

FIITJEE PET – V (REG_1ST YEAR)

MAINS_SET-A

DATE: 21.07.2018

Time: 3 hours
INSTRUCTIONS:

Maximum Marks: 360

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. A straight line makes an angle of 30° with the negative x-axis. What is the slope of the line
 (A) $\sqrt{3}$ (B) $\frac{1}{\sqrt{3}}$ (C) $-\frac{1}{\sqrt{3}}$ (D) $-\sqrt{3}$
2. The inclination of the line passing through the points $(2, \sqrt{3}-1)$, $(1, -1)$.
 (A) 60° (B) 30° (C) 45° (D) none of these
3. If the vertices of the triangle are $(1, 3)$, $(0, -2)$ and $(-3, 1)$, then find the orthocenter of triangle DEF, where D, E and F are midpoints of BC, CA and AB
 (A) $\left(-\frac{1}{3}, \frac{2}{3}\right)$ (B) $\left(\frac{1}{3}, \frac{2}{3}\right)$ (C) $\left(\frac{2}{3}, \frac{-1}{3}\right)$ (D) none of these
4. If $(3, -4)$ and $(-6, 5)$ are the extremities of the diagonal of a parallelogram and $(-2, 1)$ is its third vertex, then its fourth vertex is
 (A) $(-1, 0)$ (B) $(0, -1)$ (C) $(-1, 1)$ (D) $(1, 1)$
5. If the points $(1, 3)$ and $(5, 1)$ are two opposite vertices of a rectangle and the other two vertices lie on the line $y = 2x + c$, then value of c is
 (A) -2 (B) 3 (C) -4 (D) 4
6. Length of median through A of a triangle whose vertices are $A(1, 2)$, $B(3, 4)$ and $C(3, 0)$
 (A) 2 (B) 4 (C) 3 (D) none of these
7. In $\triangle ABC$, if the orthocenter is $(1, 2)$ and the circumcentre is $(0, 0)$, then centroid of $\triangle ABC$ is
 (A) $\left(\frac{1}{2}, \frac{2}{3}\right)$ (B) $\left(\frac{1}{3}, \frac{2}{3}\right)$ (C) $\left(\frac{2}{3}, 1\right)$ (D) none of these
8. A triangle ABC with vertices $A(-1, 0)$, $B\left(-2, \frac{3}{4}\right)$ and $C\left(-3, -\frac{7}{6}\right)$ has its orthocenter at H. Then, the orthocenter of triangle BCH will be
 (A) $(-3, -2)$ (B) $(1, 3)$ (C) $(-1, 2)$ (D) none of these
9. If in triangle ABC, $A \equiv (1, 10)$, circumcentre $\equiv \left(-\frac{1}{3}, \frac{2}{3}\right)$, and orthocenter $\equiv \left(\frac{11}{4}, \frac{4}{3}\right)$, then the coordinates of the midpoint of the side opposite to A are
 (A) $\left(1, -\frac{11}{3}\right)$ (B) $(1, 5)$ (C) $(1, -3)$ (D) $(1, 6)$

Space for rough work

10. The locus of the moving point whose coordinates are given $(e^t + e^{-t}, e^t - e^{-t})$ where t is a parameter, is
 (A) $xy = 1$ (B) $x + y = 2$ (C) $x^2 - y^2 = 4$ (D) $x^2 - y^2 = 2$
11. The locus of a point represented by $x = \frac{a}{2}\left(\frac{t+1}{t}\right), y = \frac{a}{2}\left(\frac{t-1}{t}\right)$, where $t \in \mathbb{R} - \{0\}$, is
 (A) $x^2 + y^2 = a^2$ (B) $x^2 - y^2 = a^2$ (C) $x + y = a$ (D) $x - y = a$
12. The area of the triangle with vertices at $(-4, -1), (1, 2), (4, -3)$ is
 (A) 12 (B) 18 (C) 17 (D) 30
13. The area of the quadrilateral formed by the points $(1, 2), (2, -3), (-2, 4), (0, 5)$ is
 (A) 10 sq.unit (B) 15 sq.unit (C) 18 sq.unit (D) 20 sq.unit
14. If the extremities of the base of an isosceles triangle are the points $(2a, 0)$ and $(0, a)$ and the equation of one of the sides is $x = 2a$, then the area of the triangle is
 (A) $5a^2$ sq. units (B) $\frac{5}{2}a^2$ sq. units (C) $\frac{25a^2}{2}$ sq. units (D) None of these
15. P $(3, 7)$ is a point on the line joining A $(1, 1)$ and B $(6, 16)$. The harmonic conjugate of P w.r.t to A and B is
 (A) $(9, 29)$ (B) $(-9, 29)$ (C) $(9, -29)$ (D) $(-9, -29)$
16. If $(k, 2 - 2k), (-k + 1, 2k), (-4 - k, 6 - 2k)$, are collinear, then $k =$
 (A) 2 (B) 5 (C) $1/2, -1$ (D) $-1/2, 2$
17. If the orthocentre and circumcentre of a triangle are $(-3, 5), (6, 2)$ then the centroid is
 (A) $(2, -3)$ (B) $(3, 3)$ (C) $(4, 3)$ (D) $(1, -3)$
18. The incentre of the triangle formed by $(0, 8), (6, 0), (0, 0)$ is
 (A) $(1, 1)$ (B) $(1, 2)$ (C) $(2, 1)$ (D) $(2, 2)$
19. Origin O $(0, 0)$ is the orthocentre of $\triangle ABC$ where A $= (5, -1), B = (-2, 3)$, then the orthocentre of $\triangle OAC$ is
 (A) $(-4, -7)$ (B) $(3, -2)$ (C) $(-2, 3)$ (D) $(5, -1)$
20. If G is the centroid of the triangle formed by A $(6, 1), B(3, 5), C(-1, -1)$, then the area of triangle GAB is
 (A) $19/3$ sq.unit (B) $13/2$ sq.unit (C) $17/3$ sq.unit (D) $17/2$ sq.unit

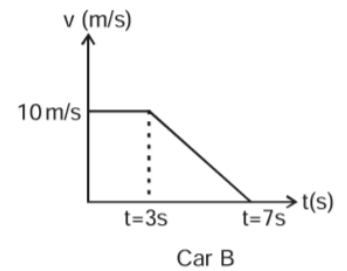
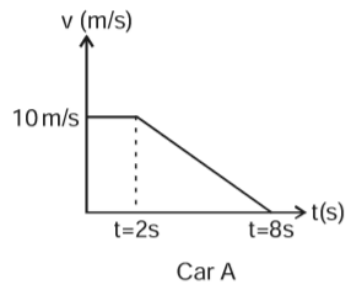
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21. The point which is equidistant to the points (9, 3), (7, -1) and (-1, 3) is
 (A) (4, 3) (B) (2, 1) (C) (2, 3) (D) (1, -1)
22. The equation of the locus of the point whose distance from x -axis is twice its distance from y axis is
 (A) $y^2 = 4x^2$ (B) $4y^2 = x^2$ (C) $y = 3x$ (D) $4x + y = 0$
23. The equation to the locus of points equidistant from the points (2, 3), (-2, 5) is
 (A) $2x - y + 4 = 0$ (B) $2x - y - 1 = 0$ (C) $2x + y - 4 = 0$ (D) $2x + y + 1 = 0$
24. The locus of the moving point P, such that $2PA = 3PB$, where $A(0,0), B(4,-3)$ is
 (A) $5x^2 + 5y^2 - 72x + 54y + 225 = 0$ (B) $5x^2 + 5y^2 + 72x - 54y - 225 = 0$
 (C) $3x^2 + 3y^2 - 70x + 52y + 225 = 0$ (D) none of these
25. The locus of the point $(a \cos t, b \sin t)$ where $0 \leq t < 2\pi$ is
 (A) $\sqrt{x} + \sqrt{y} = \sqrt{ab}$ (B) $\frac{\sqrt{x}}{a} + \frac{\sqrt{y}}{b} = 1$ (C) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (D) $\frac{x}{a} + \frac{y}{b} = 1$
26. The locus of the point $(a \cos t + b \sin t, a \sin t - b \cos t)$ where $0 \leq t < 2\pi$ is
 (A) $x^2 + y^2 = a^2 + b^2$ (B) $(x^2 - y^2)^2 = 16xy$ (C) $x^2 - y^2 = a^2 + b^2$ (D) $x^2 - y^2 = a^2 - b^2$
27. A straight rod of length 9 units, slides with its ends A, B always on the x and y axes respectively. Then the locus of the centroid of triangle OAB is
 (A) $x^2 + y^2 = 3$ (B) $x^2 + y^2 = 9$ (C) $x^2 + y^2 = 1$ (D) $x^2 + y^2 = 81$
28. The coordinates of the point (3, -5) in the new system when the origin is shifted to (-2, 3) are
 (A) (-5, 8) (B) (5, -8) (C) (4, 6) (D) (3, 1)
29. By translating the axes the equation $xy - x + 2y = 6$ has changed to $xy = c$, then $c =$
 (A) 4 (B) 5 (C) 6 (D) 7
30. If (7, 5) are the coordinates of a point P in the new system when the origin is shifted to (-5, 3), then the original coordinates of P are
 (A) (-1, 2) (B) (1, -5) (C) (2, 8) (D) (4, 1)

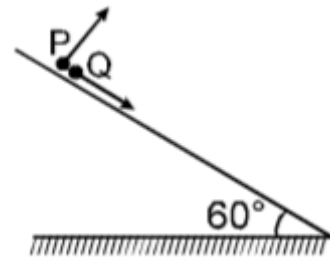
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31. A particle has initial velocity $\vec{v} = 3\hat{i} + 4\hat{j}$ and a constant force $\vec{F} = 4\hat{i} - 3\hat{j}$ acts on the particle. The path of the particle is
 (A) Straight line (B) Parabolic
 (C) Circular (D) Elliptical

32. Car A and car B move on a straight road and their velocity versus time graphs are as shown in figure. Comparing the motion of car A in between $t = 0$ to $t = 8$ sec and motion of car B in between $t = 0$ to $t = 7$ sec., pick up the correct statement.
 (A) Distance traveled by car A is less than distance traveled by car B.
 (B) Distance traveled by car A is greater than distance traveled by car B
 (C) Average speed of both cars are equal
 (D) Average speed of car A is less than average speed of car B



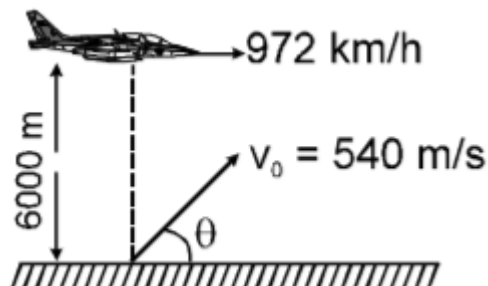
33. A particle P is projected from a point on the surface of long smooth inclined plane (see figure). Simultaneously another particle Q is released on the smooth inclined plane from the same position. P and Q collide after $t = 4$ second. The speed of projection of P is
 (A) 5 m/s (B) 10 m/s
 (C) 15 m/s (D) 20 m/s



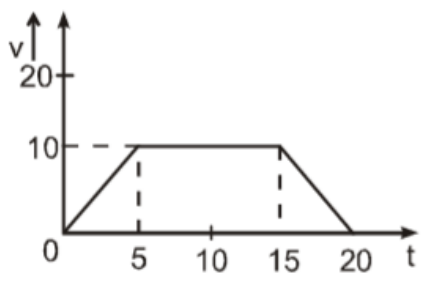
34. A stone is projected with speed 20 m/s at angle 37° with the horizontal and it hits the ground with speed 12 m/s due to air resistance. Assume the effect of air resistance to reduce only horizontal component of velocity. Then the time of flight will be
 (A) greater than 2.4 sec (B) less than 2.4 sec
 (C) 2.4 sec (D) depends on other data

Space for rough work

35. A projectile is thrown with a velocity of 20 m/s at an angle of 60° with the horizontal. After how much time the velocity vector will make an angle of 45° with the horizontal (take $g = 10 \text{ m/s}^2$)
 (A) $\sqrt{3}$ sec (B) $1/\sqrt{3}$ sec (C) $(\sqrt{3}+1)$ sec (D) $(\sqrt{3}-1)$ sec
36. A ball is projected with velocity u at right angle to the slope which is inclined at an angle α with the horizontal. The distance 'x' along the inclined plane that it will travel before again striking the slope is
 (A) $\frac{2u^2}{g} \cos \alpha$ (B) $\frac{2u^2}{g} \tan \alpha$
 (C) $\frac{2u^2 \tan \alpha}{g \cos \alpha}$ (D) $\frac{2u^2 \tan \alpha}{g \sin \alpha}$
37. A particle is projected up the inclined such that its component of velocity along the incline is 10 m/s. Time of flight is 2 sec and maximum height above the incline is 5 m. Then velocity of projection will be.
 (A) 10 m/s (B) $10\sqrt{2}$ m/s (C) $5\sqrt{5}$ m/s (D) None
38. A particle is projected from a point P(2,0,0)m with a velocity 10 m/s making an angle 45° with the horizontal. The plane of projectile motion passes through a horizontal line PQ which makes an angle of 37° with positive x –axis, xy plane is horizontal. The coordinates of the point where the particle will strike the line PQ is (Take $g = 10 \text{ m/s}^2$)
 (A) (10,6,0)m (B) (8,6,0)m (C) (10,8,0)m (D) (6,10,0)m
39. The maximum height attained by a projectile thrown over a horizontal ground is increased by 5%, keeping the angle of projection constant. What is the percentage increase in the horizontal range ?
 (A) 20 % (B) 15 % (C) 10 % (D) 5 %
40. An aircraft moving with a speed of 972 km/h is at a height of 6000 m, just overhead of an anti- aircraft gun. If the muzzle velocity of the gun is 540 / m/s, the firing angle θ for the bullet to hit the aircraft should be
 (A) 73° (B) 30°
 (C) 60° (D) 45°

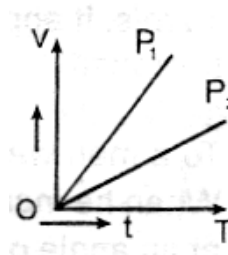


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41. The equation of motion of projectile is $y = 12x - 3/4x^2$. Given that $g = 10 \text{ ms}^{-2}$. What is the range of the projectile ?
 (A) 36 m (B) 30.6 m (C) 16 m (D) 12.4 m
42. Figure shows the velocity time graph of a particle moving along straight line (v is in m/s and t is in seconds) Its average velocity in 20 seconds will be
 (A) 10 m/s (B) zero
 (C) 3.75 m/s (D) 7.5 m/s
- 
43. The distance covered by a moving particle is directly proportional to $t^{1/2}$ where t is time elapsed. What type of motion the object is performing
 (A) always retarded (B) always accelerated
 (C) first retarded and then accelerated (D) first accelerated and then retardation
44. The vertical height of the projectile at time t is given by $y=4t - t^2$ and the horizontal distance covered is given by $x = 3t$. What is the angle of projection with the horizontal ?
 (A) $\tan^{-1} 3/5$ (B) $\tan^{-1} 4/5$ (C) $\tan^{-1} 4/3$ (D) $\tan^{-1} 3/4$
45. To cross the river in shortest distance, a swimmer should swim making angle θ with the upstream. What is the ratio of the time taken to swim across in the shortest time to that in swimming across over shortest distance. [Assume speed of swimmer in still water is greater than the speed of river flow] .
 (A) $\cos\theta$ (B) $\sin\theta$ (C) $\tan\theta$ (D) $\cot\theta$
46. A boat which can move with a speed of 5 m/s relative to water crosses a river of width 480 m flowing with a constant speed of 4 m/s . What is the time taken by the boat to cross the river along the shortest path.
 (A) 80 s (B) 160 s (C) 240 s (D) 320 s
47. A stone is thrown upwards from a tower with a velocity 50 ms^{-1} . Another stone is simultaneously thrown downwards from the same location with a velocity 50 ms^{-1} . When the first stone is at the highest point, the relative velocity of the second stone with respect to the first stone is (assume that second stone has not yet reached the ground).
 (A) zero (B) 50 ms^{-1} . (C) 100 ms^{-1} (D) 150 ms^{-1}

Space for rough work

48. Shown in the figure are the velocity time graphs of the two particles P_1 and P_2 . Which of the following statements about their relative motion is true ?



Magnitude of their relative velocity:

- (A) is zero
- (B) is non – zero but constant
- (C) continuously decreases
- (D) continuously increases

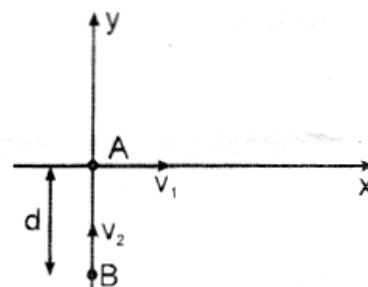
49. It is raining vertically downwards with a velocity of 3 kmh^{-1} . A man walks in the rain with a velocity of 4 kmh^{-1} . The rain drops will fall on the man with a relative velocity of

- (A) 1 kmh^{-1}
- (B) 3 kmh^{-1}
- (C) 4 kmh^{-1}
- (D) 5 kmh^{-1}

50. Raindrops are falling vertically with a velocity of 10 m/s . To a cyclist moving on a straight road the raindrops appear to be coming with a velocity of 20 m/s . The velocity of cyclist is

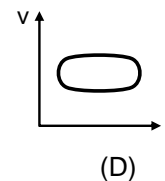
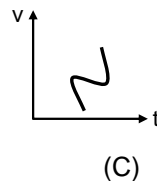
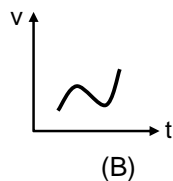
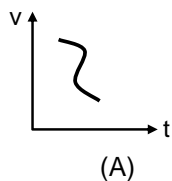
- (A) 10 m/s
- (B) $10\sqrt{3} \text{ m/s}$
- (C) 20 m/s
- (D) $20\sqrt{3} \text{ m/s}$

51. Two particles A and B move with velocities v_1 and v_2 respectively along x and y axis. The initial separation between them is 'd' as shown in the figure. Find the least distance between them during their motion.



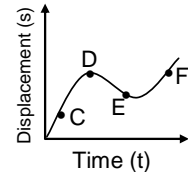
- (A) $\frac{d.v_1^2}{v_1^2 + v_2^2}$
- (B) $\frac{d.v_2^2}{v_1^2 + v_2^2}$
- (C) $\frac{d.v_1}{\sqrt{v_1^2 + v_2^2}}$
- (D) $\frac{d.v_2}{\sqrt{v_1^2 + v_2^2}}$

52. Which of the following velocity-time graphs shows a realistic situation for a body in motion?

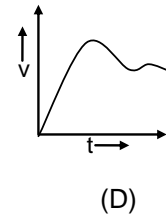
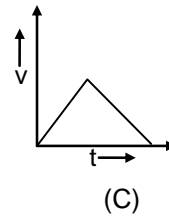
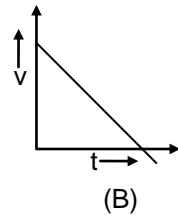
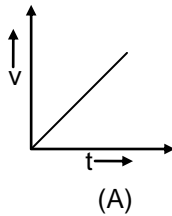
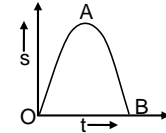


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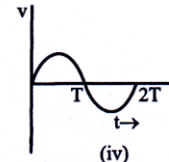
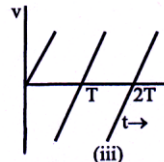
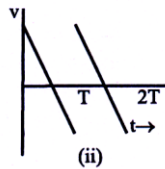
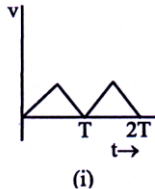
53. The displacement-time graph of a moving particle is shown in figure. The instantaneous velocity of the particle is negative at the point
 (A) D (B) F
 (C) C (D) E



54. Velocity-time graph corresponding to displacement-time graph shown in figure is



55. A ball is dropped from certain height on a glass floor so that it rebounds elastically to the same height. If the process continues, the velocity - time graph for such a motion would be _____. Take vertically downward direction positive



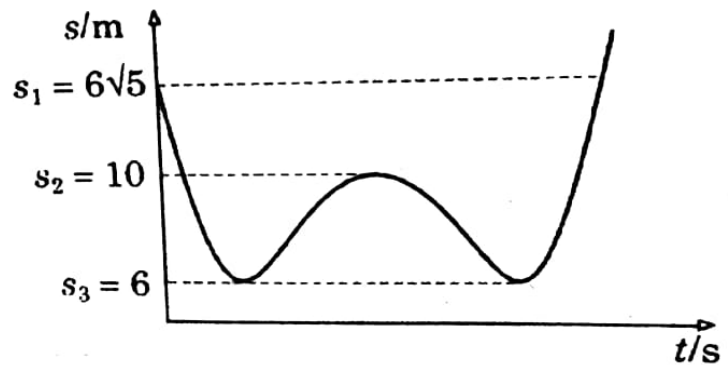
(A) (i)

(B) (ii)

(C) (iii)

(D) (iv)

56. A ball is thrown vertically upward. Its distance s (in meter) from a fixed point varies with time t (in sec) according to graph shown in fig. Then velocity of projection of the ball is _____ (Take $g = 10 \text{ m/s}^2$)



(A) 15 m/s

(B) 20 m/s

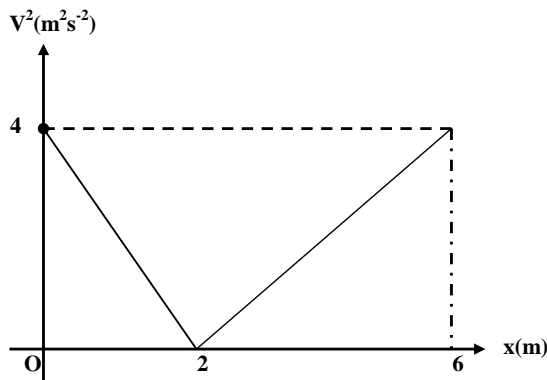
(C) 10 m/s

(D) None of these

Space for rough work

57. A projectile is projected from origin to hit a target placed at a point P (4m,3m). Then find minimum possible speed with which projectile must be projected _____ Take $g = 10 \text{ m/s}^2$
 (A) $\sqrt{91.25} \text{ m/s}$ (B) $\sqrt{80} \text{ m/s}$ (C) $4\sqrt{6} \text{ m/s}$ (D) $4\sqrt{3} \text{ m/s}$

58. V^2 versus x graph is shown in figure. Here V is velocity and x is displacement. If acceleration of the particle at $x=1.5\text{m}$ is $\alpha \text{ m/s}^2$ and acceleration at $x=4\text{m}$ is $\beta \text{ m/s}^2$, then value of $\alpha\beta$ is _____



(A) -2 (B) 2 (C) -4 (D) $-\frac{1}{2}$

59. Three particles starts from origin at the same time. The first particle starts with a velocity 2 m/s along positive x -axis, the second with a velocity 6 m/s along negative y - axis. Find the velocity of the third particle along $x = y$ line so that the three particles may always lie in a straight line.
 (A) $3\sqrt{3} \text{ m/s}$ (B) $3\sqrt{2} \text{ m/s}$ (C) $4\sqrt{2} \text{ m/s}$ (D) $2\sqrt{2} \text{ m/s}$

60. Rain is falling with a speed of 4 m/s in a direction making an angle of 30° with vertical towards south. What should be the magnitude and direction of velocity of cyclist to hold his umbrella exactly vertical, so that rain does not wet him.
 (A) 2 m/s towards north (B) 4 m/s towards south
 (C) 2 m/s towards south (D) 4 m/s towards north

61. A compound containing C, H, N in respective mass ratio of $9 : 1 : 3.5$. What is the empirical formula ?
 (A) $\text{C}_4\text{H}_3\text{N}_2$ (B) $\text{C}_3\text{H}_4\text{N}_2$ (C) $\text{C}_4\text{H}_3\text{N}$ (D) $\text{C}_3\text{H}_4\text{N}$

62. How much magnesium sulphide can be obtained from 2g of Mg and 2g of S .
 (A) 3.0g (B) 3.5g (C) 2.5g (D) 2g

63. If 0.5 mol of BaCl_2 is mixed with 0.2 mol of Na_3PO_4 , the maximum number of moles of $\text{Ba}_3(\text{PO}_4)_2$ that can be formed is
 (A) 0.70 (B) 0.50 (C) 0.20 (D) 0.10

Space for rough work

64. 4g of C_3H_8 and 14g of O_2 are allowed to react to maximum possible extent to form only CO and H_2O the mass of CO formed is
(A) 7.6 g (B) 10.5 g (C) 8.5 g (D) 11 g
65. How many mole of lead (II) chloride will be formed from a reaction between 2.24g PbO and 1.2 g HCl. (At. Wt. Pb = 208)
(A) 0.01 (B) 0.029 (C) 0.044 (D) 0.33
66. The formula of a hydrated salt of barium is $BaCl_2 \cdot XH_2O$. If 1.9g of this compound gives 1.8g anhydrous $BaSO_4$ on treatment with H_2SO_4 , the value of X is : (At. Wt. Ba = 137)
(A) 7 (B) 5 (C) 3 (D) 2
67. The ratio of masses of oxygen and nitrogen in a particular gaseous mixture is 1 : 4. The ratio of number of their molecule is :
(A) 1 : 4 (B) 7 : 32 (C) 1 : 8 (D) 3 : 14
68. If 5.6 moles of SO_2 reacts with 4.8 moles of O_2 and a large excess of H_2O , the maximum number of moles of H_2SO_4 that can be obtained is
(A) 5.6 (B) 11.2 (C) 4.8 (D) 2.4
69. 28g of KOH is used to completely neutralize CO_2 produced by heating 60g impure sample $CaCO_3$. The percentage purity of $CaCO_3$ is
(A) 83.32 (B) 20.83 (C) 41.66 (D) 40.0
70. The least number of molecules are contained in
(A) 2g H_2 (B) 8g O_2 (C) 4g N_2 (D) 16g CO_2
71. What is the mass of 3.011×10^{23} molecules of NH_3 ?
(A) 8.5g (B) 9.5g (C) 7.5g (D) 11.5g
72. Arun needs 1.71g of cane sugar ($C_{12}H_{22}O_{11}$) to sweeten his tea, what would be the number of 'C' atoms consumed through sugar in the tea ?
(A) 3.66×10^{22} (B) 7.2×10^{21} (C) 5×10^{21} (D) 6.6×10^{22}
73. Determine the empirical formula of Kelvar, which contain 70.6% C, 4.2% H, 11.8% N and 13.4% O.
(A) $C_7H_5N_2O$ (B) $C_7H_5NO_2$ (C) C_7H_9NO (D) C_7H_5NO
74. 7.5g of a gas occupy 5.6L of volume at STP. The gas is
(A) NO (B) N_2O (C) CO (D) CO_2

Space for rough work

75. A 25 mm x 40 mm piece of gold foil is 0.25 mm thick. The density of gold is 19.32 g/cm^3 . How many gold atoms are in the sheet ? (Atomic weight : Au = 197).
 (A) 7.7×10^{23} (B) 1.5×10^{23} (C) 4.3×10^{21} (D) 1.47×10^{22}
76. Which has minimum number of atoms of oxygen?
 (A) 10 mL $\text{H}_2\text{O}(\ell)$ (B) 0.1 mole of V_2O_5
 (C) 12gm $\text{O}_3(\text{g})$ (D) 12.044×10^{22} molecules of CO_2
77. The mass of N_2F_4 produced by the reaction of 2g of NH_3 and 8g of F_2 is 3.56g. What is percentage yield ?
 $2\text{NH}_3 + 5\text{F}_2 \rightarrow \text{N}_2\text{F}_4 + 6\text{HF}$
 (A) 79.4 (B) 71.2 (C) 86.6 (D) 81.4
78. Number of neutrons present in 8g of methane gas, are
 (A) 1.8066×10^{24} (B) 18.82×10^{22} (C) 1.8066×10^{23} (D) 1.5×10^{23}
79. 4.4g of CO_2 and 2.24 litre of H_2 at STP are mixed in a container, the total number of molecules present in the container will be
 (A) 6.022×10^{23} (B) 1.2044×10^{23} (C) 2 mole (D) 6.022×10^{24}
80. 1.12g of CaO is reacted with excess of HCl and 0.555g of CaCl_2 is formed. The % yield of product is
 (A) 25% (B) 75% (C) 50% (D) 60%
81. The atomic weights of two elements A and B are 40 and 80 respectively. If x g of A contains 'y' atoms, how many atoms are present in 2xg of B.
 (A) $\frac{y}{2}$ (B) $\frac{y}{4}$ (C) y (D) 2y
82. One molecule of a compound contains 6 carbon atoms, 2×10^{-23} g of hydrogen and 16×10^{-23} g of O atoms. Then Gram Molecular Weight of compound is
 (A) 180g (B) 174g (C) 90 g (D) 114g
83. Chlorophyll contains 2% by mass of Mg. The number of Mg atoms in 2g of chlorophyll is
 (A) 10^{23} (B) $0.04 \times N_A$ (C) 10^{21} (D) $24 N_A$
84. At STP the density of CO_2 vapour in g/L will be equal to
 (A) 22 (B) 44 (C) 0.98 (D) 1.96

Space for rough work

85. The simplest formula of compound containing 50% of element 'X' (Atomic mass = 20) and 50% of element 'Y' (Atomic mass = 10) is
(A) X_2Y (B) XY_2 (C) XY (D) X_2Y_3
86. The hydrated salt $Na_2CO_3 \cdot xH_2O$ undergoes 46% loss in mass on heating and becomes anhydrous. The value of 'x' is
(A) 3 (B) 5 (C) 7 (D) 10
87. How many grams are contained in 2.5 gram atom of Mg ?
(A) 48g (B) 72g (C) 60g (D) 2.5g
88. Given the reaction: $N_2 + H_2 \rightarrow NH_3$, Calculate the volume of nitrogen needed to produce 6.8 gms of ammonia at STP
(A) 22.4Lt (B) 2.24Lt (C) 44.8Lt (D) 4.48Lt
89. A gaseous mixture contains CH_4 and C_2H_6 in equimolecular proportion. The weight of 2.24 litres of this mixture at STP is :
(A) 4.6g (B) 1.6g (C) 2.3g (D) 23g
90. The amount of $KClO_3$ needed to produce 48g O_2 is ?
($KClO_3 \rightarrow KCl + O_2$)
(A) 122.5 (B) 24.5 (C) 98 (D) 153.12g

Space for rough work

FIITJEE PET – V (REG_1ST YEAR)

MAINS_SET-A_ANSWERS

DATE: 21.07.2018

MATHEMATICS

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

PHYSICS

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

CHEMISTRY

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

FIITJEE PET – V (REG_1ST YEAR)

MAINS_SET-B

DATE: 21.07.2018

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 which is equidistant to the points (9, 3), (7, -1) and (-1, 3) is
 (A) (4, 3) (B) (2, 1) (C) (2, 3) (D) (1, -1)
2. The equation of the locus of the point whose distance from x -axis is twice its distance from y axis is
 (A) $y^2 = 4x^2$ (B) $4y^2 = x^2$ (C) $y = 3x$ (D) $4x + y = 0$
3. The equation to the locus of points equidistant from the points (2, 3), (-2, 5) is
 (A) $2x - y + 4 = 0$ (B) $2x - y - 1 = 0$ (C) $2x + y - 4 = 0$ (D) $2x + y + 1 = 0$
4. The locus of the moving point P, such that $2PA = 3PB$, where $A(0,0), B(4,-3)$ is
 (A) $5x^2 + 5y^2 - 72x + 54y + 225 = 0$ (B) $5x^2 + 5y^2 + 72x - 54y - 225 = 0$
 (C) $3x^2 + 3y^2 - 70x + 52y + 225 = 0$ (D) none of these
5. The locus of the point $(a \cos t, b \sin t)$ where $0 \leq t < 2\pi$ is
 (A) $\sqrt{x} + \sqrt{y} = \sqrt{ab}$ (B) $\frac{\sqrt{x}}{a} + \frac{\sqrt{y}}{b} = 1$ (C) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (D) $\frac{x}{a} + \frac{y}{b} = 1$
6. If $(k, 2 - 2k), (-k + 1, 2k), (-4 - k, 6 - 2k)$, are collinear, then $k =$
 (A) 2 (B) 5 (C) $1/2, -1$ (D) $-1/2, 2$
7. If the orthocentre and circumcentre of a triangle are $(-3, 5), (6, 2)$ then the centroid is
 (A) (2, -3) (B) (3, 3) (C) (4, 3) (D) (1, -3)
8. The incentre of the triangle formed by (0, 8), (6, 0), (0, 0) is
 (A) (1, 1) (B) (1, 2) (C) (2, 1) (D) (2, 2)
9. Origin O (0, 0) is the orthocentre of $\triangle ABC$ where $A = (5, -1), B = (-2, 3)$, then the orthocentre of $\triangle OAC$ is
 (A) $(-4, -7)$ (B) (3, -2) (C) $(-2, 3)$ (D) (5, -1)
10. If G is the centroid of the triangle formed by A (6, 1), B(3, 5), C(-1, -1), then the area of triangle GAB is
 (A) $19/3$ sq.unit (B) $13/2$ sq.unit (C) $17/3$ sq.unit (D) $17/2$ sq.unit
11. A straight line makes an angle of 30° with the negative x -axis. What is the slope of the line
 (A) $\sqrt{3}$ (B) $\frac{1}{\sqrt{3}}$ (C) $-\frac{1}{\sqrt{3}}$ (D) $-\sqrt{3}$

Space for rough work

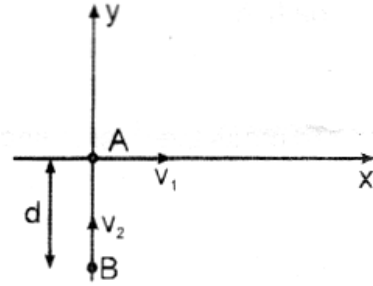
12. The inclination of the line passing through the points $(2, \sqrt{3} - 1)$, $(1, -1)$.
 (A) 60° (B) 30° (C) 45° (D) none of these
13. If the vertices of the triangle are $(1, 3)$, $(0, -2)$ and $(-3, 1)$, then find the orthocenter of triangle DEF, where D, E and F are midpoints of BC, CA and AB
 (A) $\left(-\frac{1}{3}, \frac{2}{3}\right)$ (B) $\left(\frac{1}{3}, \frac{2}{3}\right)$ (C) $\left(\frac{2}{3}, \frac{-1}{3}\right)$ (D) none of these
14. If $(3, -4)$ and $(-6, 5)$ are the extremities of the diagonal of a parallelogram and $(-2, 1)$ is its third vertex, then its fourth vertex is
 (A) $(-1, 0)$ (B) $(0, -1)$ (C) $(-1, 1)$ (D) $(1, 1)$
15. If the points $(1, 3)$ and $(5, 1)$ are two opposite vertices of a rectangle and the other two vertices lie on the line $y = 2x + c$, then value of c is
 (A) -2 (B) 3 (C) -4 (D) 4
16. The locus of the point $(a \cos t + b \sin t, a \sin t - b \cos t)$ where $0 \leq t < 2\pi$ is
 (A) $x^2 + y^2 = a^2 + b^2$ (B) $(x^2 - y^2)^2 = 16xy$ (C) $x^2 - y^2 = a^2 + b^2$ (D) $x^2 - y^2 = a^2 - b^2$
17. A straight rod of length 9 units, slides with its ends A, B always on the x and y axes respectively. Then the locus of the centroid of triangle OAB is
 (A) $x^2 + y^2 = 3$ (B) $x^2 + y^2 = 9$ (C) $x^2 + y^2 = 1$ (D) $x^2 + y^2 = 81$
18. The coordinates of the point $(3, -5)$ in the new system when the origin is shifted to $(-2, 3)$ are
 (A) $(-5, 8)$ (B) $(5, -8)$ (C) $(4, 6)$ (D) $(3, 1)$
19. By translating the axes the equation $xy - x + 2y = 6$ has changed to $xy = c$, then $c =$
 (A) 4 (B) 5 (C) 6 (D) 7
20. If $(7, 5)$ are the coordinates of a point P in the new system when the origin is $(-5, 3)$, then the original coordinates of P are
 (A) $(-1, 2)$ (B) $(1, -5)$ (C) $(2, 8)$ (D) $(4, 1)$
21. The locus of a point represented by $x = \frac{a}{2} \left(\frac{t+1}{t} \right)$, $y = \frac{a}{2} \left(\frac{t-1}{t} \right)$, where $t \in \mathbb{R} - \{0\}$, is
 (A) $x^2 + y^2 = a^2$ (B) $x^2 - y^2 = a^2$ (C) $x + y = a$ (D) $x - y = a$

Space for rough work

22. The area of the triangle with vertices at $(-4, -1)$, $(1, 2)$, $(4, -3)$ is
 (A) 12 (B) 18 (C) 17 (D) 30
23. The area of the quadrilateral formed by the points $(1, 2)$, $(2, -3)$, $(-2, 4)$, $(0, 5)$ is
 (A) 10 sq.unit (B) 15 sq.unit (C) 18 sq.unit (D) 20 sq.unit
24. If the extremities of the base of an isosceles triangle are the points $(2a, 0)$ and $(0, a)$ and the equation of one of the sides is $x = 2a$, then the area of the triangle is
 (A) $5a^2$ sq. units (B) $\frac{5}{2}a^2$ sq. units (C) $\frac{25a^2}{2}$ sq. units (D) None of these
25. P $(3, 7)$ is a point on the line joining A $(1, 1)$ and B $(6, 16)$. The harmonic conjugate of P w.r.t to A and B is
 (A) $(9, 29)$ (B) $(-9, 29)$ (C) $(9, -29)$ (D) $(-9, -29)$
26. Length of median through A of a triangle whose vertices are A $(1, 2)$, B $(3, 4)$ and C $(3, 0)$
 (A) 2 (B) 4 (C) 3 (D) none of these
27. In $\triangle ABC$, if the orthocenter is $(1, 2)$ and the circumcentre is $(0, 0)$, then centroid of $\triangle ABC$ is
 (A) $\left(\frac{1}{2}, \frac{2}{3}\right)$ (B) $\left(\frac{1}{3}, \frac{2}{3}\right)$ (C) $\left(\frac{2}{3}, 1\right)$ (D) none of these
28. A triangle ABC with vertices A $(-1, 0)$, B $\left(-2, \frac{3}{4}\right)$ and C $\left(-3, -\frac{7}{6}\right)$ has its orthocenter at H. Then, the orthocenter of triangle BCH will be
 (A) $(-3, -2)$ (B) $(1, 3)$ (C) $(-1, 2)$ (D) none of these
29. If in triangle ABC, A $\equiv (1, 10)$, circumcentre $\equiv \left(-\frac{1}{3}, \frac{2}{3}\right)$, and orthocenter $\equiv \left(\frac{11}{4}, \frac{4}{3}\right)$, then the coordinates of the midpoint of the side opposite to A are
 (A) $\left(1, -\frac{11}{3}\right)$ (B) $(1, 5)$ (C) $(1, -3)$ (D) $(1, 6)$
30. The locus of the moving point whose coordinates are given $(e^t + e^{-t}, e^t - e^{-t})$ where t is a parameter, is
 (A) $xy = 1$ (B) $x + y = 2$ (C) $x^2 - y^2 = 4$ (D) $x^2 - y^2 = 2$

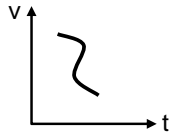
Space for rough work

31. Two particles A and B move with velocities v_1 and v_2 respectively along x and y axis. The initial separation between them is 'd' as shown in the figure. Find the least distance between them during their motion.



- (A) $\frac{d.v_1^2}{v_1^2 + v_2^2}$ (B) $\frac{d.v_2^2}{v_1^2 + v_2^2}$
 (C) $\frac{d.v_1}{\sqrt{v_1^2 + v_2^2}}$ (D) $\frac{d.v_2}{\sqrt{v_1^2 + v_2^2}}$

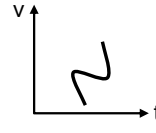
32. Which of the following velocity-time graphs shows a realistic situation for a body in motion?



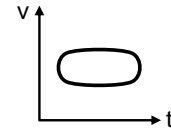
(A)



(B)



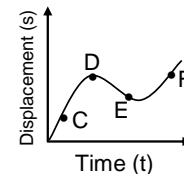
(C)



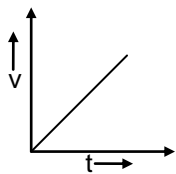
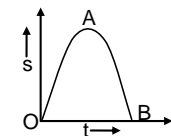
(D)

33. The displacement-time graph of a moving particle is shown in figure. The instantaneous velocity of the particle is negative at the point

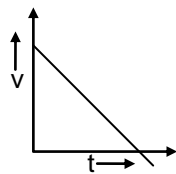
- (A) D (B) F
 (C) C (D) E



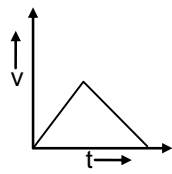
34. Velocity-time graph corresponding to displacement-time graph shown in figure is



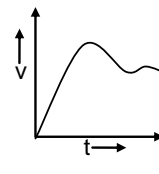
(A)



(B)



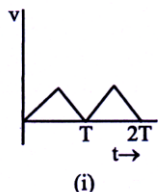
(C)



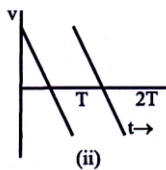
(D)

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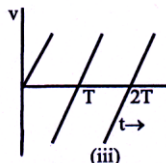
35. A ball is dropped from certain height on a glass floor so that it rebounds elastically to the same height. If the process continues, the velocity - time graph for such a motion would be _____. Take vertically downward direction positive



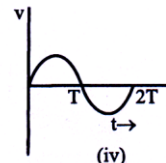
(A) (i)



(B) (ii)



(C) (iii)



(D) (iv)

36. A boat which can move with a speed of 5 m/s relative to water crosses a river of width 480 m flowing with a constant speed of 4 m/s . What is the time taken by the boat to cross the river along the shortest path.

(A) 80 s (B) 160 s (C) 240 s (D) 320 s

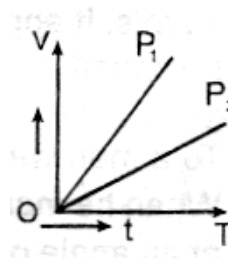
37. A stone is thrown upwards from a tower with a velocity 50 ms^{-1} . Another stone is simultaneously thrown downwards from the same location with a velocity 50 ms^{-1} . When the first stone is at the highest point, the relative velocity of the second stone with respect to the first stone is (assume that second stone has not yet reached the ground).

(A) zero (B) 50 ms^{-1} . (C) 100 ms^{-1} (D) 150 ms^{-1}

38. Shown in the figure are the velocity time graphs of the two particles P_1 and P_2 . Which of the following statements about their relative motion is true ?

Magnitude of their relative velocity:

- (A) is zero
 (B) in non – zero but constant
 (C) continuously decreases
 (D) continuously increases



39. It is raining vertically downwards with a velocity of 3 kmh^{-1} . A man walks in the rain with a velocity of 4 kmh^{-1} . The rain drops will fall on the man with a relative velocity of

(A) 1 kmh^{-1} (B) 3 kmh^{-1} (C) 4 kmh^{-1} (D) 5 kmh^{-1}

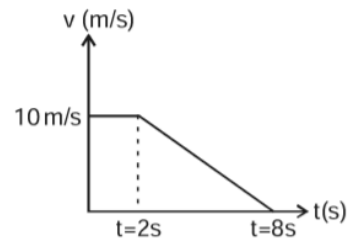
40. Raindrops are falling vertically with a velocity of 10 m/s. To a cyclist moving on a straight road the raindrops appear to be coming with a velocity of 20 m/s. The velocity of cyclist is

(A) 10 m/s (B) $10\sqrt{3} \text{ m/s}$ (C) 20 m/s (D) $20\sqrt{3} \text{ m/s}$

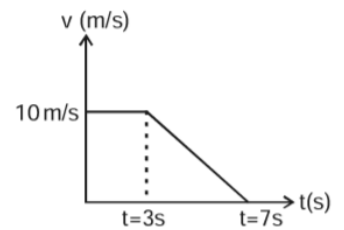
Space for rough work

41. A particle has initial velocity $\vec{v} = 3\hat{i} + 4\hat{j}$ and a constant force $\vec{F} = 4\hat{i} - 3\hat{j}$ acts on the particle. The path of the particle is
 (A) Straight line (B) Parabolic
 (C) Circular (D) Elliptical

42. Car A and car B move on a straight road and their velocity versus time graphs are as shown in figure. Comparing the motion of car A in between $t = 0$ to $t = 8$ sec and motion of car B in between $t = 0$ to $t = 7$ sec., pick up the correct statement.
 (A) Distance traveled by car A is less than distance traveled by car B.
 (B) Distance traveled by car A is greater than distance traveled by car B
 (C) Average speed of both cars are equal
 (D) Average speed of car A is less than average speed of car B

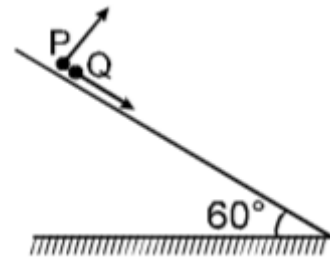


Car A



Car B

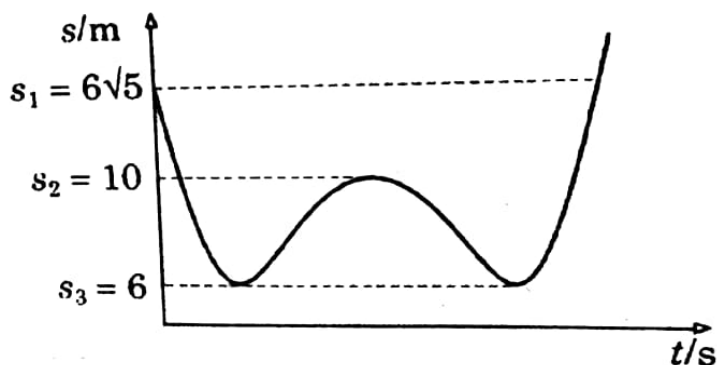
43. A particle P is projected from a point on the surface of long smooth inclined plane (see figure). Simultaneously another particle Q is released on the smooth inclined plane from the same position. P and Q collide after $t = 4$ second. The speed of projection of P is
 (A) 5 m/s (B) 10 m/s
 (C) 15 m/s (D) 20 m/s



44. A stone is projected with speed 20 m/s at angle 37° with the horizontal and it hits the ground with speed 12 m/s due to air resistance. Assume the effect of air resistance to reduce only horizontal component of velocity. Then the time of flight will be
 (A) greater than 2.4 sec (B) less than 2.4 sec
 (C) 2.4 sec (D) depends on other data
45. A projectile is thrown with a velocity of 20 m/s at an angle of 60° with the horizontal. After how much time the velocity vector will make an angle of 45° with the horizontal (take $g = 10 \text{ m/s}^2$)
 (A) $\sqrt{3}$ sec (B) $1/\sqrt{3}$ sec (C) $(\sqrt{3} + 1)$ sec (D) $(\sqrt{3} - 1)$ sec

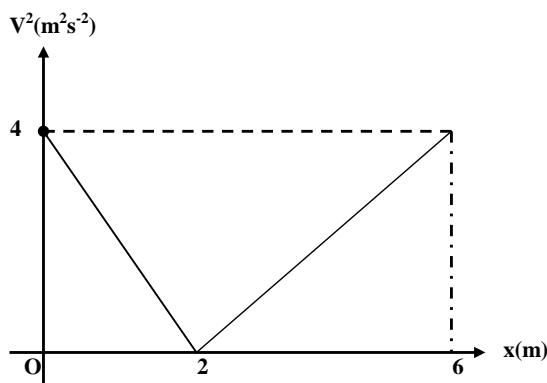
Space for rough work

46. A ball is thrown vertically upward. Its distance s (in meter) from a fixed point varies with time t (in sec) according to graph shown in fig. Then velocity of projection of the ball is _____ (Take $g = 10 \text{ m/s}^2$)



- (A) 15 m/s (B) 20 m/s (C) 10 m/s (D) None of these
47. A projectile is projected from origin to hit a target placed at a point P (4m,3m). Then find minimum possible speed with which projectile must be projected _____ Take $g = 10 \text{ m/s}^2$
- (A) $\sqrt{91.25} \text{ m/s}$ (B) $\sqrt{80} \text{ m/s}$ (C) $4\sqrt{6} \text{ m/s}$ (D) $4\sqrt{3} \text{ m/s}$

48. V^2 versus x graph is shown in figure. Here V is velocity and x is displacement. If acceleration of the particle at $x = 1.5 \text{ m}$ is $\alpha \text{ m/s}^2$ and acceleration at $x = 4 \text{ m}$ is $\beta \text{ m/s}^2$, then value of $\alpha\beta$ is _____

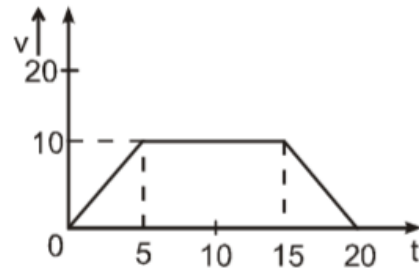


- (A) -2 (B) 2 (C) -4 (D) $-\frac{1}{2}$
49. Three particles starts from origin at the same time. The first particle starts with a velocity 2 m/s along positive x -axis, the second with a velocity 6 m/s along negative y - axis. Find the velocity of the third particle along $x = y$ line so that the three particles may always lie in a straight line.
- (A) $3\sqrt{3} \text{ m/s}$ (B) $3\sqrt{2} \text{ m/s}$ (C) $4\sqrt{2} \text{ m/s}$ (D) $2\sqrt{2} \text{ m/s}$
50. Rain is falling with a speed of 4 m/s in a direction making an angle of 30° with vertical towards south. What should be the magnitude and direction of velocity of cyclist to hold his umbrella exactly vertical, so that rain does not wet him.
- (A) 2 m/s towards north (B) 4 m/s towards south
(C) 2 m/s towards south (D) 4 m/s towards north

Space for rough work

51. The equation of motion of projectile is $y = 12x - 3/4x^2$. Given that $g = 10 \text{ ms}^{-2}$. What is the ranager of the projectile ?
 (A) 36 m (B) 30.6 m (C) 16 m (D) 12.4 m

52. Figure shows the velocity time graph of a particle moving along straight line (v is in m/s and t is in seconds) Its average velocity in 20 seconds will be
 (A) 10 m/s (B) zero
 (C) 3.75 m/s (D) 7.5 m/s

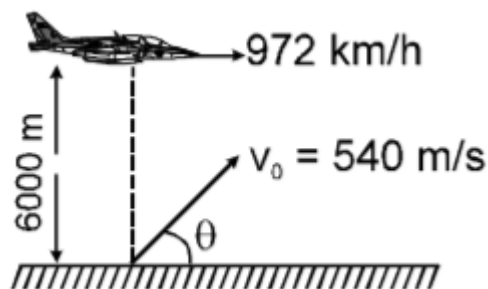


53. The distance covered by a moving particle is directly proportional to $t^{1/2}$ where t is time elapsed. What type of motion the object is performing
 (A) always retarded (B) always accelerated
 (C) first retarded and then accelerated (D) first accelerated and then retardation
54. The vertical height of the projectile at time t is given by $y=4t - t^2$ and the horizontal distance covered is given by $x = 3t$. What is the angle of projection with the horizontal ?
 (A) $\tan^{-1} 3/5$ (B) $\tan^{-1} 4/5$ (C) $\tan^{-1} 4/3$ (D) $\tan^{-1} 3/4$
55. To cross the river in shortest distance, a swimmer should swim making angle θ with the upstream. What is the ratio of the time taken to swim across in the shortest time to that in swimming across over shortest distance. [Assume speed of swimmer in still water is greater than the speed of river flow] .
 (A) $\cos \theta$ (B) $\sin \theta$ (C) $\tan \theta$ (D) $\cot \theta$
56. A ball is projected with velocity u at right angle to the slope which is inclined at an angle α with the horizontal. The distance 'x' along the inclined plane that it will travel before again striking the slope is
 (A) $\frac{2u^2}{g} \cos \alpha$ (B) $\frac{2u^2}{g} \tan \alpha$
 (C) $\frac{2u^2 \tan \alpha}{g \cos \alpha}$ (D) $\frac{2u^2 \tan \alpha}{g \sin \alpha}$

Space for rough work

57. A particle is projected up the inclined such that its component of velocity along the incline is 10 m/s. Time of flight is 2 sec and maximum height above the incline is 5 m. Then velocity of projection will be.
 (A) 10 m/s (B) $10\sqrt{2}$ m/s (C) $5\sqrt{5}$ m/s (D) None
58. A particle is projected from a point P(2,0,0)m with a velocity 10 m/s making an angle 45° with the horizontal. The plane of projectile motion passes through a horizontal line PQ which makes an angle of 37° with positive x –axis, xy plane is horizontal. The coordinates of the point where the particle will strike the line PQ is (Take $g = 10 \text{ m/s}^2$)
 (A) (10,6,0)m (B) (8,6,0)m (C) (10,8,0)m (D) (6,10,0)m
59. The maximum height attained by a projectile thrown over a horizontal ground is increased by 5%, keeping the angle of projection constant. What is the percentage increase in the horizontal range ?
 (A) 20 % (B) 15 % (C) 10 % (D) 5 %

60. An aircraft moving with a speed of 972 km/h is at a height of 6000 m, just overhead of an anti- aircraft gun. If the muzzle velocity of the gun is 540 / m/s, the firing angle θ for the bullet to hit the aircraft should be



- (A) 73° (B) 30°
 (C) 60° (D) 45°

61. The atomic weights of two elements A and B are 40 and 80 respectively. If x g of A contains 'y' atoms, how many atoms are present in 2xg of B.
 (A) $\frac{y}{2}$ (B) $\frac{y}{4}$ (C) y (D) 2y
62. One molecule of a compound contains 6 carbon atoms, 2×10^{-23} g of hydrogen and 16×10^{-23} g of O atoms. Then Gram Molecular Weight of compound is
 (A) 180g (B) 174g (C) 90 g (D) 114g
63. Chlorophyll contains 2% by mass of Mg. The number of Mg atoms in 2g of chlorophyll is
 (A) 10^{23} (B) $0.04 \times N_A$ (C) 10^{21} (D) $24 N_A$
64. At STP the density of CO_2 vapour in g/L will be equal to
 (A) 22 (B) 44 (C) 0.98 (D) 1.96

Space for rough work

65. The simplest formula of compound containing 50% of element 'X' (Atomic mass = 20) and 50% of element 'Y' (Atomic mass = 10) is
 (A) X_2Y (B) XY_2 (C) XY (D) X_2Y_3
66. Which has minimum number of atoms of oxygen?
 (A) 10 mL H_2O (ℓ) (B) 0.1 mole of V_2O_5
 (C) 12gm O_3 (g) (D) 12.044×10^{22} molecules of CO_2
67. The mass of N_2F_4 produced by the reaction of 2g of NH_3 and 8g of F_2 is 3.56g. What is percentage yield ?
 $2NH_3 + 5F_2 \rightarrow N_2F_4 + 6HF$
 (A) 79.4 (B) 71.2 (C) 86.6 (D) 81.4
68. Number of neutrons present in 8g of methane gas, are
 (A) 1.8066×10^{24} (B) 18.82×10^{22} (C) 1.8066×10^{23} (D) 1.5×10^{23}
69. 4.4g of CO_2 and 2.24 litre of H_2 at STP are mixed in a container, the total number of molecules present in the container will be
 (A) 6.022×10^{23} (B) 1.2044×10^{23} (C) 2 mole (D) 6.022×10^{24}
70. 1.12g of CaO is reacted with excess of HCl and 0.555g of $CaCl_2$ is formed. The % yield of product is
 (A) 25% (B) 75% (C) 50% (D) 60%
71. A compound containing C, H, N in respective mass ratio of 9 : 1 : 3.5. What is the empirical formula ?
 (A) $C_4H_3N_2$ (B) $C_3H_4N_2$ (C) C_4H_3N (D) C_3H_4N
72. How much magnesium sulphide can be obtained from 2g of Mg and 2g of S.
 (A) 3.0g (B) 3.5g (C) 2.5g (D) 2g
73. If 0.5 mol of $BaCl_2$ is mixed with 0.2 mol of Na_3PO_4 , the maximum number of moles of $Ba_3(PO_4)_2$ that can be formed is
 (A) 0.70 (B) 0.50 (C) 0.20 (D) 0.10
74. 4g of C_3H_8 and 14g of O_2 are allowed to react to maximum possible extent to form only CO and H_2O the mass of CO formed is
 (A) 7.6 g (B) 10.5 g (C) 8.5 g (D) 11 g

Space for rough work

75. How many mole of lead (II) chloride will be formed from a reaction between 2.24g PbO and 1.2 g HCl. (At. Wt. Pb = 208)
 (A) 0.01 (B) 0.029 (C) 0.044 (D) 0.33
76. The hydrated salt $\text{Na}_2\text{CO}_3 \cdot x\text{H}_2\text{O}$ undergoes 46% loss in mass on heating and becomes anhydrous. The value of 'x' is
 (A) 3 (B) 5 (C) 7 (D) 10
77. How many grams are contained in 2.5gram atom of Mg ?
 (A) 48g (B) 72g (C) 60g (D) 2.5g
78. Given the reaction: $\text{N}_2 + \text{H}_2 \rightarrow \text{NH}_3$; Calculate the volume of nitrogen needed to produce 6.8 gms of ammonia at STP
 (A) 22.4Lt (B) 2.24Lt (C) 44.8Lt (D) 4.48Lt
79. A gaseous mixture contains CH_4 and C_2H_6 in equimolecular proportion. The weight of 2.24 litres of this mixture at STP is :
 (A) 4.6g (B) 1.6g (C) 2.3g (D) 23g
80. The amount of KClO_3 needed to produce 48g O_2 is ?
 ($\text{KClO}_3 \rightarrow \text{KCl} + \text{O}_2$)
 (A) 122.5 (B) 24.5 (C) 98 (D) 153.12g
81. What is the mass of 3.011×10^{23} molecules of NH_3 ?
 (A) 8.5g (B) 9.5g (C) 7.5g (D) 11.5g
82. Arun needs 1.71g of cane sugar ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) to sweeten his tea, what would be the number of 'C' atoms consumed through sugar in the tea ?
 (A) 3.66×10^{22} (B) 7.2×10^{21} (C) 5×10^{21} (D) 6.6×10^{22}
83. Determine the empirical formula of Kelvar, which contain 70.6% C, 4.2% H, 11.8% N and 13.4% O.
 (A) $\text{C}_7\text{H}_5\text{N}_2\text{O}$ (B) $\text{C}_7\text{H}_5\text{NO}_2$ (C) $\text{C}_7\text{H}_9\text{NO}$ (D) $\text{C}_7\text{H}_5\text{NO}$
84. 7.5g of a gas occupy 5.6L of volume at STP. The gas is
 (A) NO (B) N_2O (C) CO (D) CO_2

Space for rough work

85. A 25 mm x 40 mm piece of gold foil is 0.25 mm thick. The density of gold is 19.32 g/cm^3 . How many gold atoms are in the sheet ? (Atomic weight : Au = 197).
(A) 7.7×10^{23} (B) 1.5×10^{23} (C) 4.3×10^{21} (D) 1.47×10^{22}
86. The formula of a hydrated salt of barium is $\text{BaCl}_2 \cdot X\text{H}_2\text{O}$. If 1.9g of this compound gives 1.8g anhydrous BaSO_4 on treatment with H_2SO_4 , the value of X is : (At. Wt. Ba = 137)
(A) 7 (B) 5 (C) 3 (D) 2
87. The ratio of masses of oxygen and nitrogen in a particular gaseous mixture is 1 : 4. The ratio of number of their molecule is :
(A) 1 : 4 (B) 7 : 32 (C) 1 : 8 (D) 3 : 14
88. If 5.6 moles of SO_2 reacts with 4.8 moles of O_2 and a large excess of H_2O , the maximum number of moles of H_2SO_4 that can be obtained is
(A) 5.6 (B) 11.2 (C) 4.8 (D) 2.4
89. 28g of KOH is used to completely neutralize CO_2 produced by heating 60g impure sample CaCO_3 . The percentage purity of CaCO_3 is
(A) 83.32 (B) 20.83 (C) 41.66 (D) 40.0
90. The least number of molecules are contained in
(A) 2g H_2 (B) 8g O_2 (C) 4g N_2 (D) 16g CO_2

Space for rough work

FIITJEE PET – V (REG_1ST YEAR)

MAINS_SET-B_ANSWERS

DATE: 21.07.2018

MATHEMATICS

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

PHYSICS

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

CHEMISTRY

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