

# URANIUM TALENT SEARCH EXAMINATION(UTSE) - 2010

(CBSE/ICSE)

Time: 60 minutes(11 am - 12 noon)

Class- IX

F.M - 180(+3/-1 system)

## Declaration of Result in the internet([www.theuranium.org](http://www.theuranium.org)) : 15.03.2009

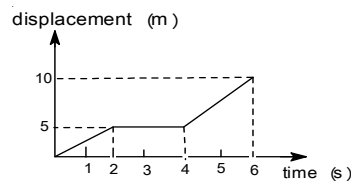
(There are 60 MCQs and each has one correct answer. You are required to darken the appropriate circle in the OMR answer sheet with the help of a HB pencil. Eraser can be used to change any answer. Note that improper darkening will make your answer sheet invalid by the computer. 3 marks will be given for each correct answer and 1 mark will be deducted for each wrong answer. Ball point pen can be used for darkening but once darkened cannot be erased)

(Uploading of correct answer in the internet: 08.02.2010)

- You are given 0.5 mole of aluminium nitrate. The number of moles of aluminium ions and nitrate ions respectively are  
(a) 0.5, 1.5 (b) 0.5, 0.5 (c) 1.5, 0.5 (d) 1.0, 1.5
- $\text{Cu}_2\text{SO}_3$  is  
(a) cupric sulphite (b) cuprous sulphite (c) cuprous sulphate (d) cupric sulphate
- Which of the following statement about structure of atom is wrong ?  
(a) According to Bohr's model of atom, as long as electron revolves in a particular orbit, it does not emit energy.  
(b) According to Rutherford's model of atom, there is a minute but massive body at centre of an atom called nucleus and most of the space of the atom is empty.  
(c) According to Rutherford's model electrons revolve round the nucleus in fixed circular orbits.  
(d) According to Bohr's model of atom electron can jump from one orbit to the other.
- Oxygen has three isotopes  $^{16}_8\text{O}$ ,  $^{17}_8\text{O}$  and  $^{18}_8\text{O}$  in the relative abundance of 99.78, 0.02 and 0.2% respectively. The average atomic mass of oxygen atom is  
(a) 17 (b)  $\approx 16$  (c)  $\approx 18$  (d)  $\approx 17$
- An element (X) has 19 protons and 21 neutrons, while element (Y) has 20 protons and 20 neutrons. Then (X) and (Y) are  
(a) isotopes (b) isotones (c) allotropes (d) isobars
- An element (P) has five electrons in the M shell. It has 16 neutrons. Then its atomic number and mass number respectively are :  
(a) 15, 31 (b) 13, 32 (c) 5, 21 (d) 21, 16
- In a sample of water the mass of oxygen was found to be  $1.328 \times 10^{-22}$  gm. The number of H atoms present in that sample of water would be  
(a) 5 (b) 10 (c) 15 (d) 20
- 98 u (amu) of sulphuric acid contains  
(a)  $6.023 \times 10^{23}$  molecules (b) 98 molecules (c) 1 molecule (d) none
- In a sample of ammonia gas( $\text{NH}_3$ ) the total number of H atoms was found to be  $0.003 \times N_A$ . The mass of nitrogen in that sample would be ( $N_A = \text{Avogadro's number}$ )  
(a) 0.028 g (b) 0.28 g (c) 0.14 g (d) 0.014 g
- The number of protons present in  $\text{Al}^{3+}$  ion ( Atomic Number = 13, Mass Number = 27)  
(a) 13 (b) 10 (c) 14 (d) 17
- 0.18 mole of a solute having molecular mass 50 was found to dissolve in 5 moles of water to give a saturated solution at a particular temperature. What is its solubility in mass by mass percentage ?  
(a) 9.09 (b) 10.00 (c) 18.00 (d) 55.55

12. Which of the following statements is not correct ?  
 (a) milk is a liquid-liquid type of colloidal system called emulsion.  
 (b) colloidal solution is homogenous  
 (c) suspension scatters light when the particles remain suspended  
 (d) the particle size(diameter) of the solute in a true solution is less than 1 nm.
13. The boiling point of methyl alcohol is 65°C while that of ethyl alcohol is 78°C. You are given a mixture of these two liquids. How will you separate one from the other ?  
 (a) simple distillation (b) distillation using a fractionating column  
 (c) chromatography (d) using a separating funnel
14. Which of the following is incorrect about states of matter ?  
 (a) solids have fixed shape because their basic crystal units have fixed shape.  
 (b) liquids have fixed volume but no fixed shape  
 (c) gases have neither fixed volume nor fixed shape  
 (d) When a particular matter changes its state from one to the other, the temperature changes.
15. According to binomial nomenclature principle an order is made up of a number of \_\_\_\_\_.  
 (a) class (b) genus (c) family (d) species
16. Which of the following statement is not true about bacteria ?  
 (a) their cells do not possess true nucleus  
 (b) they belong to the kingdom *monera*  
 (c) their cells do not contain mitochondria and golgi body  
 (d) they are always heterotrophic
17. Which is true about paramecium ?  
 (a) it is unicellular eukaryotic animal (b) it belongs to the phylum poriphera  
 (c) it cannot exist freely (d) it is a multicellular and heterotrophic animal
18. The animal belonging to which phylum has no capacity of locomotion but performs digestion and respiration through a canal system present in its body ?  
 (a) porifera (b) protozoa (c) platyhelminthes (d) coelenterata
19. Which animal possesses tentacles ?  
 (a) schisotoma (b) pinworm (c) hydra (d) euglina
20. The seeds of which plant exists in the naked state ?  
 (a) marchantia (b) cycas (c) paphiomedilum (d) ground-nut
21. By which process water enters into a cell ?  
 (a) diffusion (b) osmosis (c) endocytosis (d) exocytosis
22. Let us put a green Rheo leaf in boiling water for a few minutes. Then mount the the leaf on a slide and then put some concentrated salt solution over the leaf. After waiting for a few minutes, the leaf is observed through an ultramicroscope. Which of the following phenomenon occurs ?  
 (a) osmosis : water enters into the cell and the cell swells up  
 (b) osmosis: water leaves out of the cell and the cell shrinks  
 (c) diffusion: CO<sub>2</sub> gas bubbles leaves out of the cell (d) none of these
23. Which cell organelle of the vertebrates is responsible for detoxifying poisonous sustances ?  
 (a) ribosome (b) golgi body (c) smooth endoplasmic reticulum(SER)  
 (d) rough endoplasmic reticulum(RER)
24. Which of the following pair represents proper matching ?  
 (a) golgi apparatus - synthesis of enzymes (b) lysosome - digestion of damaged cell  
 (c) ribosome - formation of ATP (d) mitochondria - storage and package of protein
25. Which cell organelle does not have its own DNA and ribosome ?  
 (a) leucoplasts (b) mitochondria (c) lysosome (d) none of these

26. Which of the following does have a well defined nuclear membrane in the cell ?  
 (a) bacteria (b) green algae (c) amoeba (d) none of these
27. Which is incorrect about the tissue present in the husk of coconut ?  
 (a) it contains the chemical lignin (b) it is called sclerenchyma  
 (c) it belongs to meristematic tissue category (d) all of its cells are dead
28. Which tissue of plants transport food from leaves to other parts of plants ?  
 (a) xylem (b) phloem (c) collenchyma (d) meristematic
29. Easy bending in various parts of plants is possible due to \_\_\_\_\_ type of tissue.  
 (a) parenchyma (b) aerenchyma (c) chlorenchyma (d) collenchyma
30. The epithelial tissue containing cube shaped cells are present in  
 (a) lining of kidney tubules (b) respiratory tract  
 (c) oesophagus (d) none of these
31. The tissues which connects muscles with bones are called  
 (a) ligaments (b) tendons (c) cartilage (d) areolar
32. Which is correct about striated muscles ?  
 (a) they are called smooth muscles  
 (b) they are responsible for the involuntary movements of the organs  
 (c) they contain cells which are multinucleate  
 (d) bronchi of lungs is made up of such tissues
33. A particle of mass 0.5 Kg is kept at rest. A force of 2N acts on it for some time. In what time will it cover 50 m ?  
 (a) 10 sec (b) 15 sec (c) 5 sec (d) 20 sec
34. A neutron exerts a force on a proton which is  
 (a) gravitational (b) nuclear (c) electromagnetic (d) none of these
35. Consider the motion of the tip of the minute hand of a clock. In one hour  
 (a) the distance covered by it is zero (b) the displacement is zero  
 (c) the average speed is zero (d) the average velocity is non-zero
36. The area under a graph between two quantities is given in the unit m/s. The quantities are  
 (a) speed and time (b) distance and time (c) velocity and time  
 (d) acceleration and time
37. Displacement of a body is shown at different times in the diagram.

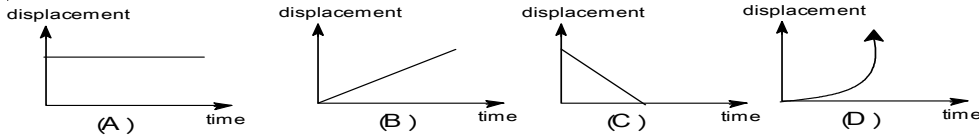


The average velocity during the time interval 2 sec to 6 sec is

- (a)  $\frac{5}{3}$  m/s (b) 2.5 m/s (c) 1.25 m/s (d)  $\frac{5}{6}$  m/s
38. A bomb of mass 20 Kg at rest explodes into two pieces of masses 12 Kg and 8 Kg. The velocity of 8 Kg mass is 6 m/s. The kinetic energy of the other mass is  
 (a) 48 J (b) 24 J (c) 120 J (d) 96 J
39. A person travelling on a straight line moves with a uniform velocity of  $V_1$  for some time 't' and with a uniform velocity of  $V_2$  for the next equal time. The average velocity 'v' is given by

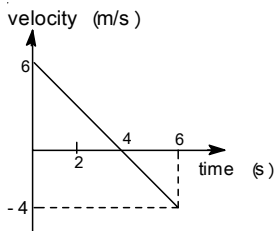
(a)  $V = \sqrt{v_1 v_2}$  (b)  $V = \left( \frac{v_1 + v_2}{2} \right)$  (c)  $V = \left( \frac{v_1 v_2}{v_1 + v_2} \right)$  (d)  $v = \left( \frac{2v_1 v_2}{v_1 + v_2} \right)$

40. Figure represents displacement - time graph for the four particles A, B, C and D.



An unbalanced force is acting on the particle

- (a) A                      (b) B                      (c) C                      (d) D
41. A body of mass 5 Kg is dropped from a height of 2 m. Its kinetic energy when it reaches the ground is  
 (a) 49 J                      (b) 19.6 J                      (c) 98 J                      (d) 9.8 J
42. The principle of conservation of linear momentum states that the linear momentum of a system  
 (a) cannot remain constant                      (b) cannot be changed  
 (c) can be changed only if external forces act  
 (d) can be changed only if internal forces act
43. A player caught a cricket ball of mass 150 g moving at a rate of 20 m/s. If the catching process is completed in 0.1 sec, the force of the blow exerted by the ball on the hand of the fieldsman is equal to  
 (a) 150 N                      (b) 3 N                      (c) 30 N                      (d) 300 N
44. A particle of mass 100 g is thrown vertically upwards with a speed of 5 m/s. The work done by the force of gravity during the particle going up is  
 (a) - 0.5 J                      (b) - 1.25 J                      (c) 1.25 J                      (d) 0.5 J
45. A man draws water from a well. The string suddenly breaks. The man  
 (a) falls backward                      (b) falls forward                      (c) moves upward  
 (d) none of the above
46. A pendulum is oscillating in a closed chamber. If the air of the chamber is pumped out. Then  
 (a) the damping will be reduced                      (b) the amplitude will increase  
 (c) the period will increase                      (d) the length of the pendulum will increase
47. A sound wave has a frequency of 2000 Hz and wavelength of 40 cm. How long will it take to travel 4 Km ?  
 (a) 10 sec                      (b) 5 sec                      (c) 20 sec                      (d) 15 sec
48. When the speed of a particle is doubled, the ratio of its momentum to its kinetic energy  
 (a) remains the same                      (b) gets doubled                      (c) becomes half                      (d) becomes 4 times
49. The engine of a car delivers a constant power. The distance moved by the car in time 't' is proportional to  
 (a)  $t^2$                       (b)  $t^3$                       (c)  $t^{3/2}$                       (d)  $t^{1/2}$
50. The velocity - time graph of a body moving in a straight line is shown in the figure.



The displacement of the body in 6 seconds is

- (a) 16 m                      (b) 12 m                      (c) 8 m                      (d) 4 m
51. A coin and a feather are dropped together in vacuum.  
 (a) the coin will reach the ground first                      (b) the feather will reach the ground first  
 (c) both the bodies will reach the ground at the same time

- (d) the feather will not fall down
52. Which of the following has the least inertia ?  
 (a) a needle (b) a pen (c) your school bag (d) your body
53. The base of a cylindrical vessel measures  $400 \text{ cm}^2$ . Water (density =  $1 \text{ g-cm}^{-3}$ ) is poured into it upto a depth of 10 cm. The pressure on the base of cylindrical vessel is ( $g = 10 \text{ m/s}^2$ )  
 (a) 600 Pa (b) 10,000 Pa (c) 500 Pa (d) 1000 Pa
54. Pressure at a certain depth in river water is  $P_1$  and at the same depth in sea water is  $P_2$ . Then  
 (a)  $P_1 = P_2$  (b)  $P_1 > P_2$  (c)  $P_1 < P_2$  (d)  $P_1 - P_2 = \text{atmospheric pressure}$
55. Nose bleeding may occur at high altitude because  
 (a) the value of 'g' decreases (b) the atmospheric pressure decreases  
 (c) the oxygen content of the atmosphere decreases  
 (d) there are strong air currents in the upper atmosphere
56. A body is projected vertically upward with an initial velocity of 'u'. If acceleration due to gravity is 'g', the time for which it remains in air is  
 (a)  $\frac{2u}{g}$  (b)  $\frac{u}{g}$  (c) gu (d)  $\frac{u}{2g}$
57. A force of 6 N acts on a body for 1 minute. What is the change in momentum produced in the body (in  $\text{Kg-m-s}^{-1}$ ) ?  
 (a) 6 (b) 60 (c) 300 (d) none of the above
58. Which of the following statement is wrong ?  
 (a) sound travels in waves (b) sound is a form of energy  
 (c) sound travels faster in vacuum than in air  
 (d) sound is a longitudinal wave
59. Which of the following wave motion is longitudinal ?  
 (a) waves produced in the air by a vibrating tuning fork  
 (b) x-rays (c) waves produced on the surface of water(ripples) by dropping a stone  
 (d) thermal radiation received from the sun
60. Choose the correct statement.  
 (a) weight of a body is greater at the poles and less at the equators  
 (b) weight of a body is greater on planes and less on hill tops  
 (c) weight of a body on the moon is less than that on the earth  
 (d) all of the above

### ANSWER-UTSE-2010

- 1.a 2.b 3.c 4.b 5.d 6.a 7.b 8.c 9.d 10.a 11.a 12.b  
 13.b 14.d 15.c 16.d 17.a 18.a 19.c 20.b 21.b 22.d 23.c 24.b  
 25.c 26.c 27.c 28.b 29.d 30.a 31.b 32.c  
 33.c 34.a 35.b 36.d 37.c 38.d 39.b 40.d 41.c 42.c 43.c 44.b  
 45.a 46.a 47.b 48.c 49.c 50.c 51.c 52.a 53.d 54.c 55.b 56.a  
 57.d 58.c 59.a 60.d

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F.M - 180(+3/-1 system)

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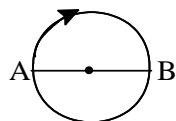
- In the structure of nitrogen molecule which of the following is correct ?  
(a) there is a triple bond between N atoms and each N atom has two unshared electrons in the valence shell  
(b) there is a triple bond between N atoms and no unshared electron in the valence shell  
(c) there is a double bond between N atoms and two pairs of unshared electrons on each atom  
(d) there is a single bond and three pairs of unshared electrons on each atom
- Which of the following is a covalent molecule ?  
(a)  $\text{MgCl}_2$                       (b)  $\text{CO}_2$                       (c)  $\text{CaO}$                       (d)  $\text{KF}$
- The number of electrons present in the valence shell of P is  
(a) 3                      (b) 5                      (c) 6                      (d) 7
- The atomic mass of Cl is 35.5 because  
(a) the percentage of Cl-35.5 isotope is the highest in nature  
(b) Cl-35 and Cl-37 are the two isotopes of Cl available in the relative ratio of 1:1 in nature  
(c) Cl-35 and Cl-37 are the two isotopes of Cl available in the relative ratio of 3:1 in nature  
(d) Cl-35 and Cl-37 are the two isotopes of Cl available in the relative ratio of 1:3 in nature
- The isotope of  ${}_8\text{X}^{20}$  from the following is [number of protons(p) and neutron(n) given]  
(a) A ( n = 10, p = 8)                      (b) B ( n = 8, p = 12)                      (c) C ( n = 12, p = 8)  
(d) none of these
- In the Goldstein's discovery of proton, the positive charged particles present in the anode rays produced by sodium vapour taken in the discharge tube are  
(a) protons only                      (b) sodium ions only                      (c) mixture of protons and sodium ions  
(d) sometime protons and some other time sodium ions
- The formula of iron chloride which is formed when iron reacts with dry chlorine is  
(a)  $\text{FeCl}_2$                       (b)  $\text{Fe}_2\text{Cl}_3$                       (c)  $\text{FeCl}$                       (d)  $\text{FeCl}_3$
- Which of the following is not oxidation ?  
(a)  $\text{Mn}^{+4} \rightarrow \text{Mn}^{+7}$                       (b)  $\text{NO}_2^- \rightarrow \text{NO}_3^-$                       (c)  $\text{O}^{2-} \rightarrow \text{O}$                       (d)  $\text{Fe}^{2+} \rightarrow \text{Fe}$
- Aluminium hydroxide reacts with sulphuric acid in the mole ratio which is respectively  
(a) 1 : 1                      (b) 1 : 2                      (c) 2 : 3                      (d) 3 : 2
- The formula of oxide of halogen showing maximum valency of halogen(X) is  
(a)  $\text{X}_2\text{O}_3$                       (b)  $\text{X}_2\text{O}_5$                       (c)  $\text{XO}_3$                       (d)  $\text{X}_2\text{O}_7$
- Which of the following is correct with respect to atomic mass of elements ?  
(a)  $\text{Co} > \text{Ni}$                       (b)  $\text{Te} < \text{I}$                       (c)  $\text{Ar} < \text{K}$                       (d)  $\text{P} > \text{S}$
- Which of the following will form anion most easily ?  
(a) C                      (b) N                      (c) O                      (d) F
- Aluminium(atomic number = 13) is a member of Group 13(IIIA) of the periodic table belonging to 3rd period. The atomic number of the next element down the same group is  
(a) 15                      (b) 21                      (c) 31                      (d) 45
- Plumbous oxide reacts with conc. HCl as per which of the following equations(not balanced)  
(a)  $\text{PbO}_2 + \text{HCl} \rightarrow \text{PbCl}_4 + \text{H}_2\text{O}$                       (b)  $\text{PbO} + \text{HCl} \rightarrow \text{PbCl}_2 + \text{H}_2\text{O} + \text{Cl}_2$   
(c)  $\text{PbO}_2 + \text{HCl} \rightarrow \text{PbCl}_2 + \text{Cl}_2 + \text{H}_2\text{O}$                       (d)  $\text{PbO} + \text{HCl} \rightarrow \text{PbCl}_2 + \text{H}_2\text{O}$



15. The highest atomic size is that of  
(a) P (b) Cl (c) N (d) S
16. A crystalline hydrate having formula  $\text{MSO}_4 \cdot x\text{H}_2\text{O}$  (atomic mass of M = 65.5) contains 43.82% water. x is  
(a) 4 (b) 5 (c) 7 (d) 10
17. A hydrocarbon has 80% carbon by mass. The empirical formula of the compound is  
(a)  $\text{CH}_2$  (b)  $\text{CH}_3$  (c)  $\text{C}_2\text{H}_3$  (d) CH
18. The number of moles of oxygen atoms present in 5.6 L of  $\text{SO}_3$  gas at NTP is  
(a) 0.25 (b) 0.5 (c) 0.75 (d) 1
19. The mass of  $\text{KMnO}_4$  present in 0.01 mole of it is (K = 39, Mn = 55, O = 16)  
(a) 0.158 g (b) 1.58 g (c) 15.8 g (d) 158 g
20. Which of the following does not produce free ions in aqueous solution?  
(a)  $\text{NaNO}_3$  (b) HCl (c) glucose ( $\text{C}_6\text{H}_{12}\text{O}_6$ ) (d)  $\text{Al}_2(\text{SO}_4)_3$
21. For separating the components of which of the following mixtures can a separating funnel be used?  
(a) water + sugar (b) alcohol + water (c) ammonia + water (d) oil + water
22. Fractional distillation method is used to separate the components of which mixture?  
(a) iodine + sand (b) oil + water (c) NaCl + water (d) kerosine + petrol
23. Which of the metal will not give  $\text{H}_2$  gas with cold water?  
(a) Mg (b) Na (c) Ca (d) K
24. The correct name of  $\text{Hg}_2(\text{ClO}_3)_2$  is  
(a) mercuric chlorate (b) mercurous chlorate (c) mercurous chlorite (d) mercuric chlorite
25. Which of the following is a redox reaction? (the equations are not balanced)  
(a)  $\text{Zn} + \text{KOH} \rightarrow \text{K}_2\text{ZnO}_2 + \text{H}_2$  (b)  $\text{BaCl}_2 + \text{K}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + \text{KCl}$   
(c)  $\text{N}_2\text{O}_5 + \text{H}_2\text{O} \rightarrow \text{HNO}_3$  (d)  $(\text{NH}_4)_2\text{SO}_4 + \text{KOH} \rightarrow \text{NH}_3 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
26. The valency of nitrogen atom in nitrite radical is  
(a) 2 (b) 3 (c) 4 (d) 1
27. The number of hydrogen atoms present in 1 mL of water at  $4^\circ\text{C}$  having density 1.0 g/mL is  
(a)  $2.68 \times 10^{19}$  (b)  $5.36 \times 10^{19}$  (c)  $8.9 \times 10^{18}$  (d)  $6.69 \times 10^{22}$
28. Which of the following is not a transition metal?  
(a) Fe (b) Au (c) Pt (d) Sn
29.  $\text{SO}_2$  will react with water to give  
(a)  $\text{H}_2\text{SO}_4$  (b)  $\text{H}_2\text{SO}_3$  (c)  $\text{SO}_3 + \text{H}_2$  (d) S +  $\text{H}_2\text{O}$
30. Which is a liquid at room temperature?  
(a)  $\text{Br}_2$  (b)  $\text{Cl}_2$  (c)  $\text{P}_4$  (d) graphite(C)

### PHYSICS SECTION

31. An electron starting from rest and covering a distance of 45 cm strikes a television screen with a velocity of  $3 \times 10^6$  m/s. Its average acceleration is  
(a)  $1.0 \times 10^{14}$  m/s<sup>2</sup> (b)  $1.0 \times 10^{13}$  m/s<sup>2</sup> (c)  $2.0 \times 10^{13}$  m/s<sup>2</sup> (d)  $2.0 \times 10^{14}$  m/s<sup>2</sup>
32. A particle is projected vertically upwards with an initial velocity of 40 m/s. The displacement of the particle in 6 seconds is (assume  $g = 10$  m/s<sup>2</sup>)  
(a) 60 m (b) 100 m (c) 20 m (d) 40 m
33. An insect moves along a circular path of radius 10 cm with a constant speed as shown in the figure. The insect takes 1 minute to move from A to B along the circular path. The magnitude of displacement of the



insect is

- (a) 31.4 cm                      (b) 10 cm                      (c) 62.8 cm                      (d) 20 cm
34. A particle moves with a uniform velocity. Which of the following statements is true ?  
(a) it must be at rest                      (b) it moves along curved path                      (c) it moves along a circle  
(d) it moves along a straight line
35. A 2 Kg ball is thrown vertically upwards with a speed of 5 m/s. What is the increase in its potential energy ?  
(a) 100 J                      (b) 125 J                      (c) 250 J                      (d) 25 J
36. Two bullets are fired simultaneously horizontally and with different speeds from the same height. Which bullet will hit the ground first ?  
(a) the faster one                      (b) the slower one                      (c) both will reach simultaneously  
(d) depends on the masses
37. The velocity of a particle is zero at  $t = 0$ . Which of the following statements is not correct ?  
(a) the acceleration at  $t = 0$  must be zero                      (b) the acceleration at  $t = 0$  may be zero  
(c) if the acceleration is zero from  $t = 0$  to  $t = 10$  sec, the speed is also zero in this interval  
(d) if the speed is zero from  $t = 0$  to  $t = 10$  sec, the acceleration is also zero in this interval
38. If a body is not accelerated  
(a) no force acts on it                      (b) no unbalanced force acts on it  
(c) the resultant force is not zero                      (d) a single force acts on it
39. Two bodies of unequal masses are dropped from a cliff. At any instant, they have equal  
(a) momentum                      (b) acceleration                      (c) kinetic energy                      (d) potential energy
40. A particle is moving on a circle with uniform speed, its motion is  
(a) periodic and simple harmonic                      (b) periodic but not simple harmonic  
(c) aperiodic                      (d) none of these
41. While walking on ice, one should take small steps to avoid slipping. This is because, smaller steps ensure  
(a) larger friction                      (b) smaller friction                      (c) larger normal force                      (d) smaller normal force
42. A liquid of mass 'm' having specific heat 'c' at temperature T and another liquid of mass 'm/2' having specific heat '2c' at temperature 2T are mixed with each other. Then the resulting temperature of the mixture is:  
(a)  $2/3 T$                       (b)  $8/5 T$                       (c)  $3/5 T$                       (d)  $3/2 T$
43. Acceleration due to gravity decreases as we go up from the surface of earth. What will happen to acceleration due to gravity when one goes below the surface of earth ?  
(a) increases                      (b) decreases                      (c) decreases then increases                      (d) remains constant
44. When water is heated from  $0^{\circ}\text{C}$  to  $10^{\circ}\text{C}$ , its volume  
(a) increases                      (b) decreases                      (c) first increases then decreases  
(d) first decreases then increases
45. How much heat is required to convert 1g of ice at  $-10^{\circ}\text{C}$  to steam at  $100^{\circ}\text{C}$  ? Specific heat of ice =  $0.5 \text{ cal/g}^{\circ}\text{C}$ , Specific heat of water =  $1 \text{ cal/g}^{\circ}\text{C}$ , Latent heat of fusion of ice =  $80 \text{ cal/g}$ , Latent heat of vaporisation of water =  $540 \text{ cal/g}$   
(a) 185 cal                      (b) 725 cal                      (c) 105 cal                      (d) 645 cal
46. When ice is converted into water  
(a) heat is absorbed                      (b) temperature increases                      (c) temperature decreases  
(d) heat is released
47. If at a place the speed of sound wave of frequency 300 Hz is V, the speed of another wave of frequency 150 Hz at the same place and same temperature will be  
(a) V                      (b)  $V/2$                       (c) 2V                      (d) 4V
48. When a body moves with a constant speed along a circle,  
(a) its velocity remains constant                      (b) no force acts on it                      (c) no work is done on it  
(d) no acceleration is produced in it



49. If a constant force acts on a body initially kept at rest, the distance moved by the body in time 't' is proportional to  
 (a)  $t^4$  (b)  $t^3$  (c)  $t^2$  (d)  $t$
50. The mass of a body is 120 Kg and its density is  $600 \text{ Kg/m}^3$ . The body floats on water. What mass should be added to the body so that it just sinks in water ?  
 (a) 120 Kg (b) 100 Kg (c) 60 Kg (d) 80 Kg
51. A particle moving in a straight line has velocity and displacement equation as  $v = 4\sqrt{1+S}$  where 'V' is in m/s and 'S' is in m. The initial velocity of the particle is  
 (a) 4 m/s (b) 16 m/s (c) 2 m/s (d) zero
52. A truck and a car moving with the same kinetic energy are brought to rest by the application of break which provide equal retarding force. Which of them will come to rest in a shorter distance ?  
 (a) the truck (b) the car  
 (c) both will travel same distance before coming to rest  
 (d) the distance of travel will depend on the power of the vehicle.
53. Which of the following properties of a wave does not change with the change in the medium?  
 (a) frequency (b) wavelength (c) velocity (d) amplitude
54. A copper disc with a central hole is heated. The diameter of the hole  
 (a) increases (b) decreases (c) first decreases then increases  
 (d) remains constant
55. A light and a heavy body have equal kinetic energy. Which one has a greater momentum ?  
 (a) the light body (b) the heavy body (c) both have equal momenta  
 (d) it is not possible to say anything without additional information
56. What is the percentage change in kinetic energy of a body if its momentum is increased by 50% ?  
 (a) 50 (b) 100 (c) 125 (d) 200
57. A wave source produces 10 crests and 10 troughs in 0.1 sec. What is the frequency of the wave ?  
 (a) 50 Hz (b) 200 Hz (c) 10 Hz (d) 100 Hz
58. The time period of a simple pendulum is doubled when  
 (a) its length is doubled (b) its length is halved (c) the length is made four times  
 (d) the mass of the bob is doubled
59. When a body falls from an aeroplane there is increase in its  
 (a) acceleration (b) potential energy (c) kinetic energy (d) rest mass
60. A body weighs 8 g when placed in one pan and 18 g when placed on the other pan of a faulty balance. If the beam is horizontal when both pans are empty, the true weight of the body is  
 (a) 13 g (b) 12 g (c) 15.5 g (d) 15 g

**ANSWER(UTSE-2009)**

1. a 2.b 3.b 4.c 5.a 6.b 7.d 8.d 9.c 10.d

11.a 12.d 13.c 14.d 15.a 16.c 17.b 18.c 19.b 20.c

21.d 22.d 23.a 24.b 25.a 26.b 27. d 28.d 29.b 30.a

31.b 32.a 33.d 34.d 35.d 36.c 37.a 38.b 39.b 40.b

41.b 42.d 43.b 44.d 45.b 46.a 47.a 48.c 49.c 50.d

51.a 52.c 53.a 54.a 55.b 56.c 57.d 58.c 59.c 60.b