



INTSO EDUCATION

SCIENCE TALENT SEARCH OLYMPIAD (STSO) 2015-16

STAGE - 1

TIME : 60 min.

CLASS : X

Max. Marks : 50

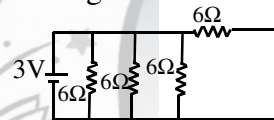
Instructions:

- ⇒ 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.

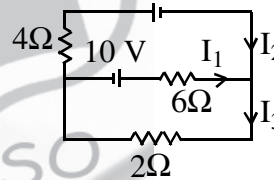
PHYSICS

- If 0.6 mol of electrons flow through a wire in 50 minutes. Find the magnitude of the current pass through the wire. (Here, Avogadro number = 6×10^{23} per mol) []
 1) 21.2 A 2) 19.2 A 3) 17.2A 4) 12.2 A
- 100 J of work is done to move a charge of 5 C from a point where potential is -20 V to a place where potential is V. The value of 'V' is []
 1) 2 volt 2) 10 volt 3) 50 volt 4) zero

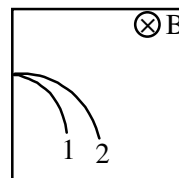
- Find the current supplied by the battery in the following circuit []
 1) 2A 2) 3A
 2) 1A 4) 1.5 A



- For the circuit shown as below, Let I_1 , I_2 and I_3 are currents marked in respective branches, then []
 1) $I_1 = 2A$, $I_2 = -3A$, $I_3 = -1A$
 2) $I_1 = -2A$, $I_2 = 3A$, $I_3 = -1A$
 3) $I_1 = 2A$, $I_2 = -3A$, $I_3 = 1A$
 4) $I_1 = -2A$, $I_2 = 3A$, $I_3 = 1A$

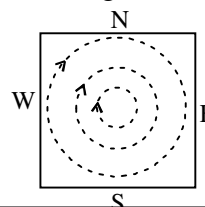


- Two charged particles having charges q_1 and q_2 masses m_1 and m_2 are projected with same velocity in a region of a uniform magnetic field. They follow the trajectory as shown in the figure below. From this, we can conclude that []
 1) $q_1 > q_2$ 2) $q_1 < q_2$
 3) $m_1 < m_2$ 4) $\frac{m_1}{q_1} < \frac{m_2}{q_2}$



- A straight horizontal stretched copper wire carries a current $i = 30$ A. The linear mass density of the wire is 45 g/m^3 . What is the magnitude of the magnetic field needed to float the wire, that is to be balance its weight ? []
 1) 147 G 2) 441 G 3) 14.7 G 4) 0 G

- A metal sheet is placed in a variable magnetic field which is increasing from zero to maximum. Induced current flows in the directions as shown in the figure. The direction of magnetic field will be []
 1) normal to the paper, in inwards
 2) normal to the paper, outwards
 3) from East to West
 4) from North to South

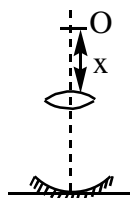


8. An aeroplane having a distance of 50 m between the edges of its wings is flying horizontally with a speed of 360 km/h. If the vertical component of earth's magnetic field is 4×10^{-4} wb / m², then the induced emf between the edges of its wings will be []
- 1) 2 mV 2) 2 V 3) 0.2 V 4) 20 V

9. Which of the following particles will describes the smallest circle when projected with the same velocity perpendicular to a magnetic field ? []
- 1) electron 2) proton 3) He⁺ 4) Li⁺

10. A convex lens of focal length 40 cm is held coaxially 12 cm above a mirror of focal length 18 cm. An object held 'X' cm above the lens gives rise to an image coincident with it, then X is equal to

- 1) 12 cm
2) 15 cm
3) 18 cm
4) 30 cm



11. A boy of height 1 m stands in front of a convex mirror. If is distance from the mirror is equal to its focal length, the height of his image is []
- 1) 0.25 m 2) 0.33 m 3) 0.5 m 4) 0.67 m

12. A convex mirror of focal length 'f' forms an image which is $\frac{1}{n}$ times the object. The distance of the object from the mirror is []

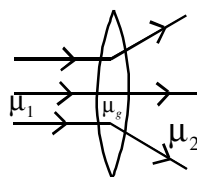
- 1) $(n - 1) f$ 2) $\left(\frac{n-1}{n}\right) f$ 3) $\left(\frac{n+1}{n}\right) f$ 4) $(n + 1) f$

13. A fish looking up through the water sees the outside world contained in a circular horizon. If the refractive index of water is $\frac{4}{3}$ and the fish is 12 cm below the surface, the radius of this circle in cm is []

- 1) $36\sqrt{5}$ 2) $4\sqrt{5}$ 3) $36\sqrt{7}$ 4) $\frac{36}{\sqrt{7}}$

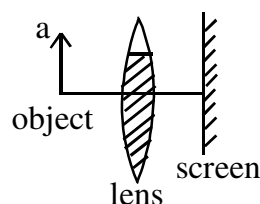
14. The ray diagram could be correct

- 1) If $\mu_1 = \mu_2 = \mu_g$
2) If $\mu_1 = \mu_2$ and $\mu_1 < \mu_g$
3) If $\mu_1 = \mu_2$ and $\mu_1 > \mu_g$
4) under no circumstances



15. An object of size 'a' is placed in front of the converging lens and its image is obtained on the screen. Now $\frac{3}{4}$ th size of the lens is covered as shown by the shaded portion []

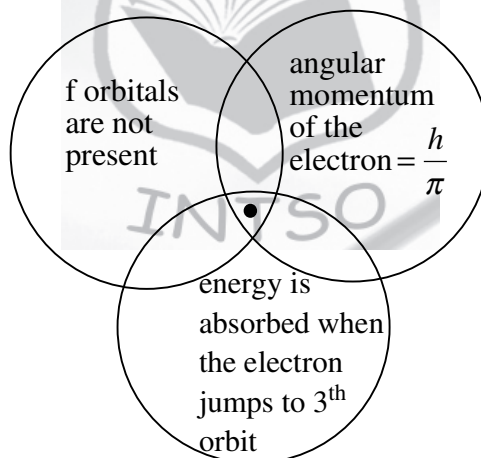
- 1) Magnification of Image reduces to $\frac{3}{4}$
2) Magnification of Image reduces to $\frac{1}{4}$
3) Magnification and brightness both become $\frac{1}{4}$
4) Magnification remains same but bright ness of image becomes $\frac{1}{4}$



16. An eye specialist prescribes spectacles having a combination of convex lens of focal length 40 cm in contact with a convex lens of focal 25 cm, the power of this lens combination in diopters is
 1) 1.5 2) - 1.5 3) 6.67 4) - 6.67 []
17. The sky would appear red instead of blue if []
 1) Atmospheric particles scatter blue light more than the red light
 2) Atmospheric particles scatter all colours equally
 3) Atmospheric particles scatter red light more than the blue light
 4) The sun was much hotter

CHEMISTRY

18. If your mother is suffering from acidity after over eating of spicy food, you will give which of the following aqueous solution as the remedy . []
 1) Soda water 2) Lemon juice
 3) Sodium hydroxide solution 4) Baking soda solution
19. A molecule of the compound 'P' contains two hydrogen atoms, one carbon atom and 3 oxygen atoms. A molecule of compound 'Q' contains one potassium atom, one oxygen atom and one hydrogen atom.
 Anion of 'P' + cation of Q → compound 'R'. From this data, select the incorrect statement.
 1) Aqueous solution of 'R' changes the methyl orange indicator to yellow. []
 2) 'R' is a basic salt
 3) 'R' is an example for alkali
 4) All of these are incorrect
20. Study the venn diagram. Centre point (.) represents which of the following. []



- 1) Maximum number of electrons that can be present in that orbit is 32.
 2) It represents K shell
 3) Only s and p subshells can be present in that orbit.
 4) Energy is released when the electron jumps from this orbit to fourth orbit.
21. Which of the following compounds can be obtained as a result of neutralisation reaction.
 1) MgO 2) K₂SO₄ 3) HNO₃ 4) NH₄OH []

22.

Oxide	HCl	NaOH
CO ₂	No reaction	Na ₂ CO ₃ +H ₂ O
MgO	MgCl ₂ +H ₂ O	No reaction
PbO	PbCl ₂ +H ₂ O	Na ₂ PbO ₂ +H ₂ O

Some statements were given below based on the above table

I) CO_2 is a basic oxide

II) MgO is a basic oxide

III) PbO is amphoteric oxide

IV) CO_2 is a neutral oxide

Select the correct set from the following. []

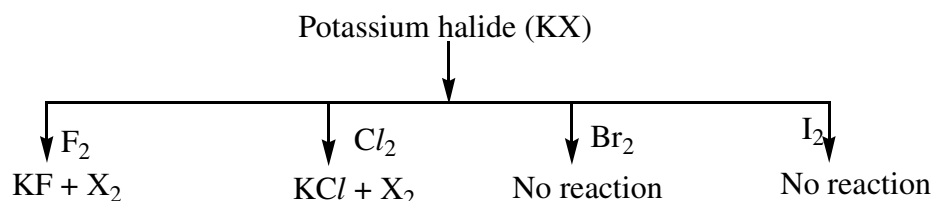
1) Only II and III are correct

2) I, II and III are correct

3) Only II and IV are correct

4) I, II and III are correct

23.



Here in KX, the element 'X' represents []

1) F

2) Cl

3) Br

d) I

24.

Aqueous solution of HCl contains

I) H^+ ions

II) Cl^-

III) HCl molecules

Pick up the correct set []

1) I, II and III are correct

2) II and III are correct

3) Only I and II are correct

4) Only III is correct

25.

In the combustion of carbon, the substance which undergoes reduction is []

1) Carbon

2) Oxygen

3) Carbon dioxide

4) None of these

26.

Ratio of the capacity to accommodate electrons of subshell with $n = 4, l = 3$ and the capacity of subshell with $n = 5, l = 1$ []

1) 3 : 7

2) 1 : 7

3) 7 : 5

4) 7 : 3

27.

Which of the following configurations obey Pauli's exclusion principle []



28.

Column - I

A) Dissolution of CO_2 in water

B) Electrolysis of water

C) Antacid tablet in the stomach

D) Sodium metal present in water

Correct match among the following is []

- | | | | | |
|----|----------|----------|----------|----------|
| | A | B | C | D |
| 1) | p | s | r | q |
| 3) | r | s | p | q |

Column - II

p) Chemical displacement reaction

q) Chemical double displacement reaction

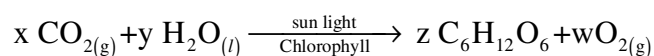
r) Chemical combination reaction

s) Chemical decomposition reaction

- | | | | | |
|----|----------|----------|----------|----------|
| | A | B | C | D |
| 2) | r | s | q | p |
| 4) | q | r | s | p |

29..

Reaction that takes place in photosynthesis process is given below []



If the value of 'x' is doubled, then the ratio between z and y is

1) 1 : 6

2) 1 : 12

3) 1 : 1

4) 12 : 1

30. Red cabbage extract + Soap solution \longrightarrow colour X
From this, select the correct statement []
- 1) Colour 'X' is same as the colour produced by solution of $P^H = 7$ with universal indicator (at 25°C)
 - 2) Formation of colour 'X' indicates that soap solution is basic in nature
 - 3) Red cabbage extract is a natural indicator
 - 4) All the these
31. P^H of milk is 6.8. What happens when lemon juice is added to boiling milk. []
- a) P^H becomes greater than 6.8
 - b) milk will be curdled
 - c) no change takes place.
 - d) neutralisation of milk takes place.
- Choose the correct set from the following
- 1) both a & b are correct
 - 2) both b & d are correct
 - 3) only b is correct
 - 4) a, b & d are correct
32. $2\text{KClO}_3 \xrightarrow[\Delta]{\text{MnO}_2} \text{A} + \text{B} \uparrow$
 $\text{A}_{(aq)} + \text{AgNO}_3(aq) \rightarrow \text{C} \downarrow + \text{D}_{(aq)}$
select the correct statement []
- 1) 6 moles of 'B' will be formed on heating 4 moles of KClO_3 .
 - 2) Second reaction is a double displacement reaction
 - 3) 'B' does not burn itself
 - 4) All are correct
33. Which of the following is incorrect []
- 1) Element, element combination reaction is always redox reaction
 - 2) All the redox reactions are displacement reactions
 - 3) Neutralisation reactions are not redox reactions
 - 4) All the decomposition reactions are not redox reactions.
34. The four quantum numbers of last electron in the element X is (only one electron is present in this subshell) $n = 3, l = 2, m = -2, S = +\frac{1}{2}$ []
What is the outermost shell present in the element 'Y' which is the predecessor of 'X'.
- 1) K shell
 - 2) L shell
 - 3) M shell
 - 4) N shell

BIOLOGY

35. Which of the following is incorrect pair []
- 1) Thiamine : Beri beri
 - 2) Retinol : Xerophthalmia
 - 3) Biotin : Nerve disorders
 - 4) Phylioquinone : Fertility disorders.
36. Read the following statements []
- I) Ptyalin helps in break down of complex carbohydrates in to simple ones.
 - II) Enzymes present in the bile juice helps in the digestion of fats.
 - III) Pepsin and trypsin enzymes digest the proteins.
 - IV) Carbohydrates digestion starts in the mouth, continues in stomach and finally completes in small intestine
- Correct statements are
- 1) I & II
 - 2) III & IV
 - 3) I & III
 - 4) All are true
37. Light reaction of photosynthesis occurs is []
- 1) Grana of chloroplast
 - 2) Stroma of chloroplast
 - 3) Mitochondria
 - 4) Cytoplasm.
38. Which of the following is the source of oxygen, released during photosynthesis []
- 1) Water
 - 2) Carbondioxide
 - 3) Chlorophyll
 - 4) All the above

39. Following are the ways , for the transport of CO_2 []
 i) Dissolved in blood plasma
 ii) combining with haemoglobin as carboxyhaemoglobin iii) As bicarbonate
 iv) Combines with haemoglobin as carbamino haemoglobin
 Which of the above are correct
 1) i, ii & iv 2) iii & ii 3) i, iii & iv 4) i, ii, iii & iv
40. The amount of air that remains in lungs after complete expiration is []
 1) 5, 800 ml 2) 1200 ml 3) 500 ml 4) 1400 ml
41. What will be the pO_2 and pCO_2 in the atmosphere air as compared to those in the alveolar air []
 1) pO_2 lesser, pCO_2 higher 2) pO_2 lesser, pCO_2 lesser
 3) pO_2 higher, pCO_2 lesser 4) pO_2 higher, pCO_2 higher
42. I - Lactate II - ATP III - Pyruvate IV - phospho Glyceric acid (PGA).
 Which of the products mentioned above are produced both in aerobic respiration and anaerobic respiration in humans. []
 1) I & IV 2) II & III 3) I, II & III 4) I, II, III & IV
43. Which of the following is incorrect regarding lymphatic system. []
 i) Lymph is the vital link between blood and tissues
 ii) It is a parallel system to arterial system
 iii) Lymph is a substance that contains blood with solid particles.
 iv) Lymph vessel is are provided with valves
 Incorrect statements from the above .
 1) ii & iii 2) i & iii 3) iii & iv 4) All are true
44. The enzyme which converts prothrombin into thrombin is []
 1) Prothrombinase 2) Thrombokinase 3) Fibrinogen 4) Peptidase
45. An artery can be distinguished from a vein in having []
 1) Lesser lumen 2) Thicker wall 3) No valves 4) All the above
46. Root pressure is maximum when []
 1) Transpiration is high and absorption is very low
 2) Transpiration is very low and absorption is high
 3) Transpiration is very high and absorption is also high
 4) Transpiration and absorption both are low.
47. **Assertion (A)** : Diameter of the efferent arteriole is less than that of afferent arteriole. []
Reason (R) : Narrow outlet of efferent arteriole exerts pressure in the glomerulus.
 1) Both A and R are true and R is the correct explanation of A
 2) Both A and R are true and R is not correct explanation of A
 3) A is correct and R is incorrect 4) A is incorrect and R is correct
48.

	Alkaloid	Plant	Uses
I.	Scopolamine	Datura stramonium	Sedative
II.	Reserpine	Chrysanthemum	Insecticide
III.	Nicotine	Nicotiana tobacum	Antiseptic
IV.	Caffeine	Coffea Arabica	Sedative

 Correct one from the above table is []
 1) I & II 2) I, III & IV 3) only I 4) only IV
49. Flame cells are the excretory organs in []
 1) Starfish 2) Planaria 3) Earthworm 4) Snail
50. Excess salts of calcium, magnesium and iron are excreted by []
 1) stomach 2) small intestine 3) Large intestine 4) Anus