

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?

(2)

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. <https://www.jkboseonline.com> 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)

14. (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 doped to make P-type semiconductor

A. Phosphorus

B. Antimony

C. Boron

D. Arsenic.