

# FIITJEE MOCK TEST-2

For NTSE STAGE-2

## Scholarship Aptitude Test (SAT)

Time:120 Minutes

Maximum Marks:100

Please read the instructions carefully.

### INSTRUCTIONS

#### A: General :

1. Immediately fill in the particulars on this page of the Test Booklet with Blue/Black Ball point pen.
2. Use **Blue/Black Ball Point Pen only** for writing particulars on **Side-1** and **Side-2** of the Answer Sheet. **Use of pencil is strictly prohibited.**
3. Darken the appropriate bubbles with **Blue/Black Ball Point Pen** only.
4. Blank papers, clipboards, log tables, slide rules, calculators, cellular phones, pagers and electronic gadgets in any form are not allowed.
5. The answer sheet, a machine-gradable Objective Response Sheet (ORS) is provided separately.
6. Do not Tamper/mutilate the **ORS** or this booklet.
7. No additional sheets will be provided for rough work
8. On completion of this test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. **However, the candidates are allowed to take away this Test Booklet with them.**

#### B: Questions paper format and Marking Scheme :

1. The question paper consists of 100 questions.
2. For each question you will be **awarded 1 marks** if you darken the bubble corresponding to the correct answer and zero mark if no bubbles is darkened. No Negative Mark will be awarded.

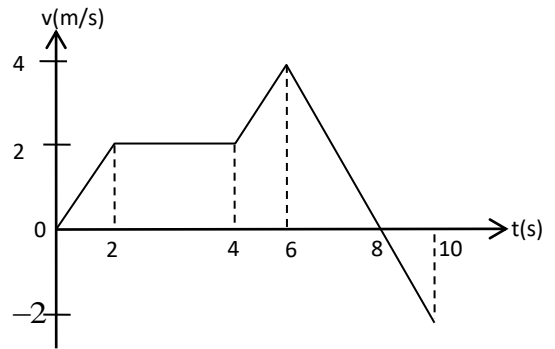
Enrollment No. :

Batch : \_\_\_\_\_

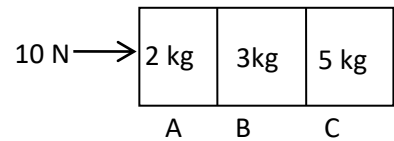
Name : \_\_\_\_\_

Candidate's Signature \_\_\_\_\_ Invigilator's Signature: \_\_\_\_\_

1. A particle is moving along positive x axis whose velocity-time graph is as given in the figure. Particle is at  $x = 4\text{m}$  at  $t = 2\text{ s}$ . The position of particle at  $t = 10\text{ s}$  is  
 (A) 12 m (B) 14 m  
 (C) 16 m (D) 18 m

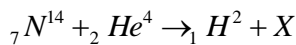


2. A constant force 10 N pushes three blocks A, B and C on a smooth horizontal smooth surface. The masses of the blocks are 2 kg, 3 kg, 5 kg respectively. The ratio of normal reaction between A and B to the normal reaction between B and C.  
 (A) 0.4 (B) 1.6  
 (C) 0.8 (D) 1.0



3. The masses of three copper wires are in the ratio 1 : 3 : 5 and their lengths are in the ratio 5 : 3 : 1. The ratio of their electrical resistances is  
 (A) 1 : 3 : 5 (B) 5 : 3 : 1 (C) 125 : 27 : 1 (D) 125 : 15 : 1

4. In the following nuclear reaction, what is the element X?

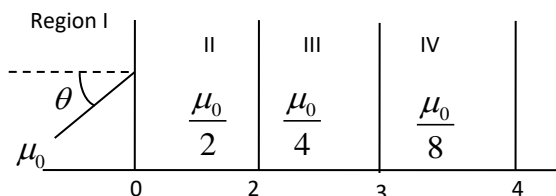


- (A)  ${}_{8}\text{O}^{16}$  (B)  ${}_{7}\text{N}^{14}$  (C)  ${}_{9}\text{F}^{17}$  (D)  ${}_{10}\text{Ne}^{17}$

5. A ray of light goes from medium 1 (refractive index  $\mu_1$ , speed of light  $V_1$ , wavelength  $\lambda_1$ , frequency  $f_1$ ) to medium 2 (Refractive index  $\mu_2$ , speed of light  $V_2$ , wavelength  $\lambda_2$ , frequency  $f_2$ ). Which of the following is necessarily not be correct?

- (A)  $\frac{\mu_1}{V_2} = \frac{\mu_2}{V_1}$  (B)  $\frac{V_1}{\lambda_1 f_1} = \frac{V_2}{\lambda_2 f_2}$  (C)  $\mu_1 \lambda_1 = \mu_2 \lambda_2$  (D)  $\mu_1 f_2 = \mu_2 f_1$

6. A beam of light is travelling from region I to Region IV (Refer figure). The refractive index in Region I, II, III, IV are  $\mu_0, \frac{\mu_0}{2}, \frac{\mu_0}{4}, \frac{\mu_0}{8}$ . The angle of incidence Q, for which the beam just misses entering Region IV is



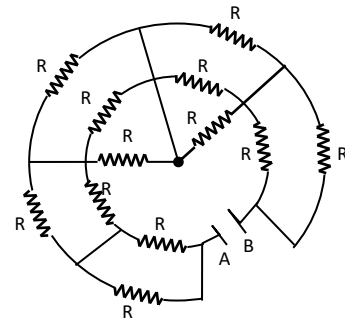
- (A)  $\sin^{-1}\left(\frac{3}{4}\right)$  (B)  $\sin^{-1}\left(\frac{1}{8}\right)$  (C)  $\sin^{-1}\left(\frac{1}{4}\right)$  (D)  $\sin^{-1}\left(\frac{1}{3}\right)$

7. A cube of wood supporting a mass of 200 g just floats in water. When the mass is removed from the cube rises by 2 cm. What is the size of cube?

- (A) 5 cm                      (B) 10 cm                      (C) 20 cm                      (D) 15 cm

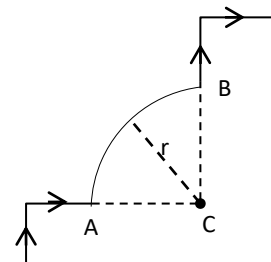
8. In the circuit diagram shown in figure the equivalent resistance between A and B

- (A)  $\frac{6R}{13}$                       (B)  $\frac{13R}{6}$   
 (C)  $13 R$                       (D)  $6R$



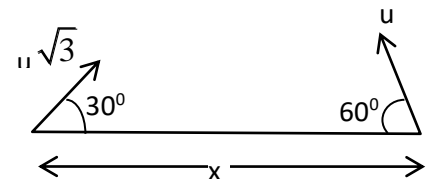
9. A block of mass 10 kg accelerates uniformly from rest to a speed of 2 m/s in 20 sec. The average power developed in time interval from  $t = 0$  to  $t = 20$  s is  
 (A) 10 W                      (B) 1 W                      (C) 20 W                      (D) 2 W

10. A wire carrying a current  $I$  is shaped as shown. Section AB is a quarter circle of radius  $r$ . The magnetic field at C is directed.  
 (A) along the bisector of the angle ACB, away from AB  
 (B) along the bisector of the angle ACB, towards AB  
 (C) perpendicular to the plane of the paper, directed into the paper  
 (D) at an angle  $\frac{\pi}{4}$  to the plane of the paper.



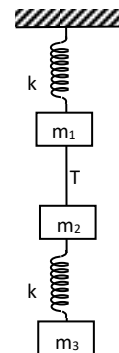
11. Two particles are separated at a horizontal distance as shown in the figure. Both are projected along the same line with different initial speeds. The horizontal distance between them become zero when time is

- (A)  $\frac{3u}{x}$                       (B)  $\frac{2x}{u}$   
 (C)  $\frac{x}{2u}$                       (D)  $\frac{x}{u}$



12. The string and springs are massless as shown in the figure spring constant of both springs is  $k$ . The tension(T) in the string is

- (A)  $(m_1 + m_2 + m_3) g$                       (B)  $(m_1 + m_2) kg$   
 (C)  $(m_2 + m_3) g$                       (D)  $k(m_2 + m_3) g$



13. A satellite is moving in a circular orbit of radius  $10R_{\text{earth}}$ . It's acceleration would be

- (A)  $0.2 \text{ m/s}^2$                       (B)  $0.4 \text{ m/s}^2$                       (C)  $0.1 \text{ m/s}^2$                       (D)  $0.8 \text{ m/s}^2$

$(g = 10 \text{ m/s}^2)$

14. An atom of an element has 4 electron in its L shell. It needs \_\_\_\_\_ electrons to complete octet and \_\_\_\_\_ electrons to combine.

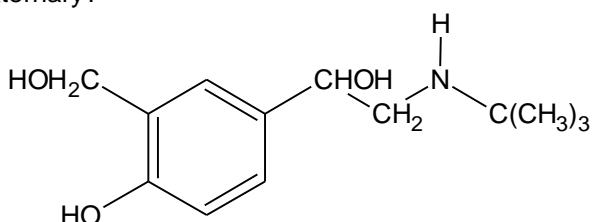
- (A) 2, 4                      (B) 4, 4                      (C) 2, 6                      (D) 4, 6

15. There is mixture of three solids X, Y and Z. X is insoluble in water. Y is soluble in water and it can also sublime. Z is soluble in water. What sequence will you follow for the separation from the following methods?  
 (I) Crystallisation (II) Filtration (III) Sublimation (IV) Dissolution in water  
 (A) (IV), (II), (I) and (III) (B) (III), (IV), (II) and (I)  
 (C) (IV), (I), (III) and (II) (D) (III), (IV), (I) and (II)

16. The average atomic mass of an element X is 17.4 u. What are the percentage of isotopes  ${}^{17}_9\text{X}$  :  ${}^{19}_9\text{X}$  in the sample?  
 (A) 1 : 4 (B) 2 : 3 (C) 1 : 5 (D) None of these

17. A compound of nitrogen and oxygen was found to contain 28 g of nitrogen to every 64 g of oxygen (N = 14 u, O = 16 u). Which of the following formulae could represent the compound?  
 (A)  $\text{N}_2\text{O}$  (B)  $\text{N}_2\text{O}_2$  (C)  $\text{N}_2\text{O}_4$  (D)  $\text{N}_4\text{O}_2$

18. Salbutamol is very effective drug for treating asthma attack. Look at its structure: is the amine group primary, secondary, tertiary or quaternary?



- (A) Primary (B) Secondary (C) Tertiary (D) Quaternary
19. 25 cm<sup>3</sup> of a solution of NaOH required 28 cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> H<sub>2</sub>SO<sub>4</sub> to neutralize it. How many moles of NaOH were thus neutralised?  
 (A) 0.028 (B) 0.056 (C) 2.24 (D) 0.12
20. Which of the statement is untrue among the following statements?  
 (A) Atoms can be created or destroyed.  
 (B) Atoms of the same element are alike in every way.  
 (C) Atoms of different elements are different.  
 (D) Atoms can combine in small numbers or large numbers to form molecules.

21. Among the following which statement(s) is/are true?  
 (I) Radium-226 emits alpha-particles.  
 (II) Potassium-43 emits beta-particles.  
 (III) Radioactive gaseous radon is known to emit alpha particles.  
 (IV) The emission of gamma-rays enables a nucleus to lose surplus energy.  
 (A) (I) and (III) (B) (II) and (IV) (C) (I), (II) and (III) (D) All the four statements

22. In general,  
 (I) cations form most easily when the resulting charge is small.  
 (II) cations form most easily when the radius of the atom is small.  
 (III) anions form most easily when the resulting charge is small.  
 (IV) anions form most easily when the radius of the atom is small.  
 The incorrect option(s) is/are –  
 (A) (I) and (III) (B) (II) only (C) (IV) only (D) (I), (III) and (IV)

23. The following statements show a link among different types of solids, examples, constituent particles and volatility. Identify the wrong link?  
 (A) Giant metallic–Na, Fe, Cu–Atoms–High m.pt., high b.pt.  
 (B) Giant covalent–Diamond, SiC, SiO<sub>2</sub>–Atoms–very high m.pt., very high b.pt.  
 (C) Giant ionic– $\text{Na}^+\text{Cl}^-$ ,  $\text{Ca}^{2+}\text{O}^{2-}$ –Ions–high m.pt., high b.pt.  
 (D) Simple molecular– $\text{I}_2$ ,  $\text{S}_8$ ,  $\text{CH}_4$ –Molecules–high m.pt., high b.pt.

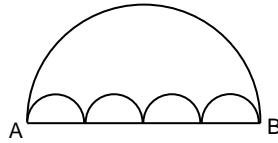
24. The physical properties for the elements in the second and third rows of periodic table are listed below. Which one is not fully correct?  
(A) The melting point rise to the element in group IV and then fall to low values.  
(B) The boiling point rise to the element in group IV and then fall to low values.  
(C) The molar volume (i.e., the volume occupied by 1 mol of the element) rises to the centre of the periods and then falls again.  
(D) The density rises to the elements in group III and IV and then falls.
25. Why does  $Al_2O_3$  display amphoteric properties with reference to the ions present?  
(A) Large and highly charged  $Al^{3+}$  ion and polarises the oxide ion  
(B) Large and highly charged  $Al^{3+}$  ion and depolarises the oxide ion  
(C) Small and highly charged  $Al^{3+}$  ion and polarises the oxide ion  
(D) Small and highly charged  $Al^{3+}$  ion and depolarises the oxide ion
26. On increasing the temperature the pH of pure water \_\_\_\_\_. As the temperature decreases water \_\_\_\_\_.  
(A) increases, becomes more acidic (B) decreases, becomes less acidic  
(C) decreases, remains neutral (D) decreases, becomes more acidic
27. In a vertebrate, which germ layer forms the skeletal muscle?  
(A) Ectoderm (B) Endoderm (C) Mesoderm (D) Both (A) and (C)
28. Which of the following is responsible for the origin of lysosome?  
(A) Chloroplast (B) Mitochondrion  
(C) Golgi bodies (D) Ribosome
29. Gametophyte is dominant stage in the life cycle of  
(A) Bryophyta (B) Pteridophyta (C) Angiosperms (D) Gymnosperms
30. Select the correctly matched ones  
I. S phase – DNA replication  
II. Zygotene – Synapsis  
III. Diplotene – Crossing over  
IV. G2 Phase – quiescent stage  
(A) I & II (B) III & IV (C) I, II, IV (D) I, III, IV
31. Adult *Whucheria bancrofti* attacks  
(A) Nervous system (B) Lymph vessels  
(C) Muscular system (D) Blood vessels
32. Which of the following is not a true fish?  
(A) Dog Fish (B) Cat Fish (C) Saw Fish (D) Devil Fish
33. Saltatory conduction occurs in  
(A) myelinated nerve fibres (B) non-myelinated nerve fibres  
(C) Liver cells (D) All the above
34. The embryo at 16 celled stage is known as  
(A) morula (B) gastrula  
(C) blastula (D) blastomere
35. Cleistogamous flowers are  
(A) wind pollinated (B) insect pollinated (C) bird pollinated (D) self pollinated

36. The process in which one bacterium transfers genetic material to another through direct contact is called  
 (A) reproduction (B) conjugation (C) transduction (D) transformation
37. Photochemical smog consists of  
 (A)  $\text{SO}_2$ ,  $\text{CO}_2$ , hydrocarbons (B)  $\text{O}_3$ , PAN,  $\text{NO}_x$   
 (C)  $\text{O}_3$ ,  $\text{SO}_2$  hydrocarbons (D) Smoke and  $\text{SO}_2$
38. Partial pressure of oxygen in oxygenated blood is  
 (A) 95 mmHg (B) 159 mmHg  
 (C) 104 mmHg (D) 40 mmHg
39. Kupffer's cells are present in  
 (A) liver (B) small intestine (C) pancreas (D) thyroid gland
40. In CAM plant,  $\text{CO}_2$  acceptor is  
 (A) RuBP (B) PEP (C) OAA (D) PGA
41. The average rainfall for a week excluding Sunday was 0.5 cm. due to heavy rainfall on Sunday average of the week rose to 1.5 cm. The rainfall on Sunday was  
 (A) 6.5 cm (B) 7.5 cm (C) 8.5 cm (D) 8.0 cm
42. Find  $\angle A + \angle B + \angle C + \angle D + \angle E$  in the following figure
- 
- (A)  $360^\circ$  (B)  $180^\circ$  (C)  $150^\circ$  (D)  $90^\circ$
43. If radius of circle is rational number, its area is given by number which is  
 (A) Irrational (B) Rational (C) Integral (D) Perfect Square
44. The angles of elevation of the top of tower from two points at a distance  $a$  and  $b$  metres from base and in same straight line with it, are complementary. The height of tower is  
 (A)  $ab$  metres (B)  $\sqrt{ab}$  metres (C)  $\frac{a}{b}$  metres (D)  $(a+b)$  meters
45. The value of  $\cot 12^\circ \cot 38^\circ \cot 52^\circ \cot 60^\circ \cot 78^\circ$  is  
 (A) 1 (B) 0 (C)  $\frac{1}{\sqrt{2}}$  (D)  $\frac{1}{\sqrt{3}}$
46. If sum of first  $n$  terms of an AP is  $2n^2 - n + 1$ , then 10<sup>th</sup> term of this AP is  
 (A) 36 (B) 37 (C) 38 (D) 39
47. A says to B, "I was four times as old as you were when I was as old as you are." If sum of their present age is 33, then present age of A and B respectively are:  
 (A) 18 years, 15 years (B) 21 years, 12 years  
 (C) 24 years, 9 years (D) 27 years, 6 years
48. AB and CD are two parallel chords of a circle such that  $AB = 10$  cm and  $CD = 24$  cm. If the chords are on the opposite side of the centre and the distance between them is 17 cm, the radius of the circle is  
 (A) 10 cm (B) 13 cm (C) 14 cm (D) 15 cm
49. Which of the following is irrational numbers?  
 (A)  $\sqrt{41616}$  (B) 23.232323

(C)  $\frac{(1+\sqrt{3})^3 - (1-\sqrt{3})^3}{\sqrt{3}}$

(D) 23.10100100010000...

50. All the arcs in following diagram are semi-circles. Diagram shows two paths connecting A and B. Path I is the single large semi circle and path II consists of chain of semi circles. Which of the following is true?



- (A) Path I is longer than Path II  
 (B) Path I is of same length of Path II  
 (C) Path I is shorter than Path II  
 (D) Path I is of same length as Path I only if number of semi circle is not more than 4.

51.  $ax^2 + bx + c = 0$ , where  $a, b, c$  are real, how real roots if

- (A)  $a, b, c$  are integer  
 (B)  $b^2 > 3ac$   
 (C)  $ac > 0$  and  $b$  is zero  
 (D)  $c = 0$

52. Median of the following data is:

133, 73, 89, 108, 94, 140, 94, 85, 100, 120

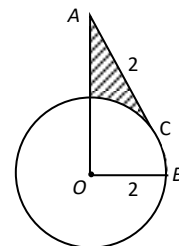
- (A) 95 (B) 96 (C) 97 (D) 98

53. If  $\frac{P}{9} = 3 + \frac{1}{4 + \frac{1}{1 + \frac{1}{5}}}$ , then find  $P/9$

- (A) 93/29 (B) 47/15 (C) 101/49 (D) 55/47

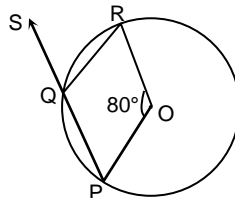
54. The area of shaded region is (In given figure, O is centre and AC is tangent to circle)

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



55. Number of points on the straight line which joins  $(-4, 11)$  to  $(16, -1)$  whose coordinates are positive integer, is  
 (A) 1 (B) 2 (C) 3 (D) 4

56. In the following figure O is centre of circle and  $\angle POR = 80^\circ$ . The  $\angle RQS$  is



- (A)  $30^\circ$  (B)  $40^\circ$  (C)  $140^\circ$  (D)  $50^\circ$

57. The square root of  $x^{b^2} x^{b^2+2ab} \cdot x^{a^2-b^2}$  is

- (A)  $x^{(a+b)^2}$  (B)  $x^{\frac{a+b}{2}}$  (C)  $x^{\frac{(a+b)^2}{2}}$  (D) None of these

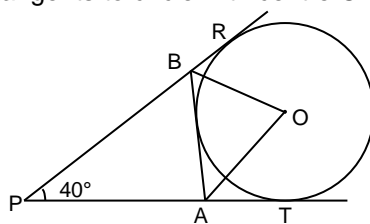
58. In what ratio is the line segment joining points  $A(-2, -3)$  and  $B(3, 7)$  divided by  $y$ -axis?

- (A) 3 : 2 (B) 2 : 3 (C) 1 : 5 (D) 2 : 5

59. Each side of a triangle is 8 cm less than sum of other two sides. Area of triangle (in  $\text{cm}^2$ ) is

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

60. In figure,  $\triangle APB$  is formed by three tangents to circle with centre O. If  $\angle APB = 40^\circ$ , then measure of  $\angle BOA$  is



- (A)  $50^\circ$                       (B)  $55^\circ$                       (C)  $60^\circ$                       (D)  $70^\circ$
61. When was the Suez canal opened?  
(A) 1861                      (B) 1868                      (C) 1870                      (D) 1869
62. Where is cape of good hope?  
(A) India                      (B) South Africa                      (C) South America                      (D) South Asia
63. What is the Ganga called when it joins the Brahmaputra?  
(A) Meghna                      (B) Padma                      (C) Brahmaputra                      (D) Son
64. Which of the following is the saline water lake?  
(A) Sambhar                      (B) Dal                      (C) Wular                      (D) Barapari
65. When was the Indus water Treaty signed?  
(A) In 1961                      (B) In 1962                      (C) In 1965                      (D) In 1960
66. The highest peak in the Eastern Ghats is  
(A) Mahendragiri                      (B) Anai Mudi                      (C) Kosi                      (D) Kanchanjunga
67. Eastward extension of the peninsular plateau is called  
(A) Vindhya-chal                      (B) Arawali                      (C) Bundelkhand                      (D) Malwa
68. Which one of the following is a warm ocean current?  
(A) Labrador                      (B) La-Lino                      (C) El-Nino                      (D) Californian current
69. Rearing of silkworms is called as  
(A) Pisciculture                      (B) Agriculture                      (C) Silviculture                      (D) Sericulture
70. Which position does India rank in terms of rice production in the world?  
(A) First                      (B) Fifth                      (C) Second                      (D) Fourth
71. A crop which is used both as food and fodder.  
(A) Rabi                      (B) Maize                      (C) Millets                      (D) Pulses
72. Khetri mines in Rajasthan are famous for the mining of  
(A) Iron                      (B) Copper                      (C) Bauxite                      (D) Uranium
73. Which state in India is the largest producer of bauxite?  
(A) Odisha                      (B) Karnataka                      (C) Maharashtra                      (D) Kerala
74. Cement is  
(A) basic industry                      (B) heavy industry                      (C) agro based industry                      (D) light industry
75. Name the oldest artificial port on the eastern coast of south India.  
(A) Mumbai                      (B) Gujarat                      (C) Chennai                      (D) None of these
76. Flying shuttle was a mechanical device for  
(A) spinning                      (B) weaving                      (C) carding                      (D) rolling
77. Which of the following is not a seasonal industry?  
(A) Brewing                      (B) Gasworks                      (C) Textile                      (D) Book binding
78. Elgin mill was set up at  
(A) Lucknow                      (B) Calicut                      (C) Kanpur                      (D) Madras



79. Which of the following is considered of Indian origin?  
 (A) Soya (B) Tomato's (C) Maize (D) None of these
80. The great depression started in which country?  
 (A) France (B) Germany (C) Britain (D) USA
81. The oldest Japanese book diamond sutra was printed in  
 (A) A D 6 8 6 (B) A D 8 6 8 (C) A D 6 6 8 (D) A D 8 6 6
82. The first Indian to publish a newspaper was  
 (A) Ram Mohan Roy (B) Bal Gangadhar Tilak  
 (C) Gangadhar Bhattacharya (D) Ranade
83. Which of the following novels was not written by Charles Dickens?  
 (A) Hard Times (B) Germinal (C) Oliver Twist (D) Pickwick Papers
84. When was the Rent Act passed in Bombay?  
 (A) 1917 (B) 1918 (C) 1818 (D) None of these
85. When did July Revolution take place?  
 (A) 1821 (B) 1905 (C) 1830 (D) 1795
86. When was Vietnamese Communist party setup?  
 (A) In 1930 (B) In 1940 (C) In 1945 (D) In 1935
87. Which of the following refers to the secret police of Nazi Germany?  
 (A) Cheka (B) Gestapo (C) SNDP (D) Security service
88. When was the first Indian Forest Act enacted?  
 (A) 1864 (B) 1865 (C) 1866 (D) 1867
89. Name the colonial power which ruled over Java.  
 (A) British (B) French (C) Dutch (D) Portuguese
90. Where do the Dhangars live?  
 (A) Himachal Pradesh (B) Rajasthan (C) Maharashtra (D) Gujarat
91. In America Universal adult Franchise was introduced in  
 (A) 1789 (B) 1950 (C) 1935 (D) 1965
92. Organs of the United Nations are  
 (A) Four (B) Five (C) Six (D) Three
93. Who passed the "Legal Framework Order"?  
 (A) ZANU (B) Robert Mugabe (C) General Musharaff (D) None of these
94. From which country did Sri Lanka win its independence?  
 (A) Belgium (B) France (C) Spain (D) England
95. The headquarter of European Union is located at  
 (A) Rome (B) Geneva (C) Berlin (D) Brussels
96. Income of the country divided by its total population is known as  
 (A) Capital income (B) National income (C) Per capita income (D) GDP
97. In 2012, Infant Mortality Rate in Kerala was  
 (A) 49 (B) 12 (C) 60 (D) 22
98. Workers in which sector do not produce goods?  
 (A) Tertiary sector (B) Secondary sector (C) Primary sector (D) None of these
99. Multiple cropping means growing  
 (A) only two crops (B) only three crops (C) up to four crops (D) more than one crop
100. "Operation Flood" is related to  
 (A) control flood (B) produce fish (C) milk production (D) gain production

# FIITJEE MOCK TEST-2

*For* NTSE STAGE-2

## Scholarship Aptitude Test (SAT)

### ANSWERS

- |       |       |       |        |
|-------|-------|-------|--------|
| 1. C  | 2. B  | 3. D  | 4. A   |
| 5. D  | 6. B  | 7. B  | 8. B   |
| 9. B  | 10. C | 11. C | 12. C  |
| 13. C | 14. B | 15. B | 16. D  |
| 17. C | 18. B | 19. B | 20. B  |
| 21. D | 22. B | 23. D | 24. C  |
| 25. C | 26. C | 27. C | 28. C  |
| 29. A | 30. A | 31. B | 32. D  |
| 33. A | 34. A | 35. D | 36. B  |
| 37. B | 38. A | 39. A | 40. B  |
| 41. B | 42. B | 43. A | 44. B  |
| 45. D | 46. B | 47. B | 48. B  |
| 49. D | 50. B | 51. D | 52. C  |
| 53. A | 54. B | 55. C | 56. B  |
| 57. D | 58. B | 59. D | 60. D  |
| 61. D | 62. B | 63. A | 64. A  |
| 65. D | 66. A | 67. C | 68. C  |
| 69. D | 70. C | 71. B | 72. B  |
| 73. A | 74. B | 75. C | 76. B  |
| 77. C | 78. C | 79. D | 80. D  |
| 81. B | 82. C | 83. B | 84. B  |
| 85. C | 86. A | 87. B | 88. B  |
| 89. C | 90. C | 91. D | 92. C  |
| 93. C | 94. D | 95. D | 96. C  |
| 97. B | 98. C | 99. D | 100. C |

### HINTS & SOLUTIONS

1. C

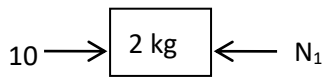
Sol.  $x_f = x_i + \text{Area under v-t graph}(t = 2 \text{ s to } t = 10 \text{ s})$   
 $= 4 + 12$   
 $= 16 \text{ m}$

2. B

Sol. Acceleration of system

$$a = \frac{10}{5+3+2} = 1 \text{ m/s}^2$$

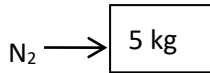
F.B.D of 2 kg block



$$10 - N_1 = 1 \times 2$$

$$N_1 = 8 \text{ N}$$

F.B.D of 5 kg block



$$N_2 = 5 \times 1 = 5 \text{ N}$$

3. D

Sol.  $R = \frac{\rho l}{A} = \frac{\rho l^2}{Al} = \frac{\rho l^2}{V} = \frac{\rho l^2}{m/d}$

$$R \propto \frac{l^2}{m}$$

4. A

Sol. Atomic number of X = 7 + 2 - 1 = 8

Atomic mass of X = 14 + 4 - 2 = 16

5. D

Sol. When light goes one medium to another medium frequency does not change.

6. B

Sol. According to Snell law

$$\mu_0 \sin \theta = \frac{\mu_0}{8} \times \sin 90^\circ$$

$$\theta = \sin^{-1} \left( \frac{1}{8} \right)$$

7. B

Sol. Initially height immersed in water is  $h_1$  and after removing mass height immersed is  $h_2$ .

$$(0.2 + m_{\text{block}}) g = \rho_w \times h_1 \times A \times g$$

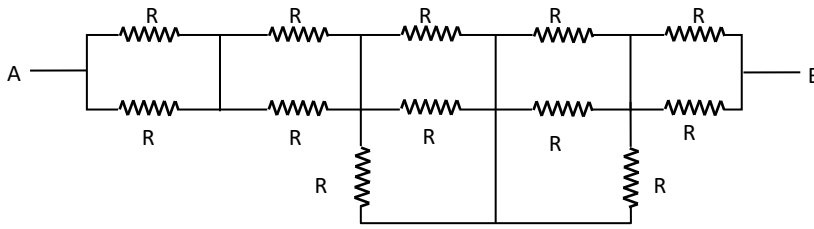
$$m_{\text{block}} g = \rho_w \times h_2 \times A \times g$$

$$0.2 g = \rho_w \times (h_1 - h_2) A \times g$$

$$A = 100 \text{ cm}^2$$

Side of cube = 10 cm

8. B  
Sol.



$$= \frac{3}{2}R + \frac{2R}{3} = \frac{(9+4)R}{6} = \frac{13R}{6}$$

9. B

Sol.  $P_{av} = \frac{w}{t} = \frac{\frac{1}{2}m(v_2^2 - v_1^2)}{t} = 1W$

10. C

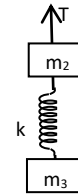
Sol. Conceptual.

11. C

Sol.  $u\sqrt{3} \cos 30t + u \cos 60t = x$

12. C

Sol.  $T = (m_2 + m_3)g$



13. C

Sol.  $v = \sqrt{\frac{GM}{r}}$   
 $a = \frac{v^2}{r} = \frac{GM}{r^2} = \frac{g(R_{earth})^2}{100(R_{earth})^2} = 0.1m/s^2$

14. B

Sol. K shell has 2 electrons and L shell has 4 electrons, thus it is carbon atom. It requires 4 electron to combine and to complete octet.

15. B

Sol. Sublimation → Dissolution in water → Filtration → Crystallisation

16. D

Sol. Say  $\frac{17}{9} X$  percent = x

$$\frac{17x + 19(100 - x)}{100} = 17.4$$

$$\therefore x = 80$$

$$\frac{17}{9} X = 80\%$$

$$\frac{19}{9} X = 20\%$$

$$\frac{17}{9} X : \frac{19}{9} X = 80 : 20 = 4 : 1.$$

17. C

$$\text{Sol. } \frac{28g N}{1} \times \frac{1 mol N}{14g N} = 2 mol N$$

$$\frac{64g O}{1} \times \frac{1 mol O}{16g O} = 4 mol O$$

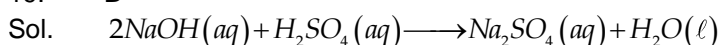
$$N : O = 2 : 4$$

$$\therefore N_2O_4$$

18. B

Sol. Amine group is attached with two alkyl groups, thus secondary.

19. B

From the above equation it is clear that 1 mol  $H_2SO_4$  neutralises 2 mol NaOH.No. of moles of  $H_2SO_4$  present =  $M \times V$ 

$$= \frac{1.0 mol}{1 L} \times \frac{28}{1000} L = 0.028 mol (\because 1 dm^3 = 1 L)$$

 $\therefore$  moles of NaOH neutralised =  $2 \times 0.028 mol = 0.056 mol$ .

20. B

Sol. (A) True – Atoms of elements beyond uranium in periodic table have been created (synthesised). Atoms are destroyed in radio isotopes.

(B) Untrue – Isotopes of the same element are not alike.

(C) True

(D) True – Atoms can combine in very large numbers, e.g. in proteins, carbohydrates and nucleic acid.

21. D

Sol. Conceptual

22. B

Sol. In general, cations form most easily when the radius of the atom is large.

23. D

Sol. Every link is correct, except in (D) where simple molecular solids have low m.pt. and low b.pt.

24. C

Sol. The molar volume falls to the centre of the periods and then rises again.

25. C

Sol. Small and highly charged  $Al^{3+}$  ion and polarises the oxide ion.

26. C

Sol. On heating ionisation of water increases, as a result the pH of water will decrease. Water is always neutral as there is always equal number of  $H^+$  ions and  $OH^-$  ions.

27. C

Sol. Skeletal muscle is mesodermal in origin.

28. C

Sol. Lysosomes are manufactured by golgi apparatus.

29. A

Sol. The gametophytic phase is conspicuous independent and dominant in Bryophytes.

30. A

Sol. DNA replication happens in S phase of cell cycle. During zygotene phase of prophase – I, homologous chromosomes form synapsis.

31. B

Sol. *Whuchereria bancrofti* attacks lymph vessels.

32. D

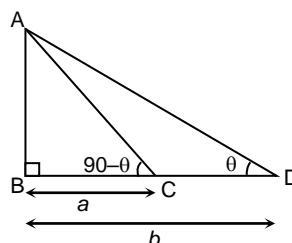
Sol. Devil Fish (octopus) is a mollusc.

33. A  
 Sol. When an impulse travels along a myelinated neuron, depolarization occurs only at nodes. It leaps over the myelin sheath from one node to the next. This process is named salutatory conduction.
34. A  
 Sol. Embryo at 16 celled stage is called morula (solid ball).
35. D  
 Sol. Cleistogamy is a type of self pollination which occurs in a closed flower.
36. B  
 Sol. Conjugation is the process by which a bacterium transfers genetic material to another by direct contact.
37. B  
 Sol. Photochemical smog is caused by chemical reaction of nitrogen oxide and volatile organic hydrocarbons.
38. A  
 Sol. Partial pressure of oxygen in oxygenated blood is 95 mmHg.
39. A  
 Sol. Kupffer's cells are phagocytic cells present over the living of sinusoid in liver.
40. B  
 Sol. Phosphoenol pyruvate (PEP) is the first CO<sub>2</sub> acceptor in CAM plants.
41. B  
 Sol.  $1.5 \times 7 - 6 \times 0.5 = 7.5$  cm
42. B  
 Sol. Use exterior angle sum property.
43. A  
 Sol. Since  $\pi$  is irrational and product of rational and irrational is irrational.
44. B

Sol.  $\tan(90^\circ - \theta) = \frac{AB}{a} \Rightarrow AB = a \cot \theta$

Also  $\tan \theta = \frac{AB}{b} \Rightarrow AB = b \tan \theta$

$AB^2 = ab \Rightarrow AB = \sqrt{ab}$



45. D

Sol.  $\cot 12^\circ \cot 38^\circ \cot 52^\circ \cot 60^\circ \cot 78^\circ = \cot 12^\circ \cdot \cot 38^\circ \cdot \tan 38^\circ \cdot \frac{1}{\sqrt{3}} \cdot \tan 12^\circ = \frac{1}{\sqrt{3}}$

46. B

Sol.  $t_{10} = S_{10} - S_9 = 37$

47. B

Sol. Let ages of A and B are A and B respectively, then

$$A - (A - B) = 4(B - A + B)$$

$$\Rightarrow A = \frac{7B}{4}$$

$$\Rightarrow B + \frac{7B}{4} = 33$$

⇒

$B = 12$  So,  $A = 21$

48. B

Sol:  $r^2 = x^2 + 25$

$r^2 = (17 - x)^2 + 144$

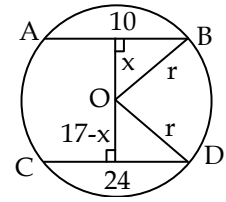
∴  $x^2 + 25 = 289 + x^2 - 34x + 144$

⇒  $34x = 433 - 25$

⇒  $x = \frac{408}{34} = 12$

∴  $r^2 = 144 + 25$

$r = 13 \text{ cm}$



49. D

Sol. (decimal expansion is non terminating nor repeating).

50. B

Sol. This is true for any number of circles.

51. D

Sol. For real roots  $b^2 - 4ac \geq 0$

If  $c = 0$ , then  $b^2 \geq 0$

This is always true.

52. C

Sol. By observation

53. A

Sol.  $\frac{P}{9} = 3 + \frac{1}{4 + \frac{1}{1 + \frac{1}{5}}} = 3 + \frac{1}{4 + \frac{5}{6}} = 3 + \frac{6}{29} = \frac{93}{29}$

54. B

Sol. Area (shaded part) = Area ( $\Delta ACO$ ) – Area (Sector of circle)

$$= \frac{1}{2} \times 2 \times 2 - \frac{\pi r^2}{8} = 2 - \frac{\pi}{2}$$

55. C

Sol.  $y - 11 = \frac{-1 - 11}{16 + 4}(x + 4)$

$y = \frac{43 - 3x}{5}$

Hence, points are (1, 8), (6, 5), (11, 2)

56. B

Sol. Reflex  $\angle O = 360^\circ - 80^\circ = 280^\circ$

So,  $\angle RQP = \frac{1}{2} \text{ reflex } \angle O = 140^\circ$

∴  $\angle RQS = 180^\circ - 140^\circ = 40^\circ$

57. D

Sol.  $x^{\{b^2 + b^2 + 2ab + a^2 - b^2\}} = x^{b^2 + 2ab + a^2} = x^{(a+b)^2}$

58. B

Sol. Let ratio be  $k : 1$

So coordinate of points which divide line segment in ratio  $k : 1$  are

$$\frac{-2+3k}{k+1}, \frac{-3+7k}{k+1}$$

As  $x=0$ ,  $k = \frac{2}{3}$

So, required ratio is  $2 : 3$ .

59. D

Sol. Let sides of a triangle are  $x, y$  and  $z$

$$x + y - 8 = z$$

$$y + z - 8 = x$$

$$x + z - 8 = y$$

Solving these equation

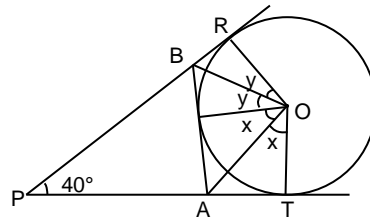
$$x = y = z = 8$$

$$\text{Area} = \frac{\sqrt{3}}{4} \times 8^2 = 16\sqrt{3}$$

60. D

Sol. From figure,  $2x + 2y = 140$

$$\angle BOA = x + y = 70^\circ$$



61. D

Sol. Suez canal opened in 1869.

62. B

Sol. cape of good hope is in South Africa

63. A

Sol. The Ganga called Meghna when it joins the Brahmaputra.

64. A

Sol. Sambhar is the saline water lake.

65. D

Sol. In 1960 the Indus water Treaty signed.

66. A

Sol. Mahendragiri is the highest peak in the Eastern Ghat.

67. C

Sol. Eastward extension of the peninsular plateau is called Bundelkhand.

68. C

Sol. El-Nino is a warm ocean current.

69. D

Sol. Rearing of silkworm is called sericulture.

70. C

Sol. India rank second in terms of rice production in the world.

71. B

Sol. Maize is used both as food and fodder.

72. B

Sol. Khetri mines in Rajasthan are famous for the mining of copper.



73. A  
Sol. In India Odisha is the largest producer of bauxite.
74. B  
Sol. cement is heavy industry.
75. C  
Sol. Chennai is the oldest artificial port on the eastern coast of south India.
76. B  
Sol. Flying shuttle was a mechanical device for weaving.
77. C  
Sol. Textile is not a seasonal industry.
78. C  
Sol. Elgin mill was set up at Kanpur
79. D  
Sol. None of these is considered of Indian origin.
80. D  
Sol. The great depression started in USA.
81. B  
Sol. Diamond Sutra was printed in A D 8 6 8.
82. C  
Sol. The first Indian to publish a newspaper was Gangadhar Bhattacharya.
83. B  
Sol. Germinal was not written by Charles Dickens.
84. B  
Sol. The Rent Act passed in Bombay in 1918.
85. C  
Sol. July Revolution take place in 1830.
86. A  
Sol. In 1930 Vietnamese Communist party setup.
87. B  
Sol. Gestapo is the secret police of Nazi Germany.
88. B  
Sol. In 1865 the first Indian Forest Act enacted.
89. C  
Sol. Dutch ruled over Java.
90. C  
Sol. Dhangars live in Maharashtra.
91. D  
Sol. In America Universal adult Franchise was introduced in 1965.
92. C  
Sol. Organ of the United Nations are six.
93. C  
Sol. General Musharaff passed the "Legal Framework Order".
94. D  
Sol. From England Sri Lanka win its independence.
95. D  
Sol. The headquarter of European Union is located at Brussels.
96. C  
Sol. Income of the country divided by its total population is known as per capita income.
97. B  
Sol. In 2012, Infant Mortality Rate in Kerala was 12.
98. C  
Sol. Workers in Primary sector don't produce goods.
99. D  
Sol. Multiple cropping means growing more than one crop.
100. C  
Sol. "Operation Flood" is related to milk production.