Subject : SCIENCE   **Subject Code : 83E**
Time : 3 hrs. 15 minutes   **Max. Marks : 80**

English Medium
Regular Fresh

General Instructions to the Candidate :

1. There are three parts in the question paper. PART A : Physics, PART B: Chemistry, PART C : Biology.

2. This question Paper consists of 38 objective and subjective types of questions.

3. This question paper has been sealed by reverse jacket. You have to cut on the right side to open the paper at the time of commencement of the examination. Check whether all the pages of the question paper are intact.

4. Follow the instructions given against both the objective and subjective types of questions.

5. Figures in the right hand margin indicate maximum marks for the questions.

6. The maximum time to answer the paper is given at the top of the question paper. It includes 15 minutes for reading the question paper.

PART : A
PHYSICS

I. **Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.**   **3 x 1 = 3**

1. The SI unit of electric charges is :

   A. volt

   B. ampere

   C. coulomb

   D. joule

2. The suitable focal length of the convex lens used as magnifying lens to read "Hallmark 916" written on ornaments is :

   A. 12 cm

   B. 60 cm

   C. 100 cm

   D. 120 cm

3. The magnetic field lines inside a solenoid are in the form of parallel straight lines. The reason for this is, the magnetic field insde the solenoid is :

   A. very high

   B. uniform

   C. zero

   D. produced by electricity

II. **Answer the following questions.**   **2 x 1 = 2**

4. If the radius of curvature of a lens is 30 cm, then what is its focal length?

5. In the experiment of refraction through a glass slab, the angle of incidence should be less than 90°. Why?

III. Answer the following questions.   3 x 2 = 6

6. Draw the ray diagram to show the formation of image by a convex lens when the object is kept between $2F_1$ and F_1. (F_1 : Principal focus of the convex lens)

7. The resistivity of two conductors 'A' and 'B' are 1.62×10^{-8} Ω m and 5.20×10^{-8} Ω m respectively. Which of them is used in :

   (i) Transportation of electricity

   (ii) The making of heating coils? Why?

8. Observe the following table. Complete the table using Ohm's law :

Sl. No.	Electric Current I	Potential Difference V	Resistance R
1.	2A	120V	- Ω
2.	1.5A	–	60 Ω
3.	–	60V	60 Ω

IV. Answer the following questions.   3 x 3 = 9

9. Draw the diagram of an electric generator. Label the following parts.

   (i) Carbon Brushes

   (ii) Rings

10. Explain the experiment to find out the focal length of a convex lens. The focal length of a convex lens is 100 cm. Find its power.

<div align="center">OR</div>

An object is kept at a distance of 30 cm from a diverging lens of focal length 15 cm. At what distance the image is formed from the lens? Find the magnification of the image.

11. Explain the advantages and disadvantages of solar cells.

V. Answer the following questions.   2 x 4 = 8

12. Explain the principle of working of simple electric motor. What is the role of split rings in an electric motor? How are commercial motors different from simple electric motor.

<div align="center">OR</div>

Explain the following with reference to the magnetic field around a straight conductor carrying current.

(i) Tracing the pattern of magnetic field

(ii) increasing the intensity of magnetic field

(iii) Reversing the direction of electric current.

13. a) State Ohm's law. Mention the factors on which the resistance of a conductor depend.

b) State Joule's law of heating and write the mathematical formula of this law.

<div align="center">

PART : B

CHEMISTRY

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VI. Four alternatives are given for each of the following questions/incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.   3 x 1 = 3

14. The gas liberated when an acid reacts with a metal is :

A. Hydrogen

B. Chlorine

C. Carbon dioxide

D. Nitrogen dioxide

15. The hydrocarbon that undergoes addition reaction among the following is :

    A. C_2H_6

    B. C_3H_8

    C. CH_4

    D. C_3H_6

16. In modern periodic table, as we move from left to right along the period, the atomic size of the elements.

    A. increases

    B. does not change

    C. decreases

    D. first increases and then decreases

VII. Answer the following questions. 3 x 1 = 3

17. Is it possible to test the hardness of water using detergents? Give reason for your answer.

18. In the modern periodic table, the elements of 17th group are Flourine, Chlorine, Bromine, Iodine respectively. Which element has the highest ability to receive electrons? Why?

19. Ionic compounds have high melting points. Why?

VIII. Answer the following questions. 3 x 2 = 6

20. Name the Ketone having four carbon atoms and write its structure.

<div align="center">OR</div>

    Explain combustion reaction of carbon compounds with an example.

21. Draw the diagram of the apparatus used to show that acid solution in water conducts electricity and label dilute hydrochloric acid.

22. The gas liberated when sodium carbonate reacts with dilute hydrochloric acid is passed through lime water, a white precipitate is formed. But when the same gas is passed through lime water in excess, precipitate is not visible. Why?

IX. Answer the following questions.   3 x 3 = 9

23. Explain the limitations of Medeleev's periodic table.

OR

Explain the limitations of Newlands' law of Octaves.

24. Write one difference between saturated carbon compounds and unsaturated carbon compounds. Carbon forms covalent bonds with other atoms but not ionic bonds. Why? Explain.

25. Draw the diagram of the arrangement of the apparatus showing the reaction of steam on metal. Label the following.

(i) Metal Sample

(ii) Delivery tube

X. Answer the following question.   1 x 4 = 4

26. a) What are alloys? Name the alloy which has lead and tin as its constituent and write one of its uses.

    b) What is an amphoteric oxide? Write any two chemical properties of metals.

PART : C

BIOLOGY

XI.   **Four alternatives are given for each of the following questions/ incomplete statements. Choose the correct alternative and write the complete answer along with its letter of alphabet.**   **2 x 1 = 2**

27. The practice of using used materials without changing their shape and form is

A. Reuse

B. Recycling

C. Repurpose

D. Reduce

28. The correct statement with respect to biodegradable substances among the following is ; these substances

    A. remain inert in the environment for a long time

    B. harm various organisms in the ecosystem

    C. increase the density of harmful chemicals in different tropic levels

    D. undergo recycling naturally in the environment

XII. Answer the following questions.   **3 x 1 = 3**

29. How is ozone layer formed in the atmosphere?

30. Forests are called 'biodiversity hotspots'. Why?

31. Mention any two problems caused by the construction of huge dams.

XIII. Answer the following questions.   **2 x 2 = 4**

32. The tendrils of pea plants appear to move in a particular direction as they grow. How is this response caused?

<div align="center">OR</div>

How does adrenal gland bring the chemical coordination in our body? Explain briefly.

33. Draw the diagram showing the longitudinal section of a typical flower and label 'anther'.

XIV. Answer the following questions.   **3 x 3 = 9**

34. 'Having two sets of genes in the germ cells is not possible'. Clarify this statement with reasons.

<div align="center">OR</div>

'Genetic drift' and 'natural selection' together result in the formation of new species of organisms. How? Explain.

35. What is the function of 'Prostate gland' and 'testicles', in human male reproductive system? What measures can be followed by man to avoid the transfer of sperms into the uterus of a woman?

<div align="center">OR</div>

What is sexual maturation? How does menstruation occur? What is the function of placenta during pregnancy?

36. a) How are the studies of anatomical structures helpful for tracing evolutionary relationships?
    b) How could we determine that 'the birds are very closely related to reptiles'?

XV . Answer the following question.   1 x 4 = 4

37. Draw the diagram showing the longitudinal section of the human brain. Label the following parts.

    i)   Hypothalamus

    ii) Medulla

XVI. Answer the following questions.   1 x 5 = 5

38. a) What are the functions of the fluids `blood' and `lymph' in humans? What are the different waste materials added to the urine from the blood?

    b) How are waste materials excreted in plants?