



INTSO EDUCATION

SCIENCE TALENT SEARCH OLYMPIAD (STSO) 2015-16

STAGE - 1

TIME : 60 min.

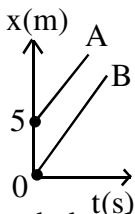
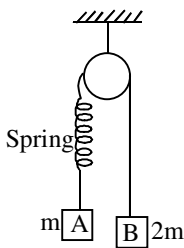
CLASS : IX

Max. Marks : 50

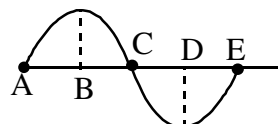
Instructions:

- ⇒ Fill the OMR sheet completely and carefully.
- ⇒ Each question carries one mark and has only one correct answer. No negative marks
- ⇒ The question paper contains 50 questions to be answered in 60 minutes.

PHYSICS

1. A particle starts from rest with uniform acceleration 'a'. Its velocity after n seconds is 'V'. The displacement of the body in the last two seconds is []
 - 1) $\frac{2V(n-1)}{n}$
 - 2) $\frac{V(n-1)}{n}$
 - 3) $\frac{V(n+1)}{n}$
 - 4) $\frac{2V(n+1)}{n}$
2. A stone is dropped into a well in which the level of water is 'h' depth below the top of the well. If 'v' is velocity of sound, the time 'T' after which the splash is heard is given by []
 - 1) $T = \frac{2h}{v}$
 - 2) $T = \sqrt{\frac{2h}{g}} + \frac{h}{v}$
 - 3) $T = \sqrt{\frac{2h}{g}} + \frac{h}{2v}$
 - 4) $T = \sqrt{\frac{h}{2g}} + \frac{2h}{v}$
3. A body is projected upwards with a velocity u. It passes through a certain point above the ground after t_1 . The time after which the body passes through the same point during the return journey is []
 - 1) $\left(\frac{u}{g} - t_1^2\right)$
 - 2) $2\left(\frac{u}{g} - t_1\right)$
 - 3) $3\left(\frac{u^2}{g} - t_1\right)$
 - 4) $3\left(\frac{u^2}{g^2} - t_1\right)$
4. Figure shows position - time graph of two cars A and B []
 - 1) Car A is faster than Car B
 - 2) Car B is faster than Car A
 - 3) Both Cars are moving with same velocity
 - 4) Both Cars are at rest
5. Two blocks A and B of masses m and 2m respectively are held at rest such that the spring is in natural length. Find out the acceleration of both the blocks just after release []
 - 1) $g \downarrow, g \downarrow$
 - 2) $\frac{g}{3} \downarrow, \frac{g}{3} \uparrow$
 - 3) 0,0
 - 4) $g \downarrow, 0 \uparrow$
6. In which of the following cases the net force is not zero ? []
 - 1) A kite skillfully held stationary in the sky
 - 2) A ball freely falling from a height with uniform velocity
 - 3) An aeroplane rising upwards at an angle of 45° with the horizontal with a constant speed
 - 4) A cork floating on the surface of water

7. A truck carrying a sand is moving on a smooth horizontal road with a uniform speed 'u'. If a mass ' Δm ' of sand leaks in time Δt from the bottom of the truck, the force needed to keep the truck moving at its uniform speed u is given by []
- 1) $\frac{\Delta mu}{\Delta t}$ 2) $\frac{\Delta mu}{2\Delta t}$ 3) $\frac{\Delta mu^2}{\Delta t}$ 4) 0
8. A machine gun fires 10 bullets per second, each of mass 10g, the speed of each bullet is 20cm / s, then force of recoil is []
- 1) 200 dyne 2) 2000 dyne 3) 20 dyne 4) 10 dyne
9. Two particles are placed at some distance. If the mass of each of the two particles is doubled, keeping the distance between them unchanged, the value of gravitational force between them will be []
- 1) 1 / 4 times 2) 4 times 3) $\frac{1}{2}$ times 4) unchanged
10. Imagine a planet having the same density as that of earth but radius is three times the radius of the earth. If acceleration due to gravity on the surface of the earth is 'g' and that of the other planet is g^1 then []
- 1) $g^1 = g / 9$ 2) $g^1 = 9g$ 3) $g^1 = \frac{g}{27}$ 4) $g^1 = 3g$
11. A solid of density ρ_s is floating on a liquid of density $\rho_l (> \rho_s)$. The fraction of volume of solid above the liquid surface is []
- 1) $\frac{\rho_s}{\rho_l}$ 2) $\frac{\rho_s}{\rho_l} - 1$ 3) $1 - \frac{\rho_s}{\rho_l}$ 4) $\frac{\rho_l}{\rho_s}$
12. A block of ice is floating in a liquid of specific gravity 1.2 in a beaker. When the ice melts completely, the level of water []
- 1) rises 2) goes down
3) remains same 4) first increases and then goes down
13. A body moving at 2 m / s can be stopped over a distance X. If its kinetic energy is doubled, how long will it go before coming to rest, if the retarding force remains unchanged []
- 1) X 2) 2 X 3) 4 X 4) 8 X
14. Calculate the work done in raising a stone of mass 5 kg and specific gravity 2 lying at the bed of a lake through a height of 5 metre ($g = 10 \text{ m / s}^2$) []
- 1) 125 J 2) 25 J 3) 100 J 4) 50 J
15. A 12 hp motor has to be operated 8 hour / day. How much will it cost at the rate of 50 paisa / kWh in 10 days []
- 1) ₹ 350 2) ₹ 358 3) ₹ 375 4) ₹ 397
16. Velocity of sound in air []
- I. Increase with temperature II. decrease with temperature
III. Increase with pressure IV. is independent of pressure
- 1) only I and II are true 2) only I and III are true
3) only II and III are true 4) only I and IV are true
17. In the sound wave produced by a vibrating tuning fork shown in the diagram, half the wavelength is represented by []
- 1) AB 2) BD
3) DE 4) AE



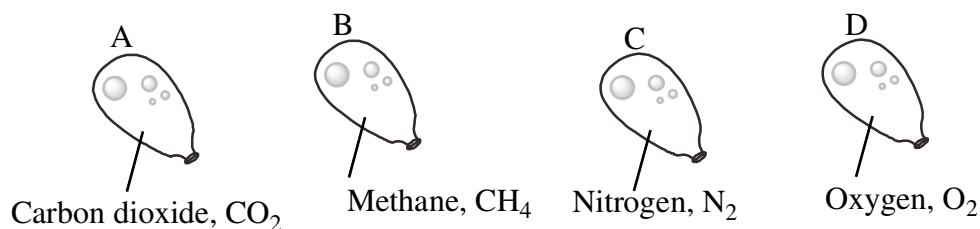
CHEMISTRY

18. While heating ice in a beaker with a thermometer suspended in it, a student recorded the following observations []

Time in min	0	1	2	3	4	5	6	7	8	10	15	20	25	30	35
Temp(in °C)	-3	-1	0	0	5	8	12	15	19	22	30	50	73	100	100

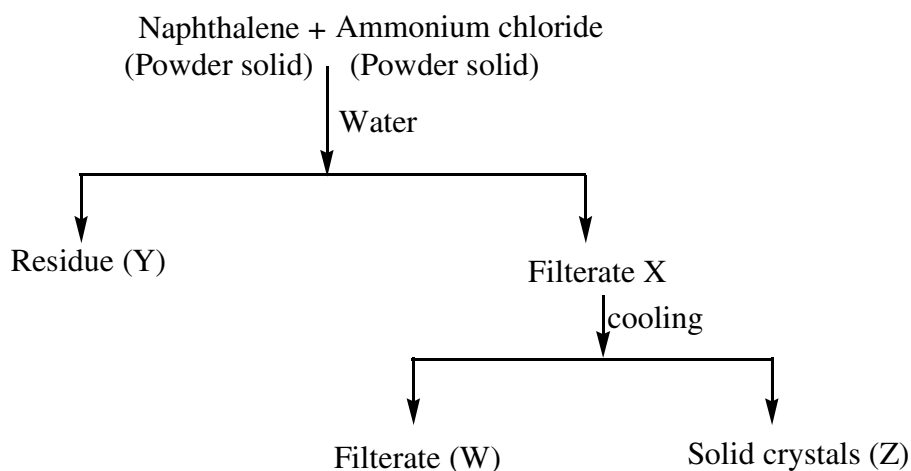
What is the name of the process for the change observed in between 2 min to 3 min

- 1) Fusion 2) Boiling 3) Evaporation 4) Condensation
19. An inflated balloon goes down because gas molecules can diffuse through the rubber. Four balloons are filled with different gases at the same temperature and pressure. Which balloon would go down most quickly ? []

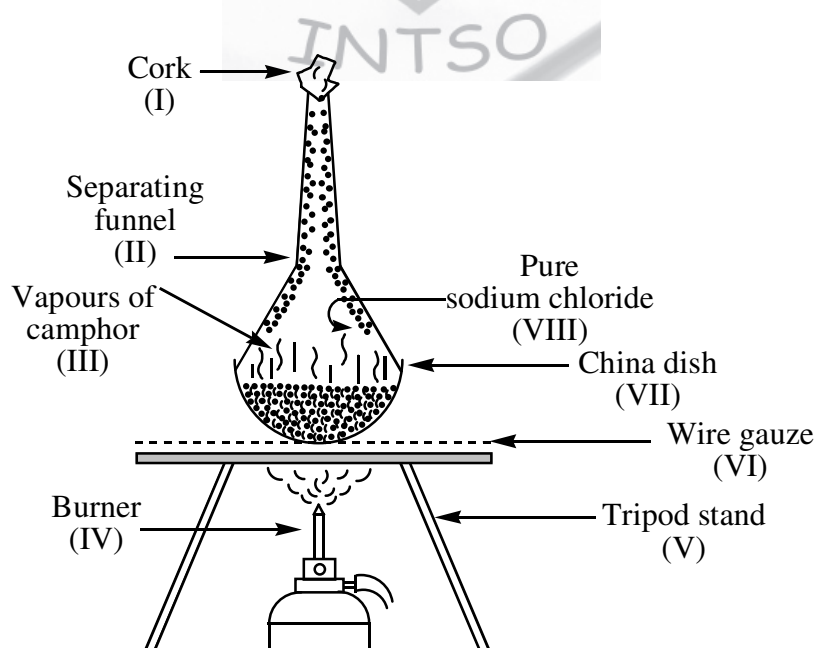


- 1) A 2) B 3) C 4) D
20. State of a substance can be determined by []
 1) Temperature 2) Pressure 3) Both 1 and 2 4) None of these
21. Arun has prepared 0.01% (by mass) solution of NaCl in water. Which of the following correctly represents the composition of the solutions ? []
 1) 1.00 g of NaCl + 100 g of water 2) 0.01 g of NaCl + 100 g of water
 3) 0.01 g of NaCl + 99.99 g of water 4) 0.10 g of NaCl + 99.90 g of water
22. Melting point of 3 solids X, Y and Z are 298 K, 314 K and 398 K respectively. The correct increasing order of interparticle forces of attractions of X, Y and Z are []
 1) Z > Y > X 2) Z < Y < X 3) Y < X < Z 4) X < Y < Z
23. During boiling, temperature of water []
 1) Increases 2) Decreases 3) Remains constant d) All of these
24. What is the difference between two temperatures X°K and (X+273)° K []
 a) 273 K b) 0°C c) 273°C
 1) only a 2) both a and b 3) only b 4) both a and c

25.



- 1) A mixture of naphthalene and ammonium chloride can also be separated by sublimation process []
- 2) Filtrate X consists of ammonium chloride
- 3) Naphthalene is soluble in water
- 4) Ammonium chloride is insoluble in water
26. A change in the physical state of a substance can be brought about []
- 1) Only when energy is given to the system
- 2) Only when energy is taken out from the system
- 3) When energy is either given to, or taken out from the system
- 4) Without any energy change
27. X, Y and Z are three metallic elements. Formula of the compound formed by X and Y is X_2Y_1 . Formula of the compound formed by Y and Z is Y_3Z_2 . Find out the ratio of number of valence electrons in 6 moles of X, 3 moles of Y and 2 moles of Z []
- 1) 1 : 1 : 1 2) 1 : 2 : 3 3) 3 : 2 : 1 4) 1 : 3 : 2
28. In balancing of chemical equation $2H_2 + O_2 \rightarrow H_2O$, we are writing $2H_2O$ but not as $(H_2O)_2$. This is according to []
- 1) Law of conservation of mass 2) Law of definite proportions
- 3) Law of multiple proportions 4) Avogadro's law
29. If 1 gram of sulphur dioxide gas contains 'x' molecules, then the number of molecules present in 1 gram of oxygen gas will be []
- 1) x 2) $\frac{x}{2}$ 3) 2x 4) can not be calculated
30. The formula of sulphate of an element 'X' is $X_2(SO_4)_3$. The formula of nitride of element X will be []
- 1) X_2N 2) XN_2 3) X_2N_3 4) XN
31. A student has done the labelling for the experimental set-up for separating a mixture of sodium chloride and camphor as indicated in the diagram given here.



- The parts/substances that have been incorrectly labelled are : []
- 1) I, III, VIII 2) II, III, VII 3) I, II, VIII 4) III, V, VII

32. Ramu extracted sucrose from sugarcane and kept in a bottle 'A'. Krishna extracted sucrose from beet root and kept in another bottle 'B'. Latha mix the products of two bottles together. Now the substance after mixing is []
- | | |
|------------------------|----------------|
| i) a pure substance | ii) a mixture |
| iii) true solution | iv) a compound |
| v) an impure substance | |
- 1) only ii, iii are correct
2) only i and iv are correct
3) only ii, iii and iv are correct
4) only ii and v are correct

33. When an electric current is passed through 180g of a liquid (whose molecular mass is 18 amu), then gas Y is liberated at cathode and gas Z is liberated at anode. X is the ratio of mass of gas Y to mass of the gas Z. W is the ratio of volume of gas Y to volume of gas Z, then find the ratio of X to W []
- 1) 1 : 16
2) 1 : 8
3) 2 : 1
4) 1 : 4

34. The mass of one atom of an element is 2.0×10^{-23} g then, find the valency of that element []
- 1) 3
2) 1
3) 2
4) 4

BIOLOGY

35. According to cell theory []
- | | |
|---|--|
| 1) Cells originate from abiotic materials | 2) Cells originate from pre existing cells |
| 3) Cells can not divide | 4) Cells formed by regeneration of old cells |

36. Match the following []
- | | |
|--------------------|--|
| a) Lysosomes | I) cell division |
| b) Golgi complex | II) Semipermeability |
| c) Centrosome | III) Intracellular & Extracellular digestion |
| d) Plasma membrane | IV) Protein synthesis |
| | V) Protein secretion |
- | | A | B | C | D | | A | B | C | D |
|----|-----|---|-----|----|----|---|-----|-----|----|
| 1) | IV | V | III | II | 2) | V | III | IV | II |
| 3) | III | V | I | II | 4) | V | IV | III | I |

37. Eukaryotes possess 80S ribosomes. Larger sub unit of 80s ribosomes posses the following r- RNA []
- 1) 18S
2) 28s+5.8s+5s
3) 16s
4) 23s +5s

38. Fluid mosaic model of cell membrane is represented by []
- 1) A lipid bilayer with embedded proteins
2) Only lipid bilayer
3) A lipid bilayer with proteins on outer surface only
4) A protein bilayer with lipids on both the surfaces

39. **Assertion (A)** : Janus green B is a vital stain used for identification of mitochondria []
Reason (R) : Janus green B is oxidised by an enzyme cytochrome a_2 present in mitochondria
- 1) Both A and R are correct, and R is the correct explanation of A.
2) Both A and R are correct, but R is not the correct explanation of A.
3) A is correct and R is incorrect.
4) A is incorrect and R is correct.

40. Identify the tissue with thin cell walls, prominent nucleus and dense cytoplasm []
- 1) Vascular tissue
2) Meristematic tissue
3) Epithelial tissue
4) Sclerenchyma

41. **Statement (I)**: The activity of sieve tubes is controlled by companion cells []
Statement (II): Sieve tubes are enucleated
- 1) Statement I is true
2) Statement II is true
3) Both statements are true
4) Both statements are false

42. Which of the following statements are correct .
 I) Outer most coverings of plant body consists of dermal tissue
 II) If any plant part is damaged it is repaired by ground tissue
 III) Water & Food materials are transported by vascular tissues
 Correct statements are []
 1) I & III 2) II & III 3) I & II 4) I,II, & III

43. Identify the tissue []
 i) With dead cells ii) With lignin deposition
 iii) With less inter cellular spaces
 1) Parenchyma 2) Sclerenchyma 3) Collenchyma 4) Aerenchyma

44. Observe the following table []

Components of xylem	Function
1) Trachieds & Vessels	P
2) Parenchyma	Q
3) Fibres	R

Identify the functions of P and R

- 1) P – support , R – Transport of water & minerals
 2) P– Transport of water & minerals R – Storage of Food
 3) P– Transport of water & minerals , R– Support
 4) P– Storage of Food , R– Transport of water & minerals

45. Match the following []

Epithelium

- A. Squamous Epithelium
 B. Stratified Epithelium
 C. Cuboidal Epithelium
 D. Columnar Epithelium

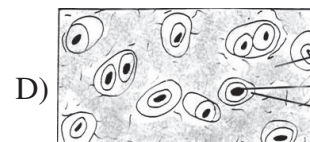
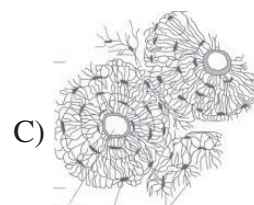
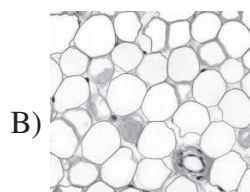
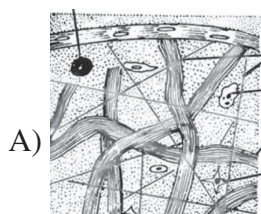
Location

- I. Microvilli of small intestine
 II. Kidney tubules
 III. Lung Alveoli
 IV. Skin
 V. Wall of Trachea

	A	B	C	D		A	B	C	D
1)	III	V	I	II	2)	II	III	I	V
3)	III	IV	II	I	4)	V	IV	I	II

46. Identify the Universal donor and Universal recipient blood groups []
 1) O^{+ve},AB^{+ve} 2) O^{-ve},AB^{+ve} 3) O^{-ve},AB^{-ve} 4) O^{+ve},AB^{-ve}

47. Sivani observed the following slides of animal tissues under microscope. Which of the following is correct regarding her identification []



	Slide	Tissue	Location	Function
1)	D	Squamous epithelium	Joints	Packaging of tissues
2)	C	Areolar	Ribs	Repair of tissues
3)	B	Adipose tissue	Below the Skin	Acts as insulator
4)	A	Bone	Skeletal system	Support for the body

48. Identify the muscle located at heart []
1) Branched, involuntary, striated 2) Unbranched, voluntary, non – striated
3) Branched , Voluntary, non – striated 4) Unbranched , involuntary, striated
49. Anti - coagulant present in the blood is []
1) Histamine 2) Heparin 3) Prostaglandin 4) Albumin
50. Which of the following is incorrect []
1) Neurons have dendrite, Axon, cell body
2) Axons of some neurons are covered with myelin sheath
3) Neurons with myelinated sheath can carry nerve impulses very fast compared non - myelinated neurons
4) Neurons with out myelin sheath can carry nerve impulses very fast compared to myelinated neurons.

