FIITJEE PET – IV (REG_1ST YEAR)

MAINS_SET–A

DATE: 30.06.2018

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. If $0 < \beta < \alpha \le \frac{\pi}{4}$, $\cos(\alpha + \beta) = \frac{3}{5}$, $\cos(\alpha - \beta) = \frac{4}{5}$, then $\sin 2\alpha$ is equal to

   (A) 1 (B) 0 (C) 2 (D) none of these

2. If $\tan\theta \cdot \tan\left(\frac{\pi}{3}+\theta\right)\cdot\tan\left(\frac{\pi}{3}-\theta\right) = -1$ and $\left(0 < \theta < \frac{\pi}{2}\right)$, then value of $8\sin\theta - 4\cos^3\theta$

   (A) $3\sqrt{2}$ (B) –1 (C) $\frac{1}{\sqrt{2}}$ (D) none of these

3. The value of $\tan 6° \tan 42° \tan 66° \tan 78°$ is

   (A) 1 (B) $\frac{1}{2}$ (C) $\frac{1}{4}$ (D) $\frac{1}{8}$

4. $\cos^2\frac{\pi}{12} + \cos^2\frac{\pi}{4} + \cos^2\frac{5\pi}{12} =$

   (A) $\frac{2}{3+\sqrt{3}}$ (B) $\frac{3}{2}$ (C) $\frac{3+\sqrt{3}}{2}$ (D) none of these

5. The value of $\sin\frac{\pi}{9}\cdot\sin\frac{2\pi}{9}\cdot\sin\frac{3\pi}{9}\cdot\sin\frac{4\pi}{9}$ is

   (A) $\frac{3}{16}$ (B) $\frac{1}{16}$ (C) $\frac{1}{8}$ (D) none of these

6. The value of expression $\sqrt{3}$ cosec 20° – sec 20° is equal to

   (A) 2 (B) 4 (C) $\frac{2\sin 20°}{\sin 40°}$ (D) none of these

7. If $\sin A + \sin B = \sqrt{3}(\cos B - \cos A)$, then $\sin 3A + \sin 3B$ is equal to

   (A) $\sqrt{3}$ (B) 0 (C) 1 (D) none of these

8. The value of $\cot^2 36° \cdot \cot^2 72°$ is

   (A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{1}{5}$ (D) none of these

9. The value of $\cos 10° - \sin 10°$ is

   (A) positive (B) negative (C) 0 (D) none of these

Space for rough work

10. If $\pi < 2\theta < \frac{3\pi}{2}$, then $\sqrt{2+\sqrt{2+2\cos 4\theta}}$ is equal to

(A) $-2\cos\theta$ (B) $-2\sin\theta$ (C) $2\cos\theta$ (D) $2\sin\theta$

11. The value of $\sin 12^\circ . \sin 42^\circ . \sin 54^\circ$ is

(A) $\frac{1}{16}$ (B) $\frac{1}{8}$ (C) $\frac{1}{4}$ (D) none of these

12. Value of $(1 + \sec 2\theta)(1 + \sec 2^2\theta)$ is

(A) $\frac{\tan 4\theta}{\tan\theta}$ (B) $\frac{\tan\theta}{\tan 4\theta}$ (C) $\frac{\cot 4\theta}{\cot\theta}$ (D) none of these

13. Value of $(1 + \tan 5^\circ)(1 + \tan 10^\circ)(1 + \tan 15^\circ) \ldots\ldots (1 + \tan 40^\circ)(1 + \tan 45^\circ)$ is

(A) 2^5 (B) 2^4 (C) 2^6 (D) 2^7

14. If $\pi < x < \frac{3\pi}{2}$, value of $\sqrt{1-\cos 2x}$ is

(A) $\sqrt{2}\sin x$ (B) $\sqrt{2}\cos x$ (C) $-\sqrt{2}\sin x$ (D) $-\sqrt{2}\cos x$

15. Value of $2\sin 80^\circ \sin 40^\circ \sin 20^\circ$

(A) $\frac{\sqrt{3}}{4}$ (B) $\frac{\sqrt{3}}{8}$ (C) $\frac{1}{4}$ (D) $\frac{1}{8}$

16. Value of $\cos 10^\circ \cos 50^\circ \sin 20^\circ \cos 60^\circ$

(A) $\frac{\sqrt{3}}{4}$ (B) $\frac{3}{4}$ (C) $\frac{\sqrt{3}}{8}$ (D) $\frac{\sqrt{3}}{16}$

17. If $\cos\theta = \frac{1}{2}$, find the value of $\tan\frac{\theta}{2}$

(A) $\frac{\sqrt{3}}{2}$ (B) $\frac{1}{3}$ (C) $\frac{1}{\sqrt{3}}$ (D) none of these

18. If $(3 - 4\sin^2\theta) = 2$, then the value of $\frac{\sin 3\theta}{\sin\theta}$ is equal to

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

Space for rough work

19. If $\frac{\left(6-8\sin^2\theta\right)}{\cos\theta} = 2$, then value of $\sin 3\theta =$

(A) $\frac{1}{2}\sin 2\theta$ (B) $\cos 2\theta$ (C) $2\sin 2\theta$ (D) none of these

20. Value of $\tan(45° - \theta) - \tan(45° + \theta)$

(A) $2\tan 2\theta$ (B) $-2\tan 2\theta$ (C) $-\tan 2\theta$ (D) $\tan 2\theta$

21. If $2\sec 2\theta = \tan\phi + \cot\phi$, then cone of the values of $\theta + \phi$ is

(A) $\frac{\pi}{2}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{3}$ (D) none of these

22. If $\cot(\alpha + \beta) = 0$, then $\sin(\alpha + 2\beta)$ can be

(A) $-\sin\alpha$ (B) $\sin\beta$ (C) $\cos\alpha$ (D) $\cos\beta$

23. If $\cos(A - B) = \frac{3}{5}$ and $\tan A \tan B = 2$, then

(A) $\cos A \cos B = \frac{1}{5}$ (B) $\sin A \sin B = -\frac{2}{5}$ (C) $\cos A \cos B = -\frac{1}{5}$ (D) $\sin A \sin B = -\frac{1}{5}$

24. If $(1 + \tan\alpha)(1 + \tan 4\alpha) = 2$, $\alpha \in \left(0, \frac{\pi}{16}\right)$, then α is equal to

(A) $\frac{\pi}{20}$ (B) $\frac{\pi}{30}$ (C) $\frac{\pi}{40}$ (D) $\frac{\pi}{60}$

25. If $A = \sin 45° + \cos 45°$ and $B = \sin 44° + \cos 44°$, then

(A) $A > B$ (B) $A < B$ (C) $A = B$ (D) none of these

26. $\frac{1}{4}\left[\sqrt{3}\cos 23° - \sin 23°\right]$ is equal to

(A) $\frac{1}{2}\cos 45°$ (B) $\frac{1}{2}\cos 7°$ (C) $\frac{1}{2}\cos 53°$ (D) none of these

27. If $\sin 2\theta = \cos 3\theta$ and θ is an acute angle, then $\sin\theta$ equals

(A) $\frac{\sqrt{5}-1}{4}$ (B) $-\left(\frac{\sqrt{5}-1}{4}\right)$ (C) $\frac{\sqrt{5}+1}{4}$ (D) $\frac{-\sqrt{5}-1}{4}$

Space for rough work

28. If $\tan A = \frac{1-\cos B}{\sin B}$, then tan 2A is

(A) tan 2A = tan B (B) tan 2A = $\tan^2 B$
(C) tan 2A = $\tan^2 B$ + 2 tan B (D) none of these

29. The numerical value of tan 20° tan 80° cot 50° is equal to

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

30. If $\tan^2\theta = 2\tan^2\phi + 1$, then $\cos 2\theta + \sin^2\phi$ equals

(A) –1 (B) 0 (C) 1 (D) none of these

31. The displacement of a body is given by $r = \sqrt{a^2 - t^2} + t\cos t^2$, where t is the time and a is constant. Its velocity is .

(A) $\frac{-t}{\sqrt{a^2 - t^2}} + \cos t^2 - t\sin 2t$ (B) $\frac{-t}{\sqrt{a^2 - t^2}} + \cos t^2 - 2t^2 \sin t^2$

(C) $\frac{-a}{\left(a^2 - t^2\right)} + 2t\cos t^2 \sin t + \sin t$ (D) $a - t^2 - t\sin t^2$

32. If $x = (6y + 4)\left(3y^2 + 4y + 3\right)$ then $\int x\,dy$ will be

(A) $\frac{1}{3y^2 + 4y + 3}$ (B) $\frac{\left(3y^2 + 4y + 3\right)^2}{2} + c$

(C) $\left(3y^2 + 4y + 3\right)$ (D) $\frac{(6y + 4)}{\left(3y^2 + 4y + 3\right)}$

33. $\int_0^{\pi/2} \left(e^{\sin x}\right)\cos x\,dx$ is _____

(A) 1 (B) e + 1 (C) e – 1 (D) None of these

34. Find the maximum value of xy if x+3y = 12

(A) 24 (B) 9 (C) 12 (D) 18

35. The acceleration of a particle varies with times as $a(t) = 3t^2 + 4$. If the initial velocity of particle is 2 m/s, find the velocity of particle at t= 3 second

(A) 41 m/s (B) 4 m/s (C) 39 m/s (D) 27 m/s

Space for rough work

36. The position of a body is given as a function of time by the relation (in SI units) $x = (2t^3 - 6t^2 + 12t + 6)$ m. The acceleration of the body is zero at time t =
(A) 2 sec (B) 3 sec (C) 1 sec (D) 4 sec

37. Find the area under the curve $y = 5e^x$ and the x – axis between x= 0 and x = 2
(A) $5e^2$ (B) $e^2 - 1$ (C) $5\left(e^2 - 1\right)$ (D) $\frac{e^2 - 1}{5}$

38. The function $x^5 - 5x^4 + 5x^3 - 10$ has a maxima, when x =
(A) 3 (B) 2 (C) 1 (D) 0

39. If $v = x^2 - 5x + 4$, find the acceleration of the particle when velocity of the particle is zero
(A) 0 (B) 2 (C) 3 (D) None of these

40. An ant is at a corner of a cubical room of side a. The ant can move with a constant speed u. The minimum time taken to reach the farthest corner of the cube is ____. Assume that ant can not fly.
(A) $\frac{\left(\sqrt{5} - 1\right)a}{u}$ (B) $\frac{\left(\sqrt{3} + 1\right)a}{u}$ (C) $\frac{\sqrt{5}a}{u}$ (D) $\frac{\left(\sqrt{2} + 1\right)a}{u}$

41. Two mosquitos move in space such that their x,y,z coordinates at any time 't'(in seconds) are given as $\left(3t + 1, 4t, 2t^2 - 1\right)$, and $\left(4t + 1, 3t + 3, 2t^2\right)$, all in meters. Find the minimum distance between these two
(A) $\sqrt{\frac{11}{2}}$m (B) $\sqrt{\frac{9}{2}}$m (C) 5 m (D) None of these

42. $\int_0^1 \left(t^2 + 9t + c\right)dt = \frac{9}{2}$. Find value of 'c'
(A) zero (B) 3 (C) 2 (D) –1/3

43. The value of $\int_0^{\pi/2} \sin^2 x \, dx$ will be
(A) 1 (B) 0 (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

Space for rough work

44. $y = 5\sin(3wt + \phi)$; where w and ϕ are constant find $\frac{dy}{dt}$

(A) $15w\cos(3wt + \phi)$ (B) $15w\cos(3wt)$

(C) $15\cos(3wt + \phi)$ (D) $5w\cos(3wt + \phi)$

45. $\int (x+1)dy$ if $y = 6x^2$

(A) $2x^3 + 6x^2 + c$ (B) $4x^3 + 6x^2 + c$

(C) $4x^3 + 4x^2 + c$ (D) $4x^3 - 6x^2 + c$

46. A particle moves in a straight line with an acceleration a m/s^2 at time 't' seconds where a = $-\frac{1}{t^2}$. When t= 1, the particle has a velocity of 3 m/s then find the velocity when t = 4 sec.

(A) 3 m/s (B) 3.5 m/s (C) 2.25 m/s (D) 3.75 m/s

47. At time t the position of a body moving such that its position varies with time and is given by $x = t^3 - 6t^2 + 9t$ m. Find the body's speed when the acceleration is zero.

(A) 3 m/s (B) 4 m/s (C) 6 m/s (D) -3 m/s

48. If number of significant digits in 0.010, 200, 10.0, 5.00 and 2.0×10^{-7} are a,b,c,d and e respectively then value of $(a+b+c+d+e)$ will be

(A) 9 (B) 14 (C) 10 (D) 11

49. Velocity of a particle varies w.r.t time as per given relation, v = $4t^2$ – 16t + 40. Find the maximum velocity attained by the particle

(A) 40 units (B) 24 units (C) 252 units (D) none of these

50. The position of a particle is given by the equation $s = f(t) = t^3 - 6t^2 + 9t$, where t is measured in seconds and s in meters. What is the acceleration after 4 s?

(A) 4 m/sec^2 (B) 6 m/sec^2 (C) 8 m/sec^2 (D) 12 m/sec^2

Space for rough work

Find the integral of functions(Q. No 51 to 54)

51. $\int x^4 dx$

(A) $\frac{x^5}{5}+c$ (B) $\frac{x^5}{4}+c$ (C) $4x^3 + c$ (D) $x^2 + c$

52. $\int \frac{1}{\sqrt{x}} dx$

(A) $\log \sqrt{x}+c$ (B) $2\sqrt{x}+c$ (C) $\frac{2}{2\sqrt{x}}+c$ (D) $x^{1/2} + c$

53. $\int_{-1}^{1} dx$

(A) 1 (B) 2 (C) 5 (D) 40

54. $\int_{2}^{2} 10\ dx$

(A) 0 (B) 20 (C) 5 (D) 40

55. The mass of a ball is 1.76 kg. The mass of 25 such balls is

(A) 0.44×10^3 kg (B) 44.0 kg

(C) 44 kg (D) 44.00 kg

56. The values $\frac{900}{10.4}$ and $\frac{90.0}{1.04}$ are respectively___(keeping the significant figures in view)

(A) 86,86 (B) 86.0, 86.0 (C) 90, 86.5 (D) 86.5, 86.54

57. 5.74 gm of substance occupies 1.2 cm^3 . Express its density by keeping the significant figures in view.

(A) 4.8 g/cm^3 (B) 4.78 g/cm^3

(C) 5.0 g/cm^3 (D) 4.7 g/cm^3

Space for rough work

58. The length and breadth of a metal sheet are 2.108 and 3.03 m respectively. The area of the sheet in appropriate significant digits will be ___

(A) 6.40 m^2 (B) 6.38 m^2 (C) 6.390 m^2 (D) 6.39 m^2

59. $\int_0^{\pi} \sin^2 x\,dx + \int_0^{\pi} \frac{1}{\sec^2 t} dt$ will be

(A) $\frac{\pi}{2}$ (B) π (C) 2 (D) 1

60. $\int_0^{\pi/2} \left(\sin^3\theta + \cos^3\theta\right) d\theta$ will be _____

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

61. Maximum number of electrons having $(n + \ell = 5)$ is :

(A) 20 (B) 18 (C) 16 (D) 22

62. If there are three possible values $\left(-\frac{1}{2}, 0, +\frac{1}{2}\right)$ for the spin quantum, then the electronic configuration of K(19) will be :

(A) $1s^3 2s^3 2p^9 3s^3 3s^1$ (B) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$

(C) $1s^2 2s^2 s2p^9 3s^2 3p^4$ (D) none

63. How many times does light travel faster in vacuum than an electron in Bohr first orbit of H–atom ?

(A) 13.7 times (B) 67 times (C) 137 times (D) 97 times

64. The compound of vanadium has a magnetic moment of 1.73 BM. The electronic configuration of vanadium ion in the compound is :

(A) $[Ar]3d^2$ (B) $[Ar]3d^1 4s^0$

(C) $[Ar]3d^3$ (D) $[Ar]3d^0 4s^1$

Space for rough work

65. The orbital angular momentum and angular momentum for the electron of 4s–orbital are respectively, equal to

(A) $\sqrt{12}\frac{h}{2\pi}$ and $\frac{h}{2\pi}$ (B) zero and $\frac{2h}{\pi}$

(C) $\sqrt{6}h$ and $\frac{2h}{\pi}$ (D) $\frac{\sqrt{2}h}{2\pi}$ and $\frac{3h}{2\pi}$

66. The wave function (Ψ) of 2s–orbital is given by $\psi_{2s} = \frac{1}{2\sqrt{32\pi}}\left(\frac{1}{a_0}\right)^{3/2}\left[2-\frac{r}{a_0}\right]e^{-r/2a_0}$

At r = r_0, radial node is formed. Find r_0.

(A) $4a_0$ (B) $3a_0$ (C) a_0 (D) $2a_0$

67. Number of nodal planes and nodal plane regions for 3dyz orbital are respectively

(A) 2 & xy, yz (B) 2 & xy, zx

(C) 2 & x, y (D) 1 & x plane

68. Total number of degenerate orbitals for Ψ_{420} orbital is

(A) 6 (B) 3 (C) 5 (D) 7

69. The magnetic moment of $_{41}Nb$ is found to be 5.916. Total number of unpaired electrons are

(A) 5 (B) 4 (C) 6 (D) 3

70. In the absence of pauli's principle, the configuration of $_3Li$ would have been .

(A) $1s^1 2s^1 2p^1$ (B) $1s^2 2s^1$

(C) $1s^3$ (D) $1s^1 2s^2$

71. Select the correct statement

(A) The electron density in xy plane of 3dxy orbital is zero

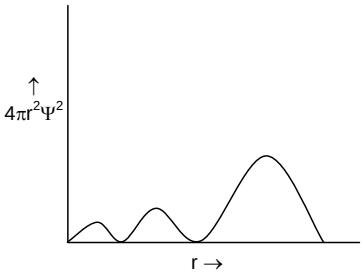
(B) The energy of 3d–orbital is less than 4s–orbital

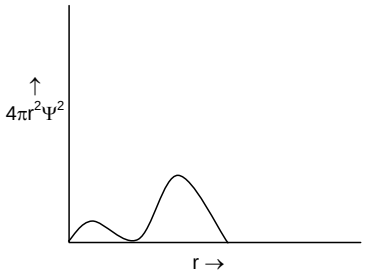
(C) The 3d–orbital is far away from the nucleus than 4s–orbital

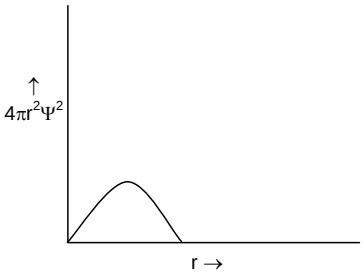
(D) Wave function of an atomic orbital represents an orbital

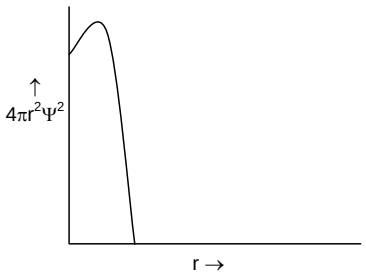
Space for rough work

72. Which of the following radial distribution graphs corresponds to $\ell = 2$ for H. atom for the least value of n for which $\ell = 2$ is allowed ?

(A)


(B)


(C)


(D)


73. The wave function of atomic orbital of H–like atoms is given as under :

$$\Psi_{2s} = \frac{1}{4\sqrt{2\pi}} Z^{3/2}(2 - Zr)e^{Zr/2}$$

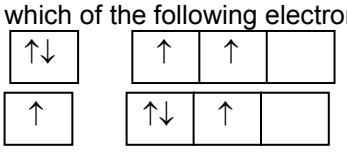
Given that the radius is in A°, then which of the following is the radius for nodal surface for $He^{(+)}$ ion ?

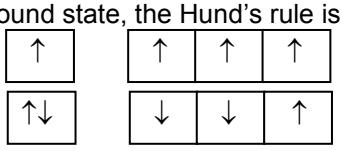
(A) 1A° (B) 2A° (C) 2.5A° (D) 4A°

74. The permissible solution to the schrodinger wave equation gave an idea of ……. Quantum numbers.

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

75. For which of the following electron distributions in ground state, the Hund's rule is violated ?

(A) 

(B) 

(C)

(D)

Space for rough work

76. How many unpaired electrons are there in Ni^{+2} ?
(A) 0 (B) 2 (C) 4 (D) 8

77. Which of the following is incorrect ?

(A) The angular momentum of an electron due to its spinning is given as $\sqrt{s(s+1)}\,\frac{h}{2\pi}$, where s can take a value of ½.

(B) The orbital angular momentum of an electron is given by $\ell.\frac{h}{2\pi}$, where ℓ can take value of 1.

(C) The azimuthal quantum number cannot have negative values.
(D) The potential energy of an electron in an orbit is twice in magnitude as compared to its KE.

78. The sum of all the quantum numbers of He atom is
(A) $\frac{5}{2}$ (B) $\frac{3}{2}$ (C) 2 (D) 1

79. The correct set of four quantum numbers for the valence electron of Rubidium (Z = 37) is
(A) 5, 0, 0, +1/2 (B) 5, 1, 0, +1/2 (C) 5, 1, 1, +1/2 (D) 6, 0, 0, +1/2

80. Which of the following has the maximum number of unpaired electrons ?
(A) Mg^{+2} (B) Ti^{+3} (C) V^{3+} (D) Fe^{+2}

81. A transition metal cation x^{3+} has magnetic moment $\sqrt{35}$BM. What is the atomic number of x^{3+} ?
(A) 25 (B) 26 (C) 27 (D) 24

82. In any subshell, the maximum number of electrons having same values of spin quantum number is :
(A) $\sqrt{\ell(\ell+1)}$ (B) $\ell+2$
(C) $2\ell+1$ (D) $4\ell+2$

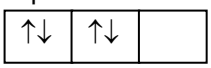
83. The correct quantum numbers of 3p–electrons are :
(A) n = 3, ℓ = 2, m = +2, s = +1/2 (B) n = 3, ℓ = 1, m = –1, s = –1/2
(C) n = 3, ℓ =–2 , m = –2, s = –1/2 (D) n = 3, ℓ = 1, m = 2, s = 1/2

84. What is the total number of orbitals in the shell in which the g–subshell first arise ?
(A) 9 (B) 16 (C) 25 (D) 36

Space for rough work

85. The number of d–electrons in $Fe^{+2}\,(Z=26)$ is not equal to that of the :

(A) p – electrons in Ne (z = 10)
(B) s – electrons in Mg (z =12)
(C) s – electrons in Na (z = 11)
(D) 3p – electrons in Cl^- (z = 17)

86. If the electronic structure of oxygen atom is written as $1s^2$, $2s^2$, 

; it would violate :

(A) Hund's rule
(B) paulil's exclusion principle
(C) Both Hund's and Pauli's principle
(D) none of the above

87. The angular momentum (L) of an electron in a Bohr orbit is given as :

(A) $L=\frac{nh}{2\pi}$ (B) $L=\sqrt{\ell(\ell+1)}\frac{h}{2\pi}$ (C) $L=\frac{mg}{2\pi}$ (D) $L=\frac{h}{4\pi}$

88. The number of radial nodes of 3s and 2p orbital are respectively.

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

89. The set of quantum numbers which can explain the last electron in $3d^6$ configuration is

(A) n = 3, l = 2, m = 3, $s=+\frac{1}{2}$
(B) n = 3, l = 2, m = ±2, $s=\pm\frac{1}{2}$
(C) n = 3, l = 1, m = – 1, $s=-\frac{1}{2}$
(D) n = 3, l = 3, m = +1, $s=\pm\frac{1}{2}$

90. The difference between 2p and 3p

(A) size of 2p > 3p
(B) radial node in 2p > 3p
(C) radial node, size, energy of 3p > 2p
(D) energy of 2p > 3p

Space for rough work

FIITJEE PET – IV (REG_1ST YEAR)

MAINS_SET–A_ANSWERS

DATE: 30.06.2018

MATHEMATICS

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

PHYSICS

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

CHEMISTRY

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

FIITJEE PET – IV (REG_1ST YEAR)

MAINS_SET–B

DATE: 30.06.2018

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. If 2 sec 2θ = tan ϕ + cot ϕ, then cone of the values of $\theta + \phi$ is

   (A) $\frac{\pi}{2}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{3}$ (D) none of these

2. If cot $(\alpha + \beta) = 0$, then sin $(\alpha + 2\beta)$ can be

   (A) –sin α (B) sin β (C) cos α (D) cos β

3. If cos (A – B) = $\frac{3}{5}$ and tan A tan B = 2, then

   (A) cos A cos B = $\frac{1}{5}$ (B) sin A sin B = $-\frac{2}{5}$ (C) cos A cos B = $-\frac{1}{5}$ (D) sin A sin B = $-\frac{1}{5}$

4. If $(1 + \tan\alpha)(1 + \tan 4\alpha) = 2$, $\alpha \in \left(0, \frac{\pi}{16}\right)$, then α is equal to

   (A) $\frac{\pi}{20}$ (B) $\frac{\pi}{30}$ (C) $\frac{\pi}{40}$ (D) $\frac{\pi}{60}$

5. If A = sin 45° + cos 45° and B = sin 44° + cos 44°, then

   (A) A > B (B) A < B (C) A = B (D) none of these

6. Value of cos 10° cos 50° sin 20° cos 60°

   (A) $\frac{\sqrt{3}}{4}$ (B) $\frac{3}{4}$ (C) $\frac{\sqrt{3}}{8}$ (D) $\frac{\sqrt{3}}{16}$

7. If cos $\theta = \frac{1}{2}$, find the value of $\tan\frac{\theta}{2}$

   (A) $\frac{\sqrt{3}}{2}$ (B) $\frac{1}{3}$ (C) $\frac{1}{\sqrt{3}}$ (D) none of these

8. If $(3 - 4\sin^2\theta) = 2$, then the value of $\frac{\sin 3\theta}{\sin\theta}$ is equal to

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

9. If $\frac{\left(6 - 8\sin^2\theta\right)}{\cos\theta} = 2$, then value of sin 3θ =

   (A) $\frac{1}{2}$ sin 2θ (B) cos 2θ (C) 2 sin 2θ (D) none of these

Space for rough work

10. Value of $\tan(45^\circ - \theta) - \tan(45^\circ + \theta)$
(A) $2\tan 2\theta$ (B) $-2\tan 2\theta$ (C) $-\tan 2\theta$ (D) $\tan 2\theta$

11. If $0 < \beta < \alpha \le \frac{\pi}{4}$, $\cos(\alpha + \beta) = \frac{3}{5}$, $\cos(\alpha - \beta) = \frac{4}{5}$, then $\sin 2\alpha$ is equal to
(A) 1 (B) 0 (C) 2 (D) none of these

12. If $\tan\theta \cdot \tan\left(\frac{\pi}{3} + \theta\right) \cdot \tan\left(\frac{\pi}{3} - \theta\right) = -1$ and $\left(0 < \theta < \frac{\pi}{2}\right)$, then value of $8\sin\theta - 4\cos^3\theta$
(A) $3\sqrt{2}$ (B) –1 (C) $\frac{1}{\sqrt{2}}$ (D) none of these

13. The value of $\tan 6^\circ \tan 42^\circ \tan 66^\circ \tan 78^\circ$ is
(A) 1 (B) $\frac{1}{2}$ (C) $\frac{1}{4}$ (D) $\frac{1}{8}$

14. $\cos^2\frac{\pi}{12} + \cos^2\frac{\pi}{4} + \cos^2\frac{5\pi}{12} =$
(A) $\frac{2}{3+\sqrt{3}}$ (B) $\frac{3}{2}$ (C) $\frac{3+\sqrt{3}}{2}$ (D) none of these

15. The value of $\sin\frac{\pi}{9} \cdot \sin\frac{2\pi}{9} \cdot \sin\frac{3\pi}{9} \cdot \sin\frac{4\pi}{9}$ is
(A) $\frac{3}{16}$ (B) $\frac{1}{16}$ (C) $\frac{1}{8}$ (D) none of these

16. $\frac{1}{4}\left[\sqrt{3}\cos 23^\circ - \sin 23^\circ\right]$ is equal to
(A) $\frac{1}{2}\cos 45^\circ$ (B) $\frac{1}{2}\cos 7^\circ$ (C) $\frac{1}{2}\cos 53^\circ$ (D) none of these

17. If $\sin 2\theta = \cos 3\theta$ and θ is an acute angle, then $\sin\theta$ equals
(A) $\frac{\sqrt{5}-1}{4}$ (B) $-\left(\frac{\sqrt{5}-1}{4}\right)$ (C) $\frac{\sqrt{5}+1}{4}$ (D) $\frac{-\sqrt{5}-1}{4}$

Space for rough work

18. If tan A = $\frac{1-\cos B}{\sin B}$, then tan 2A is

(A) tan 2A = tan B (B) tan 2A = $\tan^2 B$
(C) tan 2A = $\tan^2 B$ + 2 tan B (D) none of these

19. The numerical value of tan 20° tan 80° cot 50° is equal to

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

20. If $\tan^2\theta = 2\tan^2\phi + 1$, then $\cos 2\theta + \sin^2\phi$ equals

(A) –1 (B) 0 (C) 1 (D) none of these

21. The value of sin 12° . sin 42° . sin 54° is

(A) $\frac{1}{16}$ (B) $\frac{1}{8}$ (C) $\frac{1}{4}$ (D) none of these

22. Value of $(1 + \sec 2\theta)(1 + \sec 2^2\theta)$ is

(A) $\frac{\tan 4\theta}{\tan\theta}$ (B) $\frac{\tan\theta}{\tan 4\theta}$ (C) $\frac{\cot 4\theta}{\cot\theta}$ (D) none of these

23. Value of (1 + tan 5°) (1 + tan 10°) (1 + tan 15°) ..... (1 + tan 40°) (1 + tan 45°) is

(A) 2^5 (B) 2^4 (C) 2^6 (D) 2^7

24. If $\pi < x < \frac{3\pi}{2}$, value of $\sqrt{1-\cos 2x}$ is

(A) $\sqrt{2}\sin x$ (B) $\sqrt{2}\cos x$ (C) $-\sqrt{2}\sin x$ (D) $-\sqrt{2}\cos x$

25. Value of 2 sin 80° sin 40° sin 20°

(A) $\frac{\sqrt{3}}{4}$ (B) $\frac{\sqrt{3}}{8}$ (C) $\frac{1}{4}$ (D) $\frac{1}{8}$

26. The value of expression $\sqrt{3}$ cosec 20° – sec 20° is equal to

(A) 2 (B) 4 (C) $\frac{2\sin 20°}{\sin 40°}$ (D) none of these

Space for rough work

27. If sin A + sin B = $\sqrt{3}$ (cos B – cos A), then sin 3A + sin 3B is equal to

(A) $\sqrt{3}$ (B) 0 (C) 1 (D) none of these

28. The value of $\cot^2 36° \cdot \cot^2 72°$ is

(A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{1}{5}$ (D) none of these

29. The value of cos 10° – sin 10° is

(A) positive (B) negative (C) 0 (D) none of these

30. If $\pi < 2\theta < \frac{3\pi}{2}$, then $\sqrt{2+\sqrt{2+2\cos 4\theta}}$ is equal to

(A) –2 cos θ (B) –2 sin θ (C) 2 cos θ (D) 2 sin θ

Find the integral of functions(Q. No 31 to 34)

31. $\int x^4 dx$

(A) $\frac{x^5}{5}+c$ (B) $\frac{x^5}{4}+c$ (C) $4x^3 + c$ (D) $x^2 + c$

32. $\int \frac{1}{\sqrt{x}} dx$

(A) log $\sqrt{x}+c$ (B) $2\sqrt{x}+c$ (C) $\frac{2}{2\sqrt{x}}+c$ (D) $x^{1/2} + c$

33. $\int_{-1}^{1} dx$

(A) 1 (B) 2 (C) 5 (D) 40

34. $\int_{2}^{2} 10\, dx$

(A) 0 (B) 20 (C) 5 (D) 40

35. The mass of a ball is 1.76 kg. The mass of 25 such balls is

(A) 0.44×10^3 kg (B) 44.0 kg

(C) 44 kg (D) 44.00 kg

Space for rough work

36. A particle moves in a straight line with an acceleration a m/s^2 at time 't' seconds where a = $-\frac{1}{t^2}$. When t= 1, the particle has a velocity of 3 m/s then find the velocity when t = 4 sec.
(A) 3 m/s (B) 3.5 m/s (C) 2.25 m/s (D) 3.75 m/s

37. At time t the position of a body moving such that its position varies with time and is given by $x = t^3 - 6t^2 + 9t\,m$. Find the body's speed when the acceleration is zero.
(A) 3 m/s (B) 4 m/s (C) 6 m/s (D) -3 m/s

38. If number of significant digits in 0.010, 200, 10.0, 5.00 and 2.0×10^{-7} are a,b,c,d and e respectively then value of $(a+b+c+d+e)$ will be
(A) 9 (B) 14 (C) 10 (D) 11

39. Velocity of a particle varies w.r.t time as per given relation, $v = 4t^2 - 16t + 40$. Find the maximum velocity attained by the particle
(A) 40 units (B) 24 units (C) 252 units (D) none of these

40. The position of a particle is given by the equation $s = f(t) = t^3 - 6t^2 + 9t$, where t is measured in seconds and s in meters. What is the acceleration after 4 s?
(A) 4 m/sec^2 (B) 6 m/sec^2 (C) 8 m/sec^2 (D) 12 m/sec^2

41. The displacement of a body is given by $r = \sqrt{a^2 - t^2} + t\cos t^2$, where t is the time and a is constant. Its velocity is .
(A) $\frac{-t}{\sqrt{a^2 - t^2}} + \cos t^2 - t\sin 2t$ (B) $\frac{-t}{\sqrt{a^2 - t^2}} + \cos t^2 - 2t^2\sin t^2$
(C) $\frac{-a}{(a^2 - t^2)} + 2t\cos t^2\sin t + \sin t$ (D) $a - t^2 - t\sin t^2$

42. If $x = (6y+4)(3y^2+4y+3)$ then $\int x\,dy$ will be
(A) $\frac{1}{3y^2+4y+3}$ (B) $\frac{(3y^2+4y+3)^2}{2} + c$
(C) $(3y^2+4y+3)$ (D) $\frac{(6y+4)}{(3y^2+4y+3)}$

Space for rough work

43. $\int_0^{\pi/2}\left(e^{\sin x}\right)\cos x\,dx$ is _____

(A) 1 (B) e + 1 (C) e – 1 (D) None of these

44. Find the maximum value of xy if x+3y = 12

(A) 24 (B) 9 (C) 12 (D) 18

45. The acceleration of a particle varies with times as $a(t)=3t^2+4$. If the initial velocity of particle is 2 m/s, find the velocity of particle at t= 3 second

(A) 41 m/s (B) 4 m/s (C) 39 m/s (D) 27 m/s

46. The values $\frac{900}{10.4}$ and $\frac{90.0}{1.04}$ are respectively___(keeping the significant figures in view)

(A) 86,86 (B) 86.0, 86.0 (C) 90, 86.5 (D) 86.5, 86.54

47. 5.74 gm of substance occupies 1.2 cm^3 . Express its density by keeping the significant figures in view.

(A) $4.8\ g/cm^3$ (B) $4.78\ g/cm^3$

(C) $5.0\ g/cm^3$ (D) $4.7\ g/cm^3$

48. The length and breadth of a metal sheet are 2.108 and 3.03 m respectively. The area of the sheet in appropriate significant digits will be ___

(A) $6.40\ m^2$ (B) $6.38\ m^2$ (C) $6.390\ m^2$ (D) $6.39\ m^2$

49. $\int_0^{\pi}\sin^2 x\,dx+\int_0^{\pi}\frac{1}{\sec^2 t}dt$ will be

(A) $\frac{\pi}{2}$ (B) π (C) 2 (D) 1

50. $\int_0^{\pi/2}\left(\sin^3\theta+\cos^3\theta\right)d\theta$ will be _____

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

51. Two mosquitos move in space such that their x,y,z coordinates at any time 't'(in seconds) are given as $(3t+1,\ 4t,\ 2t^2-1)$, and $(4t+1,\ 3t+3,\ 2t^2)$, all in meters. Find the minimum distance between these two

(A) $\sqrt{\frac{11}{2}}m$ (B) $\sqrt{\frac{9}{2}}m$ (C) 5 m (D) None of these

Space for rough work

52. $\int_0^1 \left(t^2 + 9t + c\right)dt = \frac{9}{2}$. Find value of 'c'

(A) zero (B) 3 (C) 2 (D) –1/3

53. The value of $\int_0^{\pi/2} \sin^2 x\, dx$ will be

(A) 1 (B) 0 (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

54. $y = 5\sin(3wt + \phi)$; where w and ϕ are constant find $\frac{dy}{dt}$

(A) $15w\cos(3wt + \phi)$ (B) $15w\cos(3wt)$

(C) $15\cos(3wt + \phi)$ (D) $5w\cos(3wt + \phi)$

55. $\int (x+1)dy$ if $y = 6x^2$

(A) $2x^3 + 6x^2 + c$ (B) $4x^3 + 6x^2 + c$

(C) $4x^3 + 4x^2 + c$ (D) $4x^3 - 6x^2 + c$

56. The position of a body is given as a function of time by the relation (in SI units) $x = (2t^3 - 6t^2 + 12t + 6)$ m. The acceleration of the body is zero at time t =

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

57. Find the area under the curve $y = 5e^x$ and the x – axis between x= 0 and x = 2

(A) $5e^2$ (B) $e^2 - 1$ (C) $5\left(e^2 - 1\right)$ (D) $\frac{e^2 - 1}{5}$

58. The function $x^5 - 5x^4 + 5x^3 - 10$ has a maxima, when x =

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

59. If $v = x^2 - 5x + 4$, find the acceleration of the particle when velocity of the particle is zero

(A) 0 (B) 2 (C) 3 (D) None of these

Space for rough work

60. An ant is at a corner of a cubical room of side a. The ant can move with a constant speed u. The minimum time taken to reach the farthest corner of the cube is ____. Assume that ant can not fly.

(A) $\frac{\left(\sqrt{5}-1\right)a}{u}$ (B) $\frac{\left(\sqrt{3}+1\right)a}{u}$ (C) $\frac{\sqrt{5}a}{u}$ (D) $\frac{\left(\sqrt{2}+1\right)a}{u}$

61. A transition metal cation x^{3+} has magnetic moment $\sqrt{35}$BM. What is the atomic number of x^{3+} ?

(A) 25 (B) 26 (C) 27 (D) 24

62. In any subshell, the maximum number of electrons having same values of spin quantum number is :

(A) $\sqrt{\ell\left(\ell+1\right)}$ (B) $\ell+2$

(C) $2\ell+1$ (D) $4\ell+2$

63. The correct quantum numbers of 3p–electrons are :

(A) n = 3, ℓ = 2, m = +2, s = +1/2 (B) n = 3, ℓ = 1, m = –1, s = –1/2

(C) n = 3, ℓ =–2 , m = –2, s = –1/2 (D) n = 3, ℓ = 1, m = 2, s = 1/2

64. What is the total number of orbitals in the shell in which the g–subshell first arise ?

(A) 9 (B) 16 (C) 25 (D) 36

65. The number of d–electrons in $Fe^{+2}\left(Z=26\right)$ is not equal to that of the :

(A) p – electrons in Ne (z = 10) (B) s – electrons in Mg (z =12)

(C) s – electrons in Na (z = 11) (D) 3p – electrons in Cl^{-} (z = 17)

66. How many unpaired electrons are there in Ni^{+2} ?

(A) 0 (B) 2 (C) 4 (D) 8

67. Which of the following is incorrect ?

(A) The angular momentum of an electron due to its spinning is given as $\sqrt{s\left(s+1\right)}\frac{h}{2\pi}$, where s can take a value of ½.

(B) The orbital angular momentum of an electron is given by $\ell.\frac{h}{2\pi}$, where ℓ can take value of 1.

(C) The azimuthal quantum number cannot have negative values.

(D) The potential energy of an electron in an orbit is twice in magnitude as compared to its KE.

Space for rough work

68. The sum of all the quantum numbers of He atom is
(A) $\frac{5}{2}$ (B) $\frac{3}{2}$ (C) 2 (D) 1

69. The correct set of four quantum numbers for the valence electron of Rubidium (Z = 37) is
(A) 5, 0, 0, +1/2 (B) 5, 1, 0, +1/2 (C) 5, 1, 1, +1/2 (D) 6, 0, 0, +1/2

70. Which of the following has the maximum number of unpaired electrons ?
(A) Mg^{+2} (B) Ti^{+3} (C) V^{3+} (D) Fe^{+2}

71. Maximum number of electrons having $(n+\ell=5)$ is :
(A) 20 (B) 18 (C) 16 (D) 22

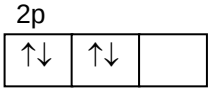
72. If there are three possible values $\left(-\frac{1}{2},0,+\frac{1}{2}\right)$ for the spin quantum, then the electronic configuration of K(19) will be :
(A) $1s^3 2s^3 2p^9 3s^3 3s^1$ (B) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$
(C) $1s^2 2s^2 s2p^9 3s^2 3p^4$ (D) none

73. How many times does light travel faster in vacuum than an electron in Bohr first orbit of H–atom ?
(A) 13.7 times (B) 67 times (C) 137 times (D) 97 times

74. The compound of vanadium has a magnetic moment of 1.73 BM. The electronic configuration of vanadium ion in the compound is :
(A) $[Ar]3d^2$ (B) $[Ar]3d^1 4s^0$
(C) $[Ar]3d^3$ (D) $[Ar]3d^0 4s^1$

75. The orbital angular momentum and angular momentum for the electron of 4s–orbital are respectively, equal to
(A) $\sqrt{12}\frac{h}{2\pi}$ and $\frac{h}{2\pi}$ (B) zero and $\frac{2h}{\pi}$
(C) $\sqrt{6}h$ and $\frac{2h}{\pi}$ (D) $\frac{\sqrt{2}h}{2\pi}$ and $\frac{3h}{2\pi}$

Space for rough work

76. If the electronic structure of oxygen atom is written as $1s^2$, $2s^2$, 

; it would violate :
(A) Hund's rule (B) paulil's exclusion principle
(C) Both Hund's and Pauli's principle (D) none of the above

77. The angular momentum (L) of an electron in a Bohr orbit is given as :
(A) $L = \frac{nh}{2\pi}$ (B) $L = \sqrt{\ell(\ell+1)}\frac{h}{2\pi}$ (C) $L = \frac{mg}{2\pi}$ (D) $L = \frac{h}{4\pi}$

78. The number of radial nodes of 3s and 2p orbital are respectively.
(A) 2, 0 (B) 0, 2 (C) 1, 2 (D) 2, 1

79. The set of quantum numbers which can explain the last electron in $3d^6$ configuration is
(A) n = 3, l = 2, m = 3, $s = +\frac{1}{2}$ (B) n = 3, l = 2, m = $\pm$2, $s = \pm\frac{1}{2}$
(C) n = 3, l = 1, m = – 1, $s = -\frac{1}{2}$ (D) n = 3, l = 3, m = +1, $s = \pm\frac{1}{2}$

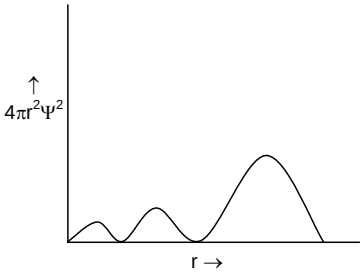
80. The difference between 2p and 3p
(A) size of 2p > 3p (B) radial node in 2p > 3p
(C) radial node, size, energy of 3p > 2p (D) energy of 2p > 3p

81. Select the correct statement
(A) The electron density in xy plane of 3dxy orbital is zero
(B) The energy of 3d–orbital is less than 4s–orbital
(C) The 3d–orbital is far away from the nucleus than 4s–orbital
(D) Wave function of an atomic orbital represents an orbital

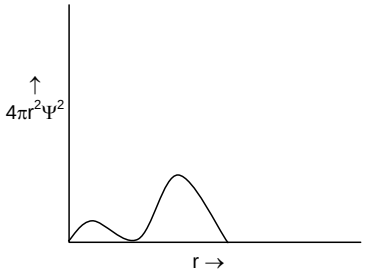
Space for rough work

82. Which of the following radial distribution graphs corresponds to $\ell = 2$ for H. atom for the least value of n for which $\ell = 2$ is allowed ?

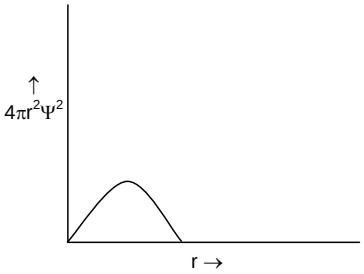
(A)



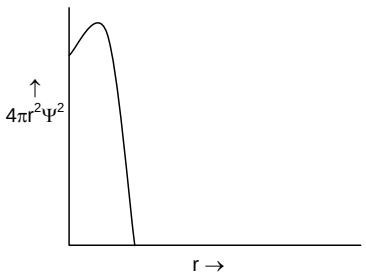
(B)



(C)



(D)



83. The wave function of atomic orbital of H–like atoms is given as under :

$$\Psi_{2s} = \frac{1}{4\sqrt{2\pi}} Z^{3/2} (2 - Zr) e^{Zr/2}$$

Given that the radius is in A°, then which of the following is the radius for nodal surface for $He^{(+)}$ ion ?

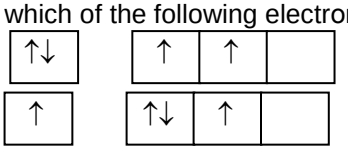
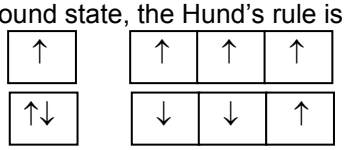
(A) 1A° (B) 2A° (C) 2.5A° (D) 4A°

84. The permissible solution to the schrodinger wave equation gave an idea of ……. Quantum numbers.

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

Space for rough work

85. For which of the following electron distributions in ground state, the Hund's rule is violated ?

(A)  (B) 

(C) (D)

86. The wave function (Ψ) of 2s–orbital is given by $\psi_{2s} = \frac{1}{2\sqrt{32\pi}}\left(\frac{1}{a_0}\right)^{3/2}\left[2-\frac{r}{a_0}\right]e^{-r/2a_0}$

At r = r_0, radial node is formed. Find r_0.

(A) $4a_0$ (B) $3a_0$ (C) a_0 (D) $2a_0$

87. Number of nodal planes and nodal plane regions for 3dyz orbital are respectively

(A) 2 & xy, yz (B) 2 & xy, zx

(C) 2 & x, y (D) 1 & x plane

88. Total number of degenerate orbitals for Ψ_{420} orbital is

(A) 6 (B) 3 (C) 5 (D) 7

89. The magnetic moment of $_{41}$Nb is found to be 5.916. Total number of unpaired electrons are

(A) 5 (B) 4 (C) 6 (D) 3

90. In the absence of pauli's principle, the configuration of $_3$Li would have been .

(A) $1s^1 2s^1 2p^1$ (B) $1s^2 2s^1$

(C) $1s^3$ (D) $1s^1 2s^2$

Space for rough work

FIITJEE PET – IV (REG_1ST YEAR)

MAINS_SET–B_ANSWERS

DATE: 30.06.2018

MATHEMATICS

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

PHYSICS

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

CHEMISTRY

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