

**Common Instructions to Candidates :**

- 1) This is a question cum answer paper booklet.
  - 2) This question cum answer booklet contains two parts. Part - A contains the questions of Physics and Chemistry and Part - B contains Biology questions.
  - 3) Space is provided to write answers below each question. Answer should be written within the space provided.
  - 4) This question cum answer booklet has 36 questions in Part - A and 19 questions in Part - B and together there are 55 questions including the matching type questions.
  - 5) Candidate should not write the answer with pencil. Answer written with pencil will not be evaluated. (Except graphs, diagrams & maps).
  - 6) In case of multiple choice, fill in the blanks and matching questions, scratching, rewriting & marking is not allowed. Answers with such errors will not be evaluated.
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**Part - A**  
**Physics & Chemistry**

- I.** Four alternatives are given for each of the following questions / incomplete statement only one of them is correct or most appropriate. Choose the most appropriate alternative and write it in the space provided below question. **[10 x 1 = 10]**
1. The important application of electromagnetic radiation of wavelength 400 nm to 750 nm is,
    - a) sterilisation
    - b) to detect fracture of bones
    - c) photosynthesis
    - d) to detect artificial gems
  
  2. In the device used in exposure meters the electrons are ejected by the following energy
    - a) heat energy
    - b) friction energy
    - c) chemical energy
    - d) light energy
  
  3. If the efficiency of a heat engine which uses 800 kJ heat energy to do a work is 40%. Then the loss of heat energy is,
    - a) 320 kJ
    - b) 480 kJ
    - c) 200 kJ
    - d) 400 kJ
  
  4. The device used in separating proteins, hormones, viruses from a liquid medium is
    - a) Fractionating column
    - b) Centrifugal governor
    - c) Centrifuge
    - d) Filtration apparatus.

5. Doppler effect of light can be applied in the study of the following
- The velocity of submarines
  - Speed of galaxies
  - Pollutants in the atmosphere
  - Crystal structure.
6. An example for a reaction in which the nucleus of an atom undergoes change is
- Photosynthesis
  - Combustion of carbon in air
  - Reaction of Sodium in water
  - Fission chain reaction of uranium.
7.  $2 \text{C}_4\text{H}_{10} + 13 \text{O}_2 \rightarrow 8 \text{CO}_2 + 10 \text{H}_2\text{O} + \text{Energy}$ . In this reaction the mass of oxygen required for the complete combustion of one mole of butane is
- |        |        |
|--------|--------|
| a) 16  | b) 416 |
| c) 208 | d) 32  |
8. The acid related to the preparation of detergent is
- Stearic acid
  - Hydrochloric acid
  - Nitric acid
  - Sulphuric acid
9. The following is not used to manufacture soap,
- |                |                 |
|----------------|-----------------|
| a) Coconut oil | b) Kerosine oil |
| c) Castor oil  | d) Palm oil.    |
10. Cement is used as building material because it
- is a good binding agent
  - sets rapidly
  - is prepared from cheap raw materials
  - withstands high temperature.

II. Fill up the blanks:

[3 x 1 = 3]

11. The valency of the dopant used in the base region of p-n-p transistor is \_\_\_\_\_.
12. The velocity of ultrasonic sound waves in water is 1.5 km/s. The distance travelled by those waves in 2 seconds is \_\_\_\_\_ km.
13. The device which converts solar energy into electrical energy is \_\_\_\_\_.

III. 14. Match the following:

[4 x 1 = 4]

Match the items of list 'A' with items of list 'B' and write the answers in the space provided:

A	B	Answers
1) Siderite	a) Copper oxide	1) _____
2) Copper glance	b) Copper sulphate	2) _____
3) Magnetite	c) Iron Carbonate	3) _____
4) Malachite	d) Copper sulphide	4) _____
	e) Iron sulphide	
	f) Iron oxide	
	g) Copper Carbonate	

IV. Answer the following:

[6 x 1 = 6]

15. How many times the first magnitude star is brighter than the third magnitude star?
16. Compact fluorescent tubes are more suitable than the Incandescent electric bulbs to save electric energy. Why?
17. What is the reason for the enormous energy of sun.

18. Calcium bicarbonate is dissolved in water. Write the equation that takes place when it is boiled?
19. What is centripetal force?
20. In the power stroke of a petrol engine the piston is pushed with great force. Why?

**V.** Answer the following:

**[9 x 2 = 18]**

21. State Faraday's laws of electromagnetic induction.
22. Draw the graph of induced current in each of A.C. and D.C. Dynamo.
23. Draw a neat diagram of gas laser tube.
24. Mention any four limitations of external combustion engine.
25. It is found that pig iron obtained from blast furnace contains more quantity of silica and carbon. What are the reasons for the presence of these impurities. How can this mistake be corrected in future?
26. What is the role of magnesium and hydrochloric acid used in the extraction of silicon.
27. What is annealing of glass? Why it is done?
28. Draw a neat diagram of the column used in the softening of hard water by permutit process.
29. Write the circuit symbol of n-p-n and p-n-p transistors.

**VI.** Answer the following:

**[4 x 3 = 12]**

30. State Kepler's laws of planetary motion.

31. What is a spectroscope? Mention the functions of the following parts in the spectroscope.
- Collimator
  - Telescope.
32. Eventhough there are no electrons in the nucleus of an atom, during beta decay electrons are ejected from the nucleus. How?  ${}_Z X^A \rightarrow Y$ . This is an example for Alpha decay. What will be the atomic number and atomic mass of Y.
- ${}_Z X^A \rightarrow Y$ . This is an example for Beta decay. What will be atomic number and atomic mass of Y.
33. Draw a neat diagram of nuclear power reactor.

**VII.** Answer the following:

[3 x 4 = 12]

34.
  - What are Geostationary satellites?
  - Mention the orbital period and the distance from the surface of the earth of geostationary satellites.
  - Write any one use of the geostationary satellite.
35.
  - What is a galaxy?
  - Mention the type of galaxies.
  - Name the galaxy in which sun is present.
  - What is the type of this galaxy?
36.
  - Draw the neat diagram of fractional tower used in the fractional distillation of petroleum refining.
  - Write the structural formula of benzene and toluene?

**Part - B**  
**Biology**

**VIII.** Four alternatives are given for each of the following questions. Choose the most appropriate alternative and write it in the space provided below each question. [5 x 1 = 5]

37. Which of the following group of plants bear Inflorescence.
- a) Bryophytes
  - b) Pteridophytes
  - c) Gymnosperms
  - d) Angiosperms
38. The egg shell of birds may break easily if one of the following is insufficient.
- a) Magnesium carbonate
  - b) Ferrous sulphate
  - c) Calcium carbonate
  - d) Calcium bicarbonate.
39. One of the main function of Parenchyma tissue is, It
- a) Supports other tissues
  - b) Takes part in Photosynthesis
  - c) Gives tensile strength to the plant body
  - d) Conducts water to different parts of the plant body.
40. The function of Adipose tissue can be compared to, Heat
- a) Regulator
  - b) Insulator
  - c) Conductor
  - d) Generator
41. Which of the following life processes may be affected if the two cells around the stomata not function.
- a) Respiration and Growth
  - b) Transpiration and Respiration
  - c) Respiration and Reproduction
  - d) Transpiration and Food conduction.

**IX. 42.** Column ‘A’ has names of bacteria and Column ‘B’ has related functions. Match the two and write the answers in the space provided. **[4 x 1 = 4]**

A	B	Answers
1) Nitrobactor	a) Releases CO <sub>2</sub> into atmosphere.	1) _____
2) Pseudomonos	b) Converts Nitrates into Nitrites.	2) _____
3) Rhizobium	c) Releases oxygen into atmosphere.	3) _____
4) Nitrosomonos	d) Releases Nitrogen into atmosphere.	4) _____
	e) Converts Ammonium salts into nitrites.	
	f) Converts Nitrites into Nitrates.	
	g) Participate in Biological fixation.	

**X.** Answer the following questions in a sentence each: **[4 x 1 = 4]**

43. Mention the genetic material and enzyme present in HIV.

44. Mention two Agricultural wastes which flows into the Natural water bodies.

45. Write any one function of Phagocytes present in Lymph tissue.

46. Why should FPO conduct quality tests of food products periodically?

**XI.** Two marks questions. **[6 x 2 = 12]**

47. What is the significant characteristic acquired by Pteridophytes in the process of Evolution? Give two examples for Pteridophytes.

48. a) How is the Stomach wall protected against the acidic contents secreted in it?  
b) Why should heart have involuntary muscle?
49. a) Due to what reason blood from retina would seep into Vitreous humour?  
b) What is the treatment for this condition?
50. Mention any two precautionary measures taken to prevent infection of HIV.
51. Mention the four aspects that a person must check while purchasing a sealed drinking water bottle.
52. Which aspect of biotechnology do you suggest to a farmer who is at loss in cultivating rose plants? And why?

**XII. Three marks questions:****[2 x 3 = 6]**

53. Give Scientific reason:

- a) An adolescent boy is found to be Sexually underdeveloped.
- b) Some young babies may show stunted growth, retarded Mental development, bowed legs, protrusion of the tongue and wrinkled skin.
- c) At the time of emergency faced by human body, there is a possibility of dialation of Pupil in Eye.

54. Draw a neat diagram to show the external feature of Fish and label the following parts:

- a) Pelvic fin.
- b) Dorsal fin.

**XIII. Four marks question:**

55. Draw a neat diagram of cross section of spinal cord and label the following parts:

- a) Central Canal **[4 x 1 = 4]**
- b) White matter
- c) Grey matter
- d) Spinal nerve.