

VISA

Vision Infinity Scholarship Award

Students of Vision Infinity who secure All India Rank in IIT-JEE within top100, will be Awarded scholarship for four years during B. Tech in IIT

3Year
2011

All India Rank in IIT-JEE	Scholarship	Total (in four years)
AIR 1	Rs. 10,000/month	Rs. 4,80,000/-
AIR 2	Rs. 7,500/month	Rs. 3,60,000/-
AIR 3	Rs. 6,000/month	Rs. 2,88,000/-
AIR 4 -10	Rs. 5,000/month	Rs. 2,40,000/-
AIR 11- 20	Rs. 3,000/month	Rs. 1,44,000/-
AIR 21-30	Rs. 1,500/month	Rs. 72,000/-
AIR 31-50	Rs. 1,000/month	Rs. 48,000/-
AIR 51-100	Rs. 500/month	Rs. 24,000/-

* Terms & Conditions apply

Model Test Paper-I

Three Year Programme

Name of the Student :

Reg. No. :

Duration : 1.30 hours

Max. Marks : 225

Please read the instructions carefully. You are allotted 3 minutes specifically for this purpose.

INSTRUCTIONS:

1. This Question Paper contains 75 Questions.
2. Each question has 4 choices for its answer (A), (B), (C) and (D).
3. Only ONE of them is the right answer.
4. There is **no negative marking**.
5. For each question you will be awarded +3 marks.
6. In all other cases you will be awarded 0 marks.
7. Use HB pencil to fill the bubble corresponding to correct answer.
8. *You should submit the question paper & answer sheet after the completion of the test to the invigilator.*
9. *You should keep the question paper & answer sheet clean. Rough work must be done in the space provided.*

MATHEMATICS

1. The decimal representation of $\frac{8}{3}$ is :
- (A) 2.6 (B) $2.\bar{6}$
(C) 2.5 (D) 0.26
2. The rational form of $0.\bar{3}$ is :
- (A) $\frac{1}{3}$ (B) $\frac{0.3}{9}$
(C) $\frac{3}{90}$ (D) $\frac{3}{7}$
3. The rational form of $0.003\bar{52}$ is :
- (A) $\frac{349}{9900}$ (B) $\frac{352}{99000}$
(C) $\frac{349}{99000}$ (D) $\frac{352}{9900}$
4. If $x = 2 + \sqrt{3}$, then $x^3 + \frac{1}{x^3} =$
- (A) 49 (B) 52
(C) 42 (D) 47
5. $(x+1)^3 - (x-1)^3 =$
- (A) $3x^2 + 1$ (B) $3x$
(C) $2(3x^2 + 1)$ (D) $3(2x^2 + 1)$

The hi-Tech Institute

VISION
Infinity

A synonym of success...

Space for rough work

6. $\frac{1.2 \times 1.2 \times 1.2 - 0.2 \times 0.2 \times 0.2}{1.2 \times 1.2 + 1.2 \times 0.2 + 0.2 \times 0.2} =$
- (A) 12 (B) 4
- (C) $\frac{1}{4}$ (D) 1
7. $(x + y)^3 - (x - y)^3 - 6y(x^2 - y^2) =$
- (A) $8y^3$ (B) $2y^2$
- (C) $2y^3$ (D) $-8y^3$
8. $\sqrt{x^{-2}y^3} =$
- (A) $\frac{y^{3/2}}{x}$ (B) $xy^{3/2}$
- (C) $\frac{x}{y^{3/2}}$ (D) $xy^{2/3}$
9. $\frac{x^{a(b-c)}}{x^{b(a-c)}} \div \left(\frac{x^b}{x^a}\right)^c =$
- (A) 0 (B) 1
- (C) -1 (D) x^{a-b}
10. If the angles of a quadrilateral are in the ratio 3:5:9:13, then the greatest angle of the quadrilateral is :
- (A) 108° (B) 156°
- (C) 220° (D) 180°

11. If the length of each edge of a cube is ℓ , then the surface area of the cube is
(A) $6\ell^2$ (B) $4\ell^2$
(C) $12\ell^2$ (D) ℓ^3
12. If the height of 5 persons are 144 cm., 152 cm., 151 cm., 158 cm. and 155 cm. respectively. Then the mean height is :
(A) 190 cm. (B) 152 cm.
(C) 146 cm. (D) 142 cm.
13. The arithmetic mean of first 6 natural numbers is :
(A) 3.5 (B) 3
(C) 4 (D) 4.5
14. A coin is tossed 1000 times with the following frequencies :
Head : 455 , Tail : 545
Then the probability of event of getting a tail is
(A) 0.455 (B) 0.99
(C) 0.545 (D) 545
15. If an angle is 28° less than its complement, then the angle is :
(A) 31° (B) 72°
(C) 28° (D) 152°
16. An exterior angle of a triangle is 110° , and one of the interior opposite angles is 30° . Then the other two angles of the triangle are:
(A) $80^\circ, 70^\circ$ (B) $80^\circ, 100^\circ$
(C) $110^\circ, 70^\circ$ (D) $40^\circ, 110^\circ$

17. If $\sqrt{2}=1.414, \sqrt{3}=1.732, \sqrt{5}=2.236$ and $\sqrt{10}=3.162$, then the value of $\frac{\sqrt{10}+\sqrt{5}}{\sqrt{2}}$ is:
- (A) 3.817 (B) 2.238
(C) 0.948 (D) 3.235
18. If $x = \frac{1}{2-\sqrt{3}}$, then the value of $x^3 - 2x^2 - 7x + 5$ is
- (A) 2 (B) -3
(C) 3 (D) $\frac{1}{2}$
19. $(0.99)^2 =$
- (A) 0.9801 (B) 1.0001
(C) 0.9981 (D) 0.981
20. $(x - 0.1)(x + 0.1) =$
- (A) $x^2 - 0.01$ (B) $x^2 - 0.2x + 0.01$
(C) $x^2 + 0.01$ (D) $x^2 + 0.2x + 0.01$
21. $991 \times 1009 =$
- (A) 999919 (B) 989919
(C) 998919 (D) 899919
22. If $x + \frac{1}{x} = 11$, then the value of $x^2 + \frac{1}{x^2}$ is
- (A) 109 (B) 119
(C) 123 (D) 121

23. If $x^2 + \frac{1}{x^2} = 66$, then the value of $x - \frac{1}{x}$
- (A) ± 4 (B) ± 11
 (C) ± 16 (D) ± 8
24. If $9x^2 + 25y^2 = 181$ and $xy = -6$, then the value of $3x + 5y$ is :
- (A) ± 1 (B) ± 2
 (C) ± 3 (D) ± 4
25. If $a + b + c = 0$ and $a^2 + b^2 + c^2 = 16$, then the value of $ab + bc + ca$ is :
- (A) 8 (B) 4
 (C) -8 (D) -4
26. $(x^2 - x + 1)^2 - (x^2 + x + 1)^2 =$
- (A) $4(x^2 + 1)$ (B) $4x^2(x + 1)$
 (C) $-4x(x^2 + 1)$ (D) $4x(x + 1)$
27. In a $\triangle ABC$, if $\angle A = 50^\circ$ and $\angle B = 60^\circ$, then the shortest side of the triangle is :
- (A) BC (B) AB
 (C) AC (D) none of these
28. The degree measure of a semicircular arc is
- (A) 180° (B) 360°
 (C) 120° (D) 90°

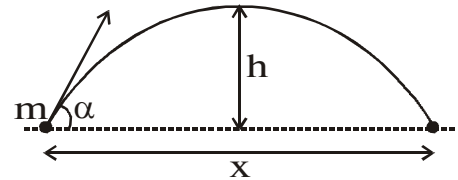
29. If a chord is at a distance 5 cm from the centre of a circle of radius 13 cm ,then the length of a chord is
(A) 12 cm. (B) 24 cm.
(C) 13 cm. (D) 15 cm.
30. If radius of a sphere is 7 cm, then the surface area is
(A) 616 cm.² (B) 676 cm.²
(C) 41582 cm.² (D) 516 cm.²

SCIENCE

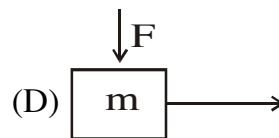
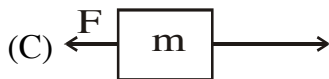
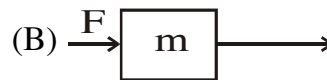
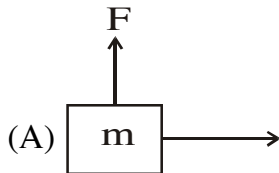
31. An object travels 16m in 4 seconds and then another 16m in 2 seconds.The average speed of the object is :
(A) $\frac{14}{3}$ m/s (B) $\frac{16}{3}$ m/s
(C) $\frac{17}{3}$ m/s (D) $\frac{19}{3}$ m/s
32. A batsman hits a cricket ball which then rolls on a level ground. After covering a short distance, the ball comes to rest. The ball slows to a stop because
(A) the batsman did not hit the ball hard enough
(B) velocity is proportional to the force exerted on the ball
(C) there is a force on the ball opposing the motion
(D) there is no unbalanced force on the ball, so the ball would want to come to rest.
33. The momentum of an object of mass m, moving with velocity v is :
(A) $(mv)^2$ (B) mv^2
(C) $\frac{1}{2}mv^2$ (D) mv .

34. A block of wood is kept on a table top. The mass of wooden block is 5kg and its dimensions are 40cm × 20cm × 10cm. The pressure exerted by the wooden block on the table top if it is made to lie on the table top with its sides of dimensions 20cm × 10cm is : [$g = 9.8 \text{ ms}^{-2}$]
- (A) 1000 Nm^{-2} (B) 1450 Nm^{-2}
 (C) 2450 Nm^{-2} (D) 3000 Nm^{-2} .

35. An object of mass m thrown at a certain angle to the ground moves in a curved path and falls back to the ground as shown in figure. The initial and final points of the path of the object lie on the same horizontal line. The workdone by the force of gravity on the object is :



- (A) zero (B) mgh
 (C) mgx (D) $mgh + mgx$.
36. In each of the following diagrams a force, F is acting on an object of mass, m . The direction of displacement is from west to east shown by the longer arrow. The diagram which represents the workdone by the force as negative is :



37. A sound wave has a frequency of 2kHz and wavelength 35cm. The time taken by the sound wave travel 1.5km is very nearly equal to :
- (A) 1.9 sec (B) 2.1 sec
 (C) 2.4 sec (D) 2.9 sec.

38. The frequency of a source of sound is 100Hz. How many times does it vibrate in a minute ?
(A) 3000 (B) 4000
(C) 5000 (D) 6000.
39. Which of the following statements is incorrect ?
(A) Sound travels as a longitudinal wave through a material medium
(B) Sound cannot travel in vacuum
(C) The amount of sound energy passing each second through unit area is called loudness of sound
(D) The audible range of hearing for average human beings is in the frequency range of 20Hz-20 kHz.
40. The energy consumed in 10 hours by four devices of power 500 W each is :
(A) 12 kWh (B) 20 kWh
(C) 26 kWh (D) 40 kWh.
41. An object of mass, m is moving with a constant velocity, v . The amount of work done on the object in order to bring the object to rest is :
(A) mv^2 (B) $\frac{1}{2}mv^2$
(C) $-\frac{1}{2}mv^2$ (D) $-mv^2$
42. A boy of mass 50kg runs up a staircase of 45 steps in 9 seconds. If the height of each step is 15cm, the power of the boy is : ($g = 10 \text{ ms}^{-2}$)
(A) 300 W (B) 325 W
(C) 350 W (D) 375 W.

43. Which of the following statement is correct ?
(A) The force of gravity increases with altitude
(B) The weight of a body is the force with which the earth repels it
(C) The mass may vary from place to place but the weight remains constant
(D) The force of gravity decreases from pole to equator.
44. Among the objects given, which of the following has the largest inertia ?
(A) a rubber ball (B) a bicycle
(C) a five rupee coin (D) a train.
45. Which of the following is not the equation of motion ?
(A) $v = u + at$ (B) $s = ut + \frac{1}{2}at^2$
(C) $v^2 - u^2 = 2as$ (D) $F = ma$.
46. Rutherford's experiment led to the discovery of :
(A) nucleus (B) alpha-particle
(C) electron (D) none of these.
47. Valence shell of carbon contains :
(A) 2 electrons (B) 4 electrons
(C) 6 electrons (D) 8 electrons.
48. The electronic configuration 2, 8, 8, 2 represents the element :
(A) Ar (B) K
(C) Ca (D) Cl.
49. The number of electrons in the atom which has 18 protons in the nucleus is :
(A) 10 (B) 18
(C) 30 (D) 40.

50. Canal rays are :
(A) electromagnetic waves (B) stream of electrons
(C) stream of α -particles (D) Positively charged radiations.
51. The number of electrons in the outermost orbit of the element of atomic number 15 is :
(A) 1 (B) 3
(C) 5 (D) 7.
52. Which of the following has the largest atomic number ?
(A) C (B) N
(C) O (D) F.
53. In an atom with atomic number 29 and atomic mass number 59 (${}_{29}^{59}\text{X}$), the number of electrons is :
(A) 29 (B) 30
(C) 40 (D) 59.
54. The nucleus of the atom consists of :
(A) proton + electron (B) proton + neutron
(C) neutron + electron (D) proton + electron + neutron.
55. Elements having same atomic number but different mass number is called :
(A) Isobar (B) Isotope
(C) Isotone (D) Mole.
56. The number of molecules in 16 g of methane (CH_4) is :
(A) 3.0×10^{23} (B) 6.02×10^{23}
(C) $\frac{16}{6.02} \times 10^{23}$ (D) $\frac{16}{3.0} \times 10^{23}$

57. If the dispersed phase in a liquid and the dispersion medium is a solid the colloid is known as :
- (A) a Sol (B) an emulsion
(C) a gel (D) a foam.
58. Which of the following is not a compound ?
- (A) common salt (B) water
(C) iron filings (D) copper sulphate.
59. What of the following is/are correct.
- (i) Solid have a definite shape and fixed volume
(ii) Solid changes shape under force and regains the same shape when excessive force is applied
(iii) A sponge is solid.
- (A) only (i) (B) (i) & (ii) only
(C) (i), (ii), (iii) all (D) (ii) only.
60. Which of the following is/are correct :
- (i) Liquids have no fixed shape but have fixed volume.
(ii) Fluid is a liquid
(iii) The rate of diffusion of liquids is higher than that of solids.
(iv) Solid particles more Freely and have greater space between each other as compared to particles in liquid state.
- (A) i, ii, iii only (B) i, ii only
(C) ii only (D) iv only.
61. Which one is not a component of cell membranes?
- (A) nucleic acids (B) lipids
(C) carbohydrates (D) proteins.

62. To enter or leave a cell, substances must pass through:
(A) Nucleus (B) Golgi complex
(C) Microtubule (D) Plasma membrane.
63. Plant cell walls mainly consist of:
(A) starch (B) cellulose
(C) protein (D) glycogen
64. A pulse crop is grown between two cereal crops to compensate for the :
(A) Loss of phosphate (B) Loss of water
(C) Loss of sulphur (D) Loss of nitrogen
65. Which of the following is known as 'powerhouse' of the cells?
(A) Ribosome (B) Nucleus
(C) Cytoplasm (D) Mitochondrion.
66. Triploblastic animals which have no body cavity are placed in the phylum :
(A) Platyhelminthes (B) Annelids
(C) Arthropoda (D) None
67. Intercellular matrix is minimum and also no intercellular space is present in :
(A) Epithelial tissue (B) Bone
(C) Cartilage (D) None of these
68. The afferent process of neuron is known as :
(A) Axon (B) Dendrite
(C) Cyton (D) Neurofibril
69. A four-chambered heart is not found in :
(A) Birds (B) Mammals
(C) Snakes (D) Crocodiles

70. Animals which show viviparity (giving birth)include:
(A) Whales (B) Bony fishes
(C) Turtles (D) Running birds
71. For building a highly muscular body, a body builder needs more of :
(A) Viramins (B) Minerals
(C) Fats (D) Proteins
72. Cholesterol is related to:
(A) Protein (B) Carbohydrate
(C) Fats (D) Vitamin C
73. A healthy person is one who is free from :
(A) Diseases (B) Mental tension
(C) Disease and mental tension (D) Bacteria
74. A type of rhabdovirus causes:
(A) AIDS (B) TB
(C) Influenza (D) Rabies
75. Which one of the following includes only weeds ?
(A) *Chenopodium*, Sunflower, *Triticale*
(B) *Amaranthus*, *Chenopodium*, *Convolvulus*
(C) *Convolvulus*, Barseem, Paddy
(D) *Amaranthus*, *Convolvulus*, sunflower.

ANSWER**3YEAR****Set-A**

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. B | 2. A | 3. C | 4. B | 5. C |
| 6. D | 7. A | 8. A | 9. B | 10. B |
| 11. A | 12. B | 13. A | 14. C | 15. A |
| 16. A | 17. A | 18. C | 19. A | 20. A |
| 21. A | 22. B | 23. D | 24. A | 25. C |
| 26. C | 27. A | 28. A | 29. B | 30. A |
| 31. B | 32. C | 33. D | 34. C | 35. A |
| 36. C | 37. B | 38. D | 39. C | 40. B |
| 41. C | 42. D | 43. D | 44. D | 45. D |
| 46. A | 47. B | 48. C | 49. B | 50. D |
| 51. C | 52. D | 53. A | 54. B | 55. B |
| 56. B | 57. C | 58. C | 59. B | 60. A |
| 61. A | 62. D | 63. B | 64. D | 65. D |
| 66. A | 67. A | 68. B | 69. C | 70. A |
| 71. D | 72. C | 73. C | 74. D | 75. B |