# 1901-Z

## PHYSICS

**Maximum Marks—70** **Time Allowed—3 Hours**

**(Fifteen Minutes Extra to read the Question Paper)**

### (Long Answer Type Questions)

1. **State and explain Coulomb's law in vector form. Hence define unit charge.**

*Or*

**Show that electric potential can be represented as line integral of electric field.** **5**

2. **Find the force between two Parallel conductors carrying current in Same and Opposite direction and hence define one ampere.**

*Or*

**What is Ampere circuit law? Derive an expression for magnetic field due to a current in a toroid.** 5

3. **State and explain Faraday's laws of Electromagnetic induction.**

*Or*

What is a Transformer? Explain its theory and discuss its main uses. 5

4. **What do you mean by total internal reflection and critical angle? Derive a relation between the refractive index and critical angle. What are the conditions for producing total internal reflection?**

*Or*

With the help of ray diagram, explain the formation of image in compound microscope. Derive an expression for its magnifying power. 5

**(Short Answer Type Questions)**

5. How is a Potentiometer used to compare e.m.f. of two cells? 3

6. State Ohm's law and deduce it from the knowledge of drift velocity. 3

7. **Three capacitors of capacitance 2PF, 3PF and 4PF are connected in parallel. What is the charge on each capacitor of the combination is connected to 100 volt supply?** 3

8. What is meant by Electric resonance? Where is it used?

9. **What does an Electromagnetic wave convert of ? On what factors does its velocity in vacuum depend?** 3

10. **Distinguish between Interference and Diffraction.** 3

11. **Show that in case of a prism $\hat{A} + \hat{D} = \hat{i} + \hat{e}$ where symbols have their usual meanings.** 3



12. **State difference between Nuclear fusion and Fission. Also give an example of each.**

**(Very Short Answer Type Questions)**

13. The following very short answer type questions of two marks, each may be answered in a few words or few sentences or as may be required.

(a) **State two properties of Paramagnetic substance.** 2

(b) **Distinguish between Constructive and Destructive interference.** 2

(c) **What is Threshold frequency and Stopping potential?**

(d) **What is the Ionization energy of H-atom?** 2

(e) Draw the circuit diagram of a pnp transistor as an amplifier.

(f) How can NOR gate be made? Write its Boolean expression. 2

(g) What is Amplitude modulation?

(h) What is Sky-wave? Where it is used?

## (Objective Type Questions)

(i) Which alloys are used for making standard resistance coils? 1

(ii) What is the magnitude of Force acting on a stationary charge? 1

(iii) The speed of light in a medium is independent of the nature of source, why? 1

(iv) What is the velocity of a Photon? 1

(v) How many electron volt make one joule? 1

Choose the correct answer :

(vi) The density of nucleus is of the order of

A. $10^3 kg / m^3$

B. $10^{10} kg / m^3$

C. $10^{15} kg / m^3$

D. $10^{17} kg / m^3$. 1

(vii) The impurity atoms with which pure silicon should be dropped to make P-type semiconductor

A. Phosphorus

B. Antimony

C. Boron

D. Arsenic.