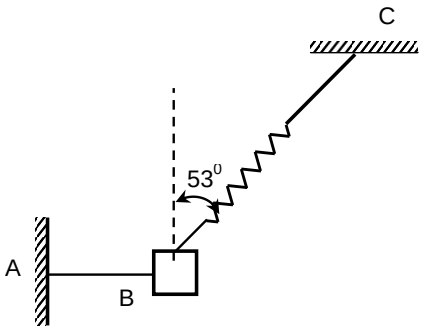
(C) 15 m/s (D) 2.5 m/s



58. Initially the block shown in fig is in equilibrium. Find acceleration of the block just after the string AB burns

(A) g downward (B) $\frac{4g}{3}$ along the line BC

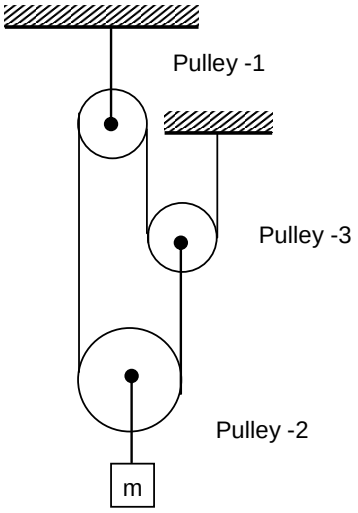
(C) $\frac{4g}{3}$ Right wards (D) $\frac{4g}{3}$ left wards



Space for rough work

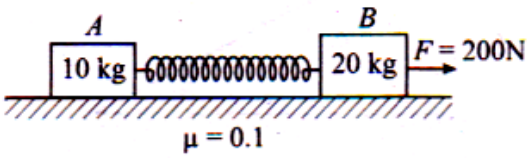
59. Initially the system is held such that all the strings are just taut. Now system is released then acceleration of pulley – 3 with respect to ground will be _____

(A) g downward (B) 2g downward
(C) 2g upward (D) None of these



60. Two blocks A and B, attached to each other by a massless springs, are kept on a rough horizontal surface (μ=0.1) and pulled by a force F = 200 N as shown in figure. If at some instant, the 10 kg has acceleration of 12 m/s^2, what is the acceleration of 20 kg mass ?

(A) 2.5 m/s^2 (B) 4.0 m/s^2
(C) 3.6 m/s^2 (D) 1.2 m/s^2



61. Dehydration of sucrose by conc.H_2SO_4 gives purest form of carbon. The amount of carbon which can be obtained from 34.2 g of sucrose is

(A) 7.2 g (B) 14.4 g (C) 3.2 g (D) 12 g

62. 4.5×10^{-3} mole of a solution containing an ion AO_3^{-n} require 1.5×10^{-3} mole $Cr_2O_7^{2-}$ for the oxidation of AO_4^{-3} in acid medium. What is the value of n?

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

63. 0.25 gram atom of oxygen, 5.6 litres of nitrogen at STP and 1.5×10^{23} molecules of CO_2 are present in a vessel. The total mass of the above mixture is

(A) 26 g (B) 22 g (C) 24 g (D) 12 g

Space for rough work

64. 0.2 mol of Na_3PO_4 and 0.5 mol of $Ba(NO_3)_2$ are mixed in 1 litre of solution. Regarding this, wrong statement is
(A) 0.2 mol barium phosphate precipitate is obtained
(B) 0.1 mol barium phosphate precipitate is obtained
(C) Molarity of Ba^{+2} ions in the resulting solution is 0.2 M
(D) Molarities of Na^+ and NO_3^- ions are 0.6 M and 1 M respectively

65. $xMnO_4^- + H_2O + yI^- \longrightarrow MnO_2 + OH^- + I_2$. The ratio of coefficients x and y in the balanced equation of the above reaction is
(A) 1 : 3 (B) 1 : 1 (C) 2 : 3 (D) 1 : 2

66. Average oxidation number of nitrogen is ammonium nitrate is
(A) zero (B) –1 (C) +1 (D) +3

67. What is the normality of 10% $\frac{w}{v}$ of HNO_3 solution.
(A) 0.5 (B) 1.27 (C) 1.58 (D) 0.7

68. For the reaction $N_2 + H_2 \rightarrow 2NH_3$, if molecular mass of NH_3 and N_2 are M_1 & M_2, their equivalent masses are E_1 & E_2, then $E_1 - E_2$ = ____
(A) $2M_1 - 2M_2$ (B) $\frac{2M_1 - M_2}{6}$ (C) $\frac{2M_1 - M_2}{4}$ (D) $2M_2 - M_1$

69. If 50 ml of 0.1 M $K_3[Fe(CN)_6]$ is reduced by some amount N_2H_4, then the no. of moles of N_2H_4 required for the above reaction is $K_3\left[Fe(CN)_6\right] + N_2H_4 \longrightarrow K_4\left[Fe(CN)_6\right] + N_2$.
(A) 1.25×10^{-3} (B) 10^{-2} (C) 5×10^{-3} (D) 2.5×10^{-3}

70. If 1 mole of ozone (O_3) is removed from a sample weighting 144g; then the number of gram molecules of ozone left is
(A) 2.5 (B) 2 (C) 2.9 (D) 1.5

71. Two elements P and Q form the compounds P_2Q_3 and PQ_2. If 0.15 mole of P_2Q_3 weighs 15.9 gr and 0.15 mole of PQ_2 weighs 9.3g, then the atomic weights of P and Q are respectively
(A) 24 and 18 (B) 24 and 20 (C) 26 and 18 (D) 26 and 20

72. 14 g of monovalent element X combines with 16 g of oxygen. On the basis of this information, which of the following is a correct statement?
(A) The element X could have an atomic weight of 14 and its oxide is XO_2
(B) The element X could have an atomic weight of 14 and its oxide is X_2O
(C) The element X could have an atomic weight of 7 and its oxide is XO
(D) The element X could have an atomic weight of 7 and its oxide is X_2O

Space for rough work

73. The molar ratio of Fe^{+2} to Fe^{+3} ions in a mixture of $FeSO_4$ and $Fe_2(SO_4)_3$ having equal number of sulphate ions in both ferrous and ferric sulphate
(A) 1 : 2 (B) 3 : 2 (C) 2 : 3 (D) None of these

74. Consider the unbalanced equation, $SbCl_3 + KIO_3 + HCl \rightarrow SbCl_5 + ICl + KCl + H_2O$. If coefficient of KIO_3 is maintained as 1, the sum of coefficients of all the products will be :
(A) 8.5 (B) 16 (C) 7 (D) none of these

75. Indicate the values of the coefficients p, q, r in the following equation in that order
$p\ K_3[Fe(CN)_6] + q\ KOH + r\ Cr_2O_3 \rightarrow p\ K_4[Fe(CN)_6] + 2r\ K_2CrO_4 + q/2\ H_2O$
(A) 6, 10, 2 (B) 6, 5, 1 (C) 6, 5, 2 (D) 6, 10, 1

76. The n–factor of Br_2 in the following reaction
$Br_2 + OH^- \longrightarrow Br^- + BrO_3^-$ is
(A) $\frac{4}{3}$ (B) $\frac{5}{3}$ (C) $\frac{7}{3}$ (D) $\frac{2}{3}$

77. The n–factor of HCl in the following reaction
$KMnO_4 + HCl \longrightarrow KCl + MnCl_2 + Cl_2 + H_2O$ is
(A) $\frac{8}{5}$ (B) 2 (C) $\frac{5}{8}$ (D) 1

78. Mole fraction of solute in aqueous HCl solution is 0.2. The molality of HCl solution is
(A) 13.88 (B) 1.388 (C) 0.138 (D) 0.0138

79. In which of the following reactions, SO_2 behaves as an oxidizing agent ?
(A) $Cl_2 + SO_2 \rightarrow SO_2Cl_2$ (B) $2H_2S + SO_2 \rightarrow 3S + 2H_2O$
(C) $SO_2 + H_2O \rightarrow H_2SO_3$ (D) All the above

80. The normality of 0.5 M H_3PO_4 solution is
(A) 0 (B) 2 (C) 3 (D) 1.5

81. What volume of water should be added to 50 ml, 0.2 M HCl solution to make it 0.1 molar ?
(A) 100 ml (B) 150 ml (C) 50 ml (D) 250 ml

Space for rough work

82. Calculate the total no. of oxygen atoms present in 18g of Glucose $\left(C_6H_{12}O_6\right)$
(A) 6.023×10^{23} (B) 36.13×10^{22} (C) $2 \times 6.023 \times 10^{23}$ (D) $4 \times 6.023 \times 10^{23}$

83. Two samples of HCl of 1.0 M and 0.25 M are mixed. Find volumes of these samples taken in order to prepare 0.75 M HCl solution. Assume no water is added
(I) 20 mL, 10 mL (II) 100 mL, 50 mL (III) 40 mL, 20 mL (D) 50 mL, 25 mL
(A) I, II, IV (B) I, II (C) II, II, IV (D) I, II, III, IV

84. The EW of H_3PO_4 in the reaction is $Ca(OH)_2 + H_3PO_4 \rightarrow CaHPO_4 + 2H_2O$
(A) 49 (B) 98 (C) 32.66 (D) 147

85. The reaction,
$3ClO^-(aq) \rightarrow ClO_3^-(aq) + 2Cl^-(aq)$ is an example of
is an example of
(A) oxidation reaction (B) reduction reaction
(C) disproportionation reaction (D) decomposition reaction

86. Carbon combines with hydrogen to form two compounds A and B. The percentage of hydrogen in A and B are 25% and 7.7% respectively. The empirical formula of A and B are respectively.
(A) CH_4, CH_2 (B) CH_2, CH (C) CH_4, CH (D) CH, CH_4

87. The molarity of NO_3^- ion in the solution after 2.0 L of 3M $AgNO_3$ is mixed with 3L of 1.0 M $BaCl_2$ is
(A) 1.6 M (B) 1.2 M (C) 3.0 M (D) 1.0 M

88. The equivalent mass of an element is 4. Its chloride has vapour density 59.25. Then the valency of the element is
(A) 4 (B) 3 (C) 2 (D) 1

89. What weight of Na_2CO_3 of 95% purity would be required to neutralize 45.6 ml of 0.235 N H_2SO_4 acid ?
(A) 0.5679g (B) 0.6021g (C) 0.5978g (D) None

90. 1.82g of a metal required 32.5 ml of 1N HCl to dissolve it. What is equivalent weight of metal
(A) 42 (B) 48 (C) 56 (D) 63

Space for rough work

FIITJEE PET – VII (REG_1ST YEAR)

MAINS_SET–B_ANSWERS

DATE: 04.08.2018

MATHEMATICS

1.	**C**	2.	**A**	3.	**B**	4.	**C**
5.	**B**	6.	**B**	7.	**A**	8.	**A**
9.	**B**	10.	**C**	11.	**A**	12.	**A**
13.	**C**	14.	**A**	15.	**D**	16.	**D**
17.	**C**	18.	**A**	19.	**D**	20.	**A**
21.	**D**	22.	**A**	23.	**C**	24.	**B**
25.	**A**	26.	**B**	27.	**A**	28.	**B**
29.	**B**	30.	**D**				

PHYSICS

31.	**C**	32.	**A**	33.	**D**	34.	**A**
35.	**D**	36.	**D**	37.	**C**	38.	**B**
39.	**C**	40.	**B**	41.	**A**	42.	**C**
43.	**C**	44.	**C**	45.	**B**	46.	**B**
47.	**A**	48.	**A**	49.	**B**	50.	**A**
51.	**B**	52.	**C**	53.	**B**	54.	**D**
55.	**A**	56.	**A**	57.	**A**	58.	**C**
59.	**C**	60.	**A**				

CHEMISTRY

61.	**B**	62.	**B**	63.	**B**	64.	**A**
65.	**A**	66.	**C**	67.	**C**	68.	**B**
69.	**A**	70.	**B**	71.	**C**	72.	**D**
73.	**B**	74.	**C**	75.	**D**	76.	**B**
77.	**C**	78.	**A**	79.	**B**	80.	**D**
81.	**C**	82.	**B**	83.	**D**	84.	**A**
85.	**C**	86.	**C**	87.	**B**	88.	**B**
89.	**C**	90.	**C**				