FIITJEE PET – III (EXTENDED)

MAINS

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 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

2. 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) $\frac{-3x + 4y - 12}{5} = \frac{12x - 5y + 7}{13}$

3. The line $x + 3y - 2 = 0$ bisects the angle between a pair of straight lines of which one has equation $x - 2y + 5 = 0$. The equation of the other line is
(A) $3x + 3y - 1 = 0$ (B) $x - 3y + 2 = 0$ (C) $5x + 5y - 3 = 0$ (D) none of these

4. Find the condition that the pair of straight lines joining the origin to the intersections of the line $y = mx + c$ and the circle $x^2 + y^2 = a^2$ may be at right angles.
(A) $2a^2 = c^2 (1 + m^2)$ (B) $2a^2 = c^2 (1 - m^2)$ (C) $2c^2 = a^2 (1 + m^2)$ (D) $2c^2 = a^2 (1 - m^2)$

5. The vertices of ΔOBC are respectively $(0, 0)$, $(-3, -1)$ and $(-1, -3)$. The equation of the parallel to BC and at a distance $\frac{1}{2}$ form O which intersects OB and OC is
(A) $2x + 2y + \sqrt{2} = 0$ (B) $2x - 2y + \sqrt{2} = 0$ (C) $2x + 2y - \sqrt{2} = 0$ (D) none of these

6. 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

7. 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) $7x^2 - 9y^2 - 63 = 0$

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 H. Then the orthocenter of triangle BCH will be
(A) (–3, –2) (B) (1, 3) (C) (–1, 2) (D) none of these

9. A variable straight line passes through a fixed point (a, b) intersecting the co-ordinates axes at A and B. If 'O' is the origin then the locus of the centroid of the triangle OAB is
(A) $bx + ay - 3xy = 0$ (B) $bx + ay - 2xy = 0$ (C) $ax + by - 3xy = 0$ (D) $ax + by - 2xy = 0$

Space for rough work

10. Drawn from the origin are two mutually perpendicular straight lines forming an isosceles triangle together with the straight line, 2x + y = a. Then the area of the triangle is

(A) $\frac{a^2}{2}$ (B) $\frac{a^2}{3}$ (C) $\frac{a^2}{5}$ (D) none of these

11. The orthocenter of the triangle ABC is 'B' and the circumcentre is 'S' (a, b). If A is the origin then the co-ordinates of C are

(A) (2a, 2b) (B) $\left(\frac{a}{2},\frac{b}{2}\right)$ (C) $\left(\sqrt{a^2+b^2},0\right)$ (D) none of these

12. The equation of the line segment AB is y = x. If A and B lie on the same side of the line mirror 2x – y = 1, the image of AB has the equation

(A) x + y = 2 (B) 8x + y = 9 (C) 7x – y = 6 (D) none of these

13. A is a point on either of two lines y + $\sqrt{3}$ |x| = 2 at a distance of $\frac{4}{\sqrt{3}}$ units from either point of intersection. The co-ordinates of the foot of perpendicular from A on the bisector of the angle between them are

(A) $\left(-\frac{2}{\sqrt{3}},2\right)$ (B) (0, 0) (C) (0, 4) (D) All of these

14. On the portion of the straight line, x + 2y = 4 intercepted between the axes, a square is constructed on the side of the line away from the origin. Then the point of intersection of its diagonals has co-ordinates

(A) (2, 3) (B) (3, 2) (C) (3, 3) (D) none of these

15. Given the family of lines, a(3x + 4y + 6) + b(x + y + 2) = 0. The line of the family situated at the greatest distance from the point P(2, 3) has equation

(A) 4x + 3y + 8 = 0 (B) 5x + 3y + 10 = 0 (C) 15x + 8y + 30 = 0 (D) none of these

16. The solution set of the equation |5x – 3| = –1 is

(A) {0} (B) ϕ (C) $\left\{\frac{3}{5}\right\}$ (D) none of these

17. Let f(x) = $\log_{x^2} 25$ and g(x) = $\log_x 5$, then f(x) = g(x) holds for x belonging to

(A) R (B) (0, 1) $\cup$ (1, +∞) (C) (–∞, 0) (D) R ~ {0}

Space for rough work

18. Range of f(x) = $3\sin\sqrt{\frac{\pi^2}{9}-x^2}$ is

(A) $\left[0,\frac{3\sqrt{3}}{2}\right]$ (B) $\left[-\frac{3\sqrt{3}}{2},\frac{3\sqrt{3}}{2}\right]$ (C) [0, 3] (D) [–3, 3]

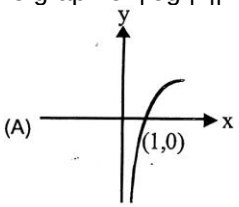
19. If g denotes the inverse of function f: (0, 1) $\to$ (–∞, 0) given by f(x) = $x-\frac{1}{x}$, then g(x) equals

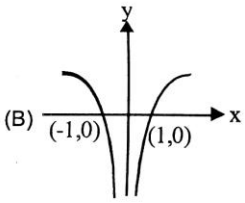
(A) $\frac{x+\sqrt{x^2+4}}{2}$ (B) $\frac{-\left(x+\sqrt{x^2+4}\right)}{2}$ (C) $\frac{\sqrt{x^2+4}-x}{2}$ (D) $\frac{x-\sqrt{x^2+4}}{2}$

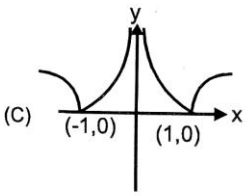
20. Range of the function f(x) = $\frac{1}{2-\sin 3x}$ is

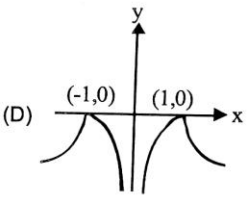
(A) [1, 3] (B) $\left[\frac{1}{3},1\right]$ (C) (1, 3) (D) $\left(\frac{1}{3},1\right)$

21. The graph of |log |x|| is

(A) 

(B) 

(C) 

(D) 

22. Domain of the function f(x) = log (log x) is

(A) (–∞, –1) (B) (1, ∞) (C) (–1, 1) (D) (0, 1)

Space for rough work

23. Let $g(x) = 1 + x - [x]$ and $f(x) = \begin{cases} -1, & x < 0 \\ 0, & x = 0 \\ 1, & x > 0 \end{cases}$. Then for all $x \in R$, $f(g(x))$ is equal to

(A) x (B) 1 (C) f(x) (D) g(x)

24. If $f: [0, \infty) \to [0, \infty)$ and $f(x) = \frac{x}{1+x}$, then f is

(A) a bijection
(B) one-one but not onto
(C) onto but not one-one
(D) neither one-one nor onto

25. Let f be a function satisfying $f(xy) = \frac{f(x)}{y}$ for all positive real numbers x and y. If f(30) = 20, then the value of f(40) is

(A) 15 (B) 20 (C) 40 (D) 60

26. If f(x) = px + q and f(f(f(x))) = 8x + 21, where p and q are real numbers, then p + q equals

(A) 3 (B) 5 (C) 7 (D) 11

27. The range of the function $y = \frac{8}{9 - x^2}$ is

(A) $(-\infty, \infty) - \{\pm 3\}$ (B) $\left[\frac{8}{9}, \infty\right)$ (C) $\left(0, \frac{8}{9}\right)$ (D) $(-\infty, 0) \cup \left[\frac{8}{9}, \infty\right)$

28. Range of the function $f(x) = \ln\sqrt{x^2 + 4x + 5}$ is

(A) R (B) $[0, \infty)$ (C) (–3, 3) (D) (–2, 0)

29. Domain of the function $f(x) = \frac{1}{\sqrt{[x^2] - [x] - 6}}$ is

(where [.] denotes greatest integer function)

(A) $(-\infty, -2) \cup [4, \infty)$ (B) $(-\infty, -2] \cup [4, \infty)$ (C) $(-\infty, -2] \cup (4, \infty)$ (D) $(-\infty, -2) \cup (4, \infty)$

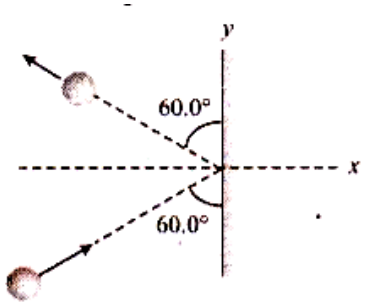
30. Range of the function $f(x) = \sin^{-1}\left[\frac{1}{2} + x^2\right]$ is

(where [.] denotes greatest integer function)

(A) $\left(0, \frac{\pi}{2}\right)$ (B) $\left\{0, \frac{\pi}{2}\right\}$ (C) $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ (D) none of these

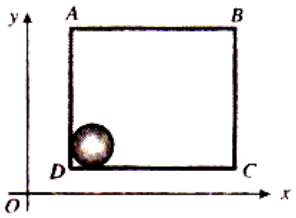
Space for rough work

31. A 3–kg steel ball strikes a wall with a speed of 10.0 ms^{-1} at angle of 60.0^0 with the surface of the wall. The ball bounces off The same speed and same angle fig. If the ball was in contact with the wall for 0.2s, find the average force exerted by the wall on the ball is



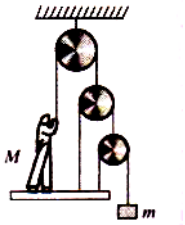
(A) $130\sqrt{3}$ N (B) $150\sqrt{3}$ N (C) $170\sqrt{3}$ N (D) None

32. A solid sphere of mass 2 kg is resting in side a cube as shown in fig. The cube is moving with a velocity $\vec{v} = \left(5t\hat{i} + 2t\hat{j}\right) ms^{-1}$. Here t is time in seconds. All surface are smooth. The sphere is at rest with respect to the cube. The total force exerted by the sphere on the cube is



(A) 24 N (B) 34 N (C) 26 N (D) 36 N

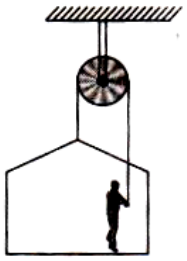
33. fig shows a light platform on which a man of mass M is standing and holding a string passes over a system of ideal pulley. Another mass m is hanging as shown in fig. Also find the ratio of M/m to keep system in equilibrium



(A) 5 (B) 7 (C) 9 (D) None

Space for rough work

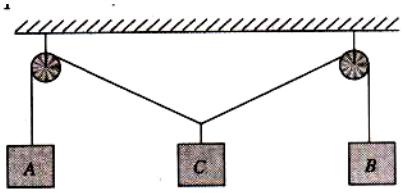
34. A man is raising himself and the crate on which he stands with an acceleration of $5\ ms^{-2}$ by a massless rope and pulley arrangement. Mass of the man is 100 kg and that of the crate is 50 kg. if $g = 10ms^{-2}$, then the tension in the rope is



(A) 2250 N (B) 1125 N

(C) 750 N (D) 375 N

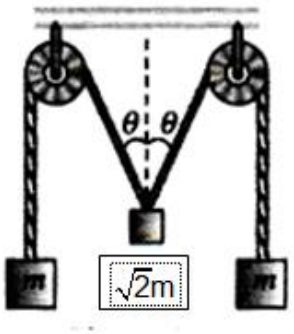
35. Three blocks A,B, and C are suspended as shown in fig. Mass of each of blocks A and B is m. If the system is in equilibrium, and mass of C is M, then



(A) M> 2m (B) M=2m

(C) M<2m (D) None of these

36. The pulleys and strings shown in fig are smooth and of negligible mass. For the system to remain equilibrium, the angle θ should be

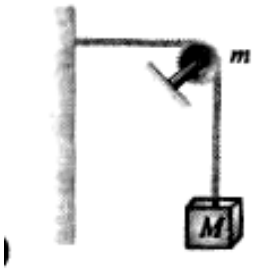


(A) 0^0 (B) 30^0

(C) 45^0 (D) 60^0

Space for rough work

37. A string of negligible mass going over a clamped pulley of mass m supports a block of M as shown in the fig. The force on the pulley by the clamp is given by



(A) $\sqrt{2}$ Mg

(B) $\sqrt{2}$mg

(C) $\left(\sqrt{(M+m)^2+m^2}\right)g$

(D) $\left(\sqrt{(M+m)^2+M^2}\right)g$

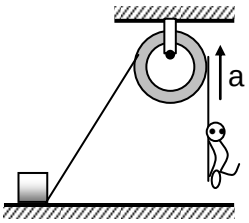
38. A boy of mass 40 kg is hanging from the horizontal branch of a tree. The tension in his arms is minimum when the angle between the arms is
(A) 0^o (B) 90^o (C) 120^o (D) 180^o

39. A force vector applied on a mass is represented a $\vec{F} = 6\,\hat{i} - 8\,\hat{j} + 10\,\hat{k}$ and accelerates with 1 m/s^2. What will be the mass of the body?
(A) 10 $\sqrt{2}$ kg (B) 2$\sqrt{10}$ kg (C) 10 kg (D) 20 kg

40. A riffle bullet loses $\frac{1}{20}$ of its velocity in passing through a plank. The least number of such planks required to just stop the bullet is
(A) 5 (B) 10 (C) 11 (D) 20

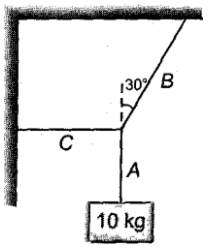
Space for rough work

41. A light string fixed at one end to a clamp on ground passes over a fixed pulley and hangs at the other side. It makes an angle of 30^o with the ground. A monkey of mass 5 kg climbs up the rope. The clamp can tolerate a vertical force of 40 N only. The maximum acceleration in upward direction with which the monkey can climb safely is (neglect friction and take g = 10 m/s^2)



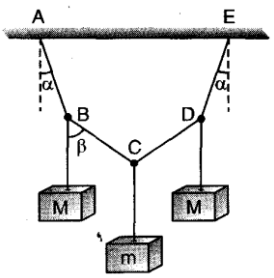
(A) 2 m/s^2 (B) 4 m/s^2 (C) 6 m/s^2 (D) 8 m/s^2

42. In a figure a block of mass 10kg is in equilibrium. Identify the string in which the tension is zero.



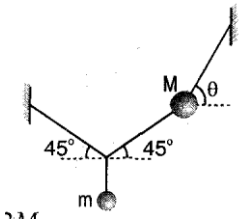
(A) B
(B) C
(C) A
(D) None of these

43. The figure represents a light inextensible string ABCDE in which AB = BC = CD = DE and to which are attached masses M, m and M at the points B, C and D, respectively. The system hangs freely in equilibrium with ends A and E of the string fixed in the same horizontal line shown in figure. It is given that $\tan\alpha = \frac{3}{4}$ and $\tan\beta = \frac{12}{5}$. Then the tension in the string BC is



(A) 2mg (B) $\frac{13}{10}$mg (C) $\frac{3}{10}$mg (D) $\frac{20}{11}$mg

44. Two masses m and M are attached with strings as shown. For the system to be in equilibrium we have

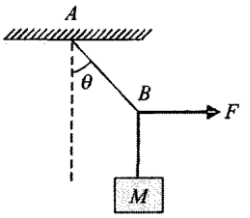


(A) $\tan\theta = 1+\frac{2M}{m}$ (B) $\tan\theta = 1+\frac{2m}{M}$

(C) $\tan\theta = 1+\frac{M}{2m}$ (D) $\tan\theta = 1+\frac{m}{2M}$

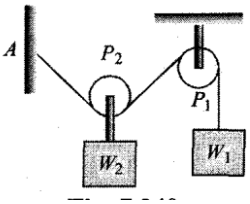
Space for rough work

45. A mass M is suspended by a rope from a rigid support at A as shown in figure. Another rope is tied at the end B and it is pulled horizontally with a force F. If the rope AB makes an angle θ with the vertical, then the tension in the string AB is



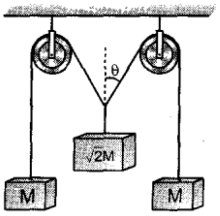
(A) F sin θ (B) F/sinθ (C) F cos θ (D) F/cosθ

46. In the following figure, the pulley P_1 is fixed and the pulley P_2 is movable. If $W_1 = W_2 = 100$N, what is the angle AP_2P_1? The pulleys are frictionless and assume equilibrium.



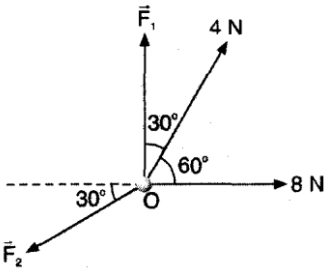
(A) 30^0 (B) 60^0
(C) 90^0 (D) 120^0

47. The pulleys and strings shown in the figure are smooth and of negligible mass. For the system to remain in equilibrium, the angle θ should be



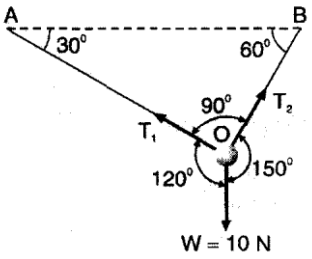
(A) 0^0 (B) 30^0
(C) 45^0 (D) 60^0

48. An object is in equilibrium under four concurrent forces in the directions shown in figure. The magnitude of $\vec{F}_1$ is



(A) $\frac{2}{\sqrt{3}}$N (B) $\frac{20}{\sqrt{3}}$N
(C) $\frac{4}{\sqrt{3}}$N (D) None of these

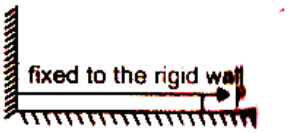
49. A ball of mass 1 kg hangs in equilibrium form two strings OA and OB as shown in figure. What are the tensions in strings OA and OB? Take g = 10 ms^{-2}.



(A) 5N, $5\sqrt{3}$ N (B) 5N, 5N
(C) $5\sqrt{3}$N.$5\sqrt{3}$N (D) $\frac{5}{\sqrt{3}}$N,5N

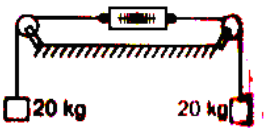
Space for rough work

50. In the figure a rope of mass m and length ℓ is such that its one end is fixed to a rigid wall and the other is applied with a horizontal force F as shown below, then tension at the middle of the string is



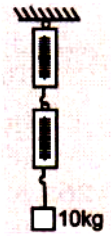
(A) F (B) 2F (C) zero (D) F/2

51. Figure shows a light spring balance connected to two blocks of mass 20 kg each. The graduations in the balance measure the tension in the spring. The reading of the balance is



(A) 40 kg
(B) zero kg
(C) 20 kg
(D) Depends on mass of spring balance

52. A block of mass 10 kg is suspended through two light spring balance as shown below.



(A) Both the scales will read 5 kg
(B) The upper scale will read 10 kg and the lower zero
(C) Both the scales will read 10 kg
(D) The readings may be anything but their sum will be 10kg

53. In an imaginary atmosphere, the air exerts a small force F on any particle in the direction of the particle's motion. A particle of mass m projected upward takes a time t_1 in reaching the maximum height and t_2 in the return journey to the original point. Then.

(A) $t_1 > t_2$
(B) $t_1 = t_2$
(C) $t_1 < t_2$
(D) The relation between t_1 & t_2 depends on the mass of the particle.

Space for rough work

54. A force $\vec{F} = \vec{v} \times \vec{A}$ is exerted on a particle in addition to the force of gravity, where $\vec{v}$ is the velocity of the particle and $\vec{A}$ is a constant vector in the horizontal direction. The minimum speed of projection for a particle of mass m so that it continues to move with a constant velocity is given by

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

55. A particle travels along the arc of a circle of radius r. Its speed depends on the distance travelled ℓ as $v = a\sqrt{\ell}$, where 'a' is a constant. The angle α between the vectors of total acceleration and the velocity of the particle is

(A) $\alpha = \tan^{-1}(2\ell/r)$ (B) $\alpha = \cos^{-1}(2\ell/r)$

(C) $\alpha = \sin^{-1}(2\ell/r)$ (D) $\alpha = \cot^{-1}(2\ell/r)$

56. A particle is moving in a circle of radius R in such a way that at any instant the normal and tangential components of the acceleration are equal. If its speed at t=0 is u_0, the time taken to complete the first revolution is

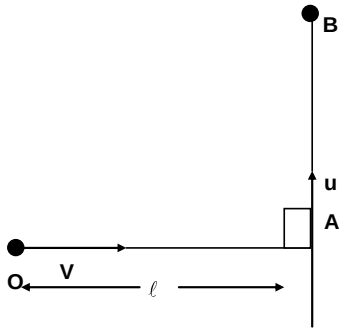
(A) R/u_0 (B) u_0/R (C) $\frac{R}{u_0}(1-e^{-2\pi})$ (D) $\frac{R}{u_0}e^{-2\pi}$

57. A particle of mass m moves along a circle of constant radius 'R' with radial acceleration changing with time as $a_r = kt^n$ where k is constant and n>1. The tangential force on the particle varies with time as .

(A) $\frac{mn}{2}\sqrt{Rk}\ t^{\left(2-\frac{n}{2}\right)}$ (B) $\frac{mn}{2}\sqrt{Rk}\ t^{\left(2+\frac{n}{2}\right)}$

(C) $\frac{mn}{2}\sqrt{Rk}\ t^{\left(\frac{n}{2}-1\right)}$ (D) None

At t= 0, dog is at point O and cat is at point A. At this instant, the cat starts moving along AB with a constant speed 'u'. Now dog starts chasing cat with a constant speed 'v' in such a way that its velocity is always directed towards cat. Finally dog catches the cat at B. Initial separation between cat and dog is 'ℓ' (u= 3 m/s, v= 5m/s , $\ell = 1.25m$)



58. Tangential acceleration of dog at t= 0 $(\text{in } m/s^2)$

(A) 0 (B) 3 (C) 4 (D) 12

Space for rough work

59. Radial acceleration of dog at t= 0 (approx.) $\left(\text{in } m/s^2\right)$

(A) 0 (B) 3 (C) 4 (D) 12

60. Time taken for dog to catch the cat (in sec)

(A) 4 (B) $\frac{25}{4}$ (C) $\frac{15}{64}$ (D) $\frac{25}{64}$

61. Diagonal relationship is not shown by :

(A) Li and Mg (B) C and P (C) B and Si (D) Be and Al

62. The order in which the following oxides are arranged according to decreasing basic nature is :

(A) CuO, Na_2O, MgO, Al_2O_2 (B) Al_2O_3, MgO, CuO, Na_2O

(C) MgO, Al_2O_3, CuO, Na_2O (D) Na_2O, MgO, Al_2O_3, CuO

63. The valency shell of element A contains 3 electrons while the valency shell of element B contains 6 electrons. If A combined with B, the probable formula of the compound formed will be :

(A) AB_2 (B) A_2B (C) A_2B_3 (D) A_3B_2

64. In which of the following arrangements, the order is not according to the property indicated against it ?

(A) $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$ increasing ionic size

(B) B < C < N < O increasing first ionisation enthalpy

(C) I < Br < F < Cl increasing electron gain enthalpy (with negative sign)

(D) Li < Na < K < Rb increasing metallic radius

65. The correct increasing order of size is ,

(A) $Yb^{3+} < Pm^{3+} < Ce^{3+} < La^{3+}$ (B) $Ce^{3+} < Yb^{3+} < Pm^{3+} < La^{3+}$

(C) $Yb^{3+} < Pm^{3+} < La^{3+} < Ce^{3+}$ (D) $Pm^{3+} < La^{3+} < Ce^{3+} < Yb^{3+}$

66. I.P values of an element M are 5 eV, 47 eV, 62 eV, … The sulphate formula of that element is

(A) MSO_4 (B) $M_2(SO_4)_3$ (C) M_2SO_4 (D) $M(SO_4)_2$

67. The atomic numbers of elements A, B, C and D are z-1, z, z+1 and z+2, respectively. If `B' is a noble gas, choose the correct answers from the following statements.

(a) `A' has higher electron affinity (b) `C' exists in +2 oxidation state

(c) `D' is an alkaline Earth metal (d) 'D' exists in +1 oxidation state

(A) (a) and (b) (B) (b) and (c) (C) (a) and (c) (D) (a), (b) and (c)

Space for rough work

68. Find the correct statements from the following:
I) Vander Waal's radii are calculated in solid state.
II) For noble gases, atomic radii are Vander Waal's radii.
III) Vander Waal's radii are more than actual atomic radii.
IV) Covalent radii vary with bond multiplicity.
A) I and II only B) I, II and III only C) II and III only D) I, II, III and IV

69. The statement incorrect for f–block elements :
(A) they belong to group 3rd (III B) of periodic table
(B) their outer most three shells are incomplete
(C) they are collectively known as transuranic elements
(D) 4 f series elements are called rare earths.

70. In which of the following the order is not correct, according to the property indicated against it?
(A) $F > Cl > Br > I \rightarrow$ Electronegativity (B) $Ti < Zr < Hf \rightarrow$ Atomic radius
(C) $Na > Mg < Al > Si \rightarrow$ Second ionization energy (D) $P_2O_5 < SO_3 < Cl_2O_7 \rightarrow$ Acidic nature

71. The ionisation energy of lithium is 500 kJ mol^{-1}. The amount of energy required to convert 70mg of lithium atoms in gaseous state into Li^+ ions is
(A) 3 (B) 7 (C) 11 (D) 5

72. For bromine the IE/EA ratio = $\frac{10}{3}$. Electronegativety of bromine is 2.8. on Mulliken's scale its electron affinity in kJ/mol is,
(A) 81 (B) 93 (C) 162 (D) 351

73. A large difference in atomic radius is observed in the pair
(A) Zr, Hf (B) Nb, Ta (C) Mo, W (D) V, Nb

74. A 100 watt bulb emits monochromatic light of wavelength 400nm. The number of photons emitted per second by the bulb are
(A) 2.012 x 10^{19} (B) 2.012 x 10^{20} (C) 2.012 x 10^{21} (D) 2.012 x 10^{22}

75. Which transition of electron in the hydrogen atom emits maximum energy ?
(A) $2 \rightarrow 1$ (B) $1 \rightarrow 4$ (C) $4 \rightarrow 3$ (D) $3 \rightarrow 2$

76. The first emission line of Balmer series for H–spectrum has the wave no. equal to :
(A) $\frac{9R_H}{400} cm^{-1}$ (B) $\frac{7R_H}{144} cm^{-1}$ (C) $\frac{3R_H}{4} cm^{-1}$ (D) $\frac{5R_H}{36} cm^{-1}$

Space for rough work

77. Ratio of frequency of revolution of electron in the 2nd excited state of He^+ and 2nd state of hydrogen is:
(A) $\frac{32}{27}$ (B) $\frac{27}{32}$ (C) 1/54 (D) 27/2

78. If a_0 be the radius of first Bohr's orbit of H-atom, the de-Broglie's wavelength of an electron revolving in the third Bohr's orbit will be
(A) $6\pi a_0$ (B) $4\pi a_0$ (C) $2\pi a_0$ (D) πa_0

79. Series – I : $\left[N^{3-}, O^-, Na^+\right]$; Series – II : $\left[N^+, C^+, O^+\right]$
Choose the species of lowest I.P. from series–I and highest I.P. from Series – II respectively :
(A) N^{3-}, O^+ (B) Na^+, C^+ (C) N^{3-}, N^+ (D) O^-, C^+

80. Increasing order of metallic characteristic of C, Sb, As, Bi, Si is shown by :
(A) C, Si, As, Sb, Bi (B) C, Si, Bi, Sb, As
(C) C, Si, Sb, Bi, As (D) C, Si, As, Bi, Sb

81. Which of the following orders for electron affinity is/are corret ?
(a) S > O < Se (b) Cl > F (c) S > O (d) O > S
(e) N > P (f) C > N
(A) a, b, c, e (B) a, b, c, f (C) b, c, d, e (D) b, c, f

82. An electron in an atom jumps in such a way that its kinetic energy changes from x to $\frac{x}{4}$. The change in potential energy will be :
(A) $+\frac{3}{2}x$ (B) $-\frac{3}{8}x$ (C) $+\frac{3}{4}x$ (D) $-\frac{3}{4}x$

83. The correct order of screening effects of s, p, d, f sub – shells is :
(A) s > p > d > f (B) s < p < d < f (C) d > p > s > f (D) s > f > d > p

84. The Schrodinger wave equation for hydrogen atom is

$$\psi_{2s} = \frac{1}{4\sqrt{2\pi}}\left(\frac{1}{a_0}\right)^{\frac{3}{2}}\left(2-\frac{r}{a_0}\right)e^{-r/a_0}$$

Where a_0 is Bohr's radius. If the radial node in 2s be at r_0, then r_0 would be equal to :
(A) $\frac{a_0}{2}$ (B) $2a_0$ (C) $\sqrt{2}a_0$ (D) $\frac{a_0}{\sqrt{2}}$

Space for rough work

85. The halogens
(A) are highly electropositive (B) have an electronic configuration ns^2np^6
(C) form a volatile, covalent hydride HX in which the halogen (X) shows an oxidation state of +1
(D) show variable oxidation state –1, +1, +3, +5, and +7 in their various compounds.

86. 106^{th} element belong to which of the following blocks ?
(A) f–block (B) s–block (C) p–block (D) d–block

87. Pauling's equation for determining the electronegativity of an element is
(A) $X_A - X_B = 0.208\sqrt{\Delta}$ (B) $X_A + X_B = 0.208\sqrt{\Delta}$
(C) $X_A - X_B = 0.208\Delta^2$ (D) $X_A - X_B = \sqrt{\Delta}$

88. Which of the following shows inert pair effect ?
(A) Tl (B) C (C) S (D) Si

89. Which of the following statements is correct?
(A) Atomic radii of noble gases are expressed as vanderwaals's radius which are smaller than metallic radius.
(B) Metallic radius refer to metals only and is smaller than covalent radius.
(C) Generally covalent radius refer to non-metals as well as metals in bonded state
(D) Metallic radius refer to metals only and is greater than covalent radius.

90. The I.P values of Li, Be and C are 5.4 eV/ atom, 9.32 eV/atom and 11.26 eV/atom. The I.P value of Boron is
(A) 13.6 eV/atom (B) 8.29 eV/atom (C) 14.5 eV/atom (D) 21.5 eV/atom

Space for rough work

FIITJEE PET – III (EXTENDED)

MAINS_ANSWERS

DATE: 04.08.2018

MATHEMATICS

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

PHYSICS

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

CHEMISTRY

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