

**B-1-X**

Roll No.....

Total No. of Questions : 21]

[Total No. of Printed Pages : 4

**XIIRSZJF19**  
**22001-X**  
**PHYSICS**

Time : 3 Hours]

[Maximum Marks : 70

(Long Answer Type Questions)

5 each

1. State Gauss's law. Derive an expression for electric field due to an infinite plane sheet of charge.

*Or*

Give the principle, construction and working of Van de Graff's generator.

2. State Biot Savart's law. Derive an expression for the magnetic field at the centre of circular coil carrying current.

*Or*

Give the principle, construction and working of moving coil galvanometer.

3. Derive an expression for the impedance and phase angle of an LCR-series circuit. Hence write the condition for impedance to be maximum and minimum.

*Or*

Give the principle, construction and working of a transformer.

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Turn Over

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4. Define fringe width. Derive an expression for fringe width in case of Young's double slit experiment of interference of light.

Or

What is lens maker's formula ? Derive lens maker's formula for a convex lens.

**(Short Answer Type Questions)**

3 each

5. What is the capacity of a parallel plate capacitor, whose area of plates is  $1.13 \times 10^9 \text{ m}^2$  and separation between them is 0.7 cm ? Also, find the energy stored in the capacitor for a potential of 200 volt.
6. State and explain Kirchhoff's laws.
7. A wire of 5 ohm is stretched to double its original length. Calculate its new resistance.
8. State and explain Faraday's laws of electromagnetic induction.
9. State and explain Brewster's law of polarization of light.
10. Calculate angle of minimum deviation for an equilateral triangular prism of refractive index  $\sqrt{3}$ .
11. Define half life period of a radioactive substance. Derive an expression for it.
12. What is a Zener diode ? How is Zener diode used as a voltage regulator ?

**(Very Short Answer Type Questions)**

2 each

13. A galvanometer of resistance 30 ohm shows a full scale deflection for a current of 2 mA. Calculate the value of resistance required to convert it into a voltmeter of range 0-5 volt.
14. Write *four* properties of electromagnetic waves.
15. What is total internal reflection ? Write *two* conditions for total internal reflection of light. <https://www.jkboseonline.com>
16. Define threshold frequency and stopping potential.
17. What is the momentum and energy of a photon of frequency  $1.5 \times 10^{13}$  Hz ? Take  $h = 6.6 \times 10^{-34}$  Js and  $c = 3 \times 10^8$  m/s.
18. Write *four* properties of  $\alpha$ -rays.
19. Give the truth table and logic symbol of NOR gate.
20. Why sky waves are not used for transmission of TV signals ?

**(Objective Type Questions)**

1 each

21. Do as directed :
- (i) What is the condition for Wheatstone bridge to be most sensitive and balanced ?
- (ii) Write the dimensional formula of magnetic field.

(iii) Electromagnetic waves are produced by accelerated charge.  
(True/False)

(iv) What is myopia ? Which lens is used to correct myopia ?

(v) The nuclear radius depends upon the mass number as  $A^{1/3}$ , while as nuclear density is independent of mass number.  
(True/False)

(vi) The conductivity of an intrinsic semiconductor depends upon temperature only.  
(True/False)

(vii) *n*-type semiconductor is obtained by adding ..... impurity to pure semiconductor.

- (A) Trivalent (B) Tetravalent  
(C) Pentavalent (D) All of these

(viii) Define ground wave propagation.

(ix) The radio waves received after reflection from ionosphere are :

- (A) Ground waves (B) Sky waves  
(C) Space waves (D) Surface waves

(x) Modulation is essential feature of a :

- (A) Transmitter (B) Receiver  
(C) Medium (D) None of these

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