SCIENCE(HINTS & SOLUTON)

SUBJECT CODE : 112

Time allowed : 3 hrs **Maximum Marks : 90**

General Instructions :

(i) Candidates are required to given their answers in their own words as far as practicable.
(ii) Figure in the right hand margin indicate full marks.
(iii) 15 minutes of extra time has been allotted for the candidates to read the questions carefully.
(iv) This question paper is divided into two sections – Section-A and section-B.
(v) In section-A there are 40 object type questions which are compulsory, each carrying 1 mark. Darken the circle with blue/black ball pen against the correct option on OMR Answer Sheet provided to you .
Do not use Whitener/Liquid/Blade/Nail ect. On OMR Sheet: otherwise the result will be invalid.

(vi) In section-B there are 2 short answer types questions. Out of these, eight questions are from Physics seven questions are from Chemistry, and seven question are from Biology. Four question are to be answered from each subject (Physics, Chemistry, Biology). Each question carries 2 marks. Apart from this, there are 6 long Answer type questions. Two questions from Physics, Chemistry and Biology. Long answer type questions from Physics carries 6 marks and from Chemistry and Biology caries 5 marks each. Answer of one from Physics, chemistry and Biology is compulsory.
(vii) Use of any electronic appliances is strictly prohibited.

SECTION – A

1. The chemical formula for bleaching power is :
(A) $Ca(OH)_2$ (B*) $CaOCl_2$ (C) $CaCO_3$ (D) $Ca(HCO_3)_2$

2. Which of the following compounds can be used as a fuel ?
(A*) Ethanol (B) Propanol (C) Ethanoic acid (D) All of these

3. Which among these do not act as an endocrine gland as well as an exocrine gland?
(A*) Pancreas (B) Pituitary gland (C) Ovary (D)Testes

4. Which of the following carbon compound is the most reactive ?
(A) CH_4 (B) C_2H_6 (C*) C_2H_4 (D) C_3H_8

5. The loss of oxygen from a substance during chemical reaction is called :
(A) Oxidation (B*) Reduction (C) Corrosion (D) None of these

6. How many chambers are present in human heart ?
(A) 2 (B) 3 (C*) 4 (D) 5

7. Which is a non-biodegradable waste ?
(A) Tissue paper (B) Peel of banana (C*) Thermocol (D) All of these

8. Which substance changes colour of Red litmus into blue ?
(A) Acid (B*) Base (C) Salt (D) None of these

9. How many bonds are formed between two atoms of hydrogen ?
(A*) Single bond (B) Double bond (C) Triple bond (D) None of these

10. On decreasing the number of resistors from a parallel combination of resistors, the total resistance of the new combination of resistors in parallel -
(A*) Increases (B) Decreases (C) Remains the same (D) None of these

11. The pH value of pure water is :
(A) 6 (B*) 7 (C) 8 (D) 9

12. Which one of the following character is not inheritable ?
(A) Colour of eye (B) Colour of skin (C*) Size of body (D) Nature of hair

13. Which of the following constitutes a food Chain?
(A) Grass, wheat and mango (B*) Grass, goat and human
(C) Goat, cow and elephant (D) Grass, fish and goat

14. Which is not responsible for Ganga's pollution ?
(A*) Fish farming in Ganga (B) Washing of cloths in Ganga
(C) Immersion of unburnt corpse in Ganga (D) Emission of chemical effluents in Ganga

15. Which of the following is unsaturated hydrocarbon ?
(A) CH_4 (B) C_2H_6 (C*) C_2H_4 (D) All of these

16. Which phenomenon of light does the Tyndall effect show?.
(A) Reflection of light (B) Refraction of light (C) Dispersion of light (D*) Scattering of light

17. Bile juice is secreted from -
(A) Pancreas (B*) Liver (C) Small intestine (D) None of these

18. Which colour has the largest wave — length? .
(A*) Red (B) Blue (C) Yellow (D) Violet

19. Which of the following is an example of regeneration?
(A) Hydra (B) Amoeba (C) Spirogyra (D*) None of these

20. Which one of the following term represents electric power in electric circuit?
(A*) I^2R (B) IR^2 (C) V^2I (D) VI^2

21. Which mirror is commonly used as rear-view mirror in vehicles?
(A) Plane mirror (B) Concave mirror (C*) Convex mirror (D) None of these

22. Which of the following is an ideal source of energy?
(A) Coal (B) Wood (C) Petroleum (D*) Bio-mass

23. A rectangular coil of a copper wire is rotate, in-a magnetic field. The direction of the induced current in the coil changes once in every
(A) Two rotations (B) One rotation (C*) Half rotation (D) One - fourth rotation

24. Which of the following is not a receptor organ ?
(A) Ear (B) Eye (C) Nose (D*)Brain

25. Male reproductive part of flower is -
(A*) Stamen (B) Pistil (C) Petal (D) None of these .

26. Which of the following is a malarial parasite?
(A*) Plasmodium (B) Leishmania (C) Protozoa (D) None of these

27. According to Fleming's left-hand rule, the index finger of the left hand indicates -
(A) Direction of electric force applied on a conductor
(B*) Direction of magnetic field
(C) Direction of the flow of electric current in a conductor
(D) None of these

28. Which one of the following lenses has positive focal length?
(A) Concave lens (B*) Convex lens (C) Piano-concave lens (D) None of these

29. Which type of mode of nutrition is found in fungi?-
(A) Saprophytic (B) Holozoic (C) Autotrophic (D) None of these

30. An example of homologous organs are
(A) Our arm and dog's foreleg (B) Our teeth and elephant's tusks
(C) Potato and runners of grass (D) All of the above

31. The far - point for the normal vision is –
(A) 25 m (B*) 25 cm (C) 25 mm (D) infinity

32. The process of forming a think oxide layer on aluminium is called :
(A) Galvanisation (B*) Anodising
(C) Enrichment (D) None of these

33. The number of groups in the modern periodic table is
(A) 7 (B) 8 (C) 9 (D*) 18

34. What is the commercial unit of electric energy?
(A) Watt (B) Watt/hour (C*) Unit (D) None of these

35. Which lens can be used for correction of hypermetropia?
(A) Concave lens (B*) Convex lens
(C) Sometimes concave lens and sometime (D) Cylindrical lens convex lens

36. How many atoms of oxygen are there in one molecule of Glucose ?
(A) 4 (B*) 6 (C) 8 (D) 12

37. How many electrons are there in the outer orbit of an atom of sulphur ?
(A*) 4 (B) 5 (C) 6 (D) 7

38. Which gas is responsible for the global warming ?
(A*) carbon dioxide (B) oxygen (C) nitrogen (D) None of these

39. According to New Cartesian sign convention, the object distance of an object placed before a mirror is taken
(A) Positive (B*) Negative
(C) Sometimes positive sometimes negative (D) None of these

40. Food cans are coated with tin, not with zinc because :
(A) Zinc is costlier than Tin (B) Zinc has a higher melting point than Tin
(C) Zinc is more reactive than Tin (D) Zinc is less reactive than Tin

SECTION – B
Non-Objective Type Questions
Short Answer type Questions
PHYSICS

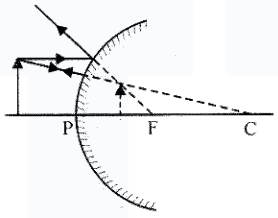
Question No.1 to 8 is short answer type. Answer any 4 questions. Each question carries 2 marks. (4x2=8)

1. Why do we prefer a convex mirror as a rear-view mirror in vehicles?
Ans. As convex mirror produces diminished image so it can cover a large field hence we use convex mirror as rear-view mirror.

2. Why is a normal eye not able to see clearly the objects placed closer than 25 cm?
Ans. Normal eye is unable to see clearly the objects placed closer than 25 cm due to power of accommodation of eye.

3. Define refractive index. The refractive index of diamond is 2.42. What is the meaning of this statement?
Ans. Refractive index of a material is a dimensionless number that describes how fast light propagates through the material. It is the ratio of velocity of light in vacuum to its velocity is a specified medium.
R.I. of diamond is 2.42 which means speed of light is diamond is 2.42 times slower than that is vacuum.

4. Draw a ray diagram for image of an object placed on-the principal axis of a convex mirror. Write the nature, position and size of the image formed by the mirror.
Ans.



Nature – Virtual and Errect
Position – B/W focus and pole.
Size – Diminished

5. What is electric current? Write SI unit of electric current.
Ans. The rate of flow of change at a given point of a conductor is known as electric current.

$$I = \frac{q}{t}$$

Its SI. unit is Ampere.

6. An electric lamp with voltage rating 60W; 220V is connected to main supply of 100V. What current is drawn by the lamp from the main supply?
Ans. $P = \frac{V^2}{R}$

$$60 = \frac{220 \times 220}{R}$$

$$R = \frac{220 \times 220}{60}$$

$V = IR$

$$110 = I = \frac{220 \times 220}{60} \qquad \Rightarrow \qquad I = \frac{110 \times 60}{220 \times 220} = \frac{3}{22} A$$

7. What is an earth wire? What is its function?

Ans. Earth wire is a low resistance wire which connects an appliance to earth so that all the excess current passes to the earth from the wire instead of human body and hence saves from shock.

8. Why does the sun appear reddish early in the morning?

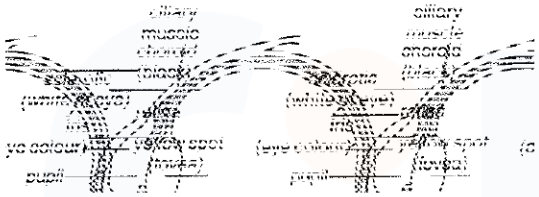
Ans. As the distance of travel through the atmosphere increases during dawn and dusk. Light is scattered much more than during noon. As the shorter wavelengths are scattered, only red light is left, as it has largest wavelength of the seven colors. Thus sun appears red during sunrise and sunset.

Long Answer Type questions

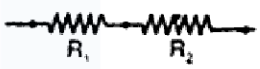
Questions No. 9 and 10 are Long Answer Type questions. Answer any one of the following.
(6x,1= 6)

9. (a) Draw a well labelled diagram of human eye.
(b) Flow do ciliary muscles accommodate focal length of eye lens to see nearby objects and far objects?

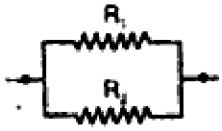
Ans. (a) Human eye diagram



(b) By changing the curvature of lens.

10. (a) 

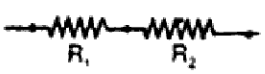
Prove that $R = R_1 + R_2$
Where R is the equivalent. resistance of resistors R_1 and R_2 connected in series.

(b) 

Prove that $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$

Where R is the equivalent. resistance of resistors R_1 and R_2 connected in parallel.

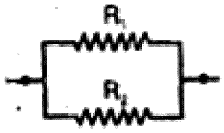
Ans. (a) $V_1 = iR_1$
$V_2 = iR_2$
$V_1 + V_2 = V$
$iR_1 + iR_2 = i\,(R_{eq})$
$R_{eq} = R_1 + R_2$



(b) $i_1 + i_2 = i$

$$\frac{V}{R_1}+\frac{V}{R_2}=\frac{V}{R_{eq}}$$

$$\frac{1}{R_{eq}}=\frac{1}{R_1}+\frac{1}{R_2}$$



CHEMISTRY
Short Answer type Questions

Question No.11 to 17 is short answer type. Answer any 4 questions. Each question carries 2 marks. **(4×2= 8)**

11. Write one equation each for decomposition reaction and combination reaction.

Sol. Decomposition reaction :

$CaCO_3(s) \xrightarrow{\Delta} CaO(s) + CO_2\uparrow$

Combination reaction : $3Mg(s) + N_2(g) \rightarrow Mg_3N_2(s)$

12. Differentiate between washing soda and baking soda.

	Baking Soda	**Washing soda**
Chemical formula	$NaHCO_3$	$Na_2CO_3.10H_2O$
pH	8	11
Uses	Manufacture of baking powder -as antacid - in textile, tanning, paper industries	-Cleaning agent for domestic purpose - Used in softening of hard water and controlling the pH of water

13. Why distilled water does not conduct electricity, whereas rain water does ?

Sol. Distilled water does not contain any dissolved salts so it does not conduct electricity. Rain water contains dissolved impurities which are capable of conducting electricity.

14. What are alloys ? Give two examples of alloys.

Sol. Alloys are homogeneous mixture of two or more metals or a metal and non-metal

Examples : (i) Brass - Alloy of Cu and Zn

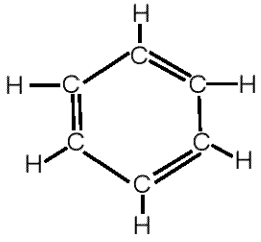
(ii) Stainless steel - Alloy of Fe, Cr, Ni

15. Give two ways to prevent iron from rusting.

Sol. Two ways to prevent iron from rusting

(i) By painting or greasing (ii) By alloying

16. Draw the structure of Benzene and Cyclohexane.

Sol. Structure of Benzene  or 

Structure of cyclohexane 

17. How the electronic configuration of an atom is related to its position in the Modern Periodic table.

Sol. Electronic configuration
No. of mass - period no.
No. of valence - group No.

Long Answer Type questions

Questions No. 18 and 19 are Long answer Type questions. Answer any one of the following.
(5 ×1 = 5)

18. What are the following reactions ? **(5)**
(i) Addition reaction
(ii) Substitution reaction
(iii) Esterification reaction

Sol. (i) The reactions in which a reactant molecule is added to another reactant molecule to form a product are known as addition reactions**.** Unsaturated hydrocarbons, such as alkenes and alkynes undergo addition reactions.

E.g. $\underset{\text{Ethene}}{CH_2=CH_2} + \underset{\text{Hydrogen}}{H_2} \xrightarrow[\text{Heat}]{Ni} \underset{\text{Ethane}}{CH_3-CH_3}$

(ii) The reaction in which an atom or group of atoms in a molecule is replaced or substituted by different atoms or group of atoms are called substitution reactions. Saturated hydrocarbons are fairly unreactive.

Eg. $CH_4 + Cl_2 \xrightarrow{hv} CH_3Cl + HCl$

(iii) It is the reaction in which carboxylic acid and an alcohol in the presence of little concentrated sulphuric acid to form an ester

$CH_3COOH + C_2H_5OH \rightarrow CH_3COOC_2H_5 + H_2O$

19. Write the steps involved in the extraction of metals from their ores. **(5)**

Sol. Steps involved in the extraction of metals from their ores :
Ores
↓
Powdering of ore
↓
Concentration of ore
↓
Conversion of ore into metal oxide
↓
Reduction of metal oxide into metal (Crude metal is obtained)
↓
Refining
↓
Pure metal

(1) Powdering of ores - Ores are broken into small pieces with the help of crushers. These pieces are then reduced to fine powder with the help of a ball mill or a stamp mill.
(2) Concentration of ore- The process of removal of unwanted impurities (gangue) from the ore is called ore concentration. It can be done by hydraulic washing, Magnetic separation, Froth floatation leaching.
(3) Conversion of ore into metal oxide : It can be done by two process
(i) Calcination (for carbonate ores)
(ii) Roasting (sulphide ores)
(4) Reduction of metal oxide into metal :

This process depends upon the nature and chemical reactivity of metal.
(i) For low reactive metal : self reduction process
(ii) For middle reactive metal :
(a) Carbon reduction (b) Reduction with CO
(c) Reduction with aluminium
(iii) For high reactive metal : Electrolytic reduction
(5) Refining of impure metal
(i) Distillation refining : for refining volatile metals e.g. Zn, Hg
(ii) Liquation : For refining low m.p. metals e.g. lead, tin
(iii) Electrolytic refining : For metals like, e.g. Cu, Al etc.

BIOLOGY
Short Answer Type questions

Question No.20 to 26 is short answer type. Answer any 4 questions. Each question carries 2 marks.
(4 ×2 = 8)

20. Differentiate between autotrophic nutrition and heterotrophic nutrition ?

21. Define-hormone ? Name any two plant hormones.

22. Given reasons for adopting contraceptive methods ?

23. Distinguish between self-pollination and cross-pollination.

24. What do you mean by biological magnification ?

25. Give two suggestions to make your school environment friendly ?

26. How is food transported in plants ?

Long Answer Type questions

Questions No. 27 and 28 are Long answer Type questions. Answer any one of the following.
(5 ×1 = 5)

27. Draw a well labelled diagram of human 'digestive system and describe the digestion of food.. **(5)**

28. Describe the structure of human brain. **(5)**