

(English Version)

- Instructions :**
1. All Parts are compulsory.
  2. Answer without relevant diagram/figure/circuit wherever necessary will not carry any marks.
  3. Numerical problems solved without writing the relevant formulae carry no marks.

**PART – A**

I. Answer **all** the following questions.

(10 × 1 = 10)

- 1) How does the Resistance of a Conductor Vary with its length?
- 2) State Ampere's Circuital Law.
- 3) When does the force acting on a charged particle moving in a uniform magnetic field is Maximum?
- 4) Define declination?
- 5) What is Retentivity?
- 6) Write any one advantage of Eddy Current.
- 7) What is the rest mass of photon?
- 8) Name the Spectral Series of Hydrogen atom which lies in the Visible region of electro magnetic spectrum.
- 9) What are isotopes?
- 10) Mention one need for modulation.

**PART – B**

II. Answer any **five** of the following questions : **(5 × 2 = 10)**

- 11) Write any two Limitations of ohm's Law.
- 12) Draw a neat Labelled diagram of Cyclotron.
- 13) Mention an expression for the magnetic field produced at the center on the axis of a current carrying Solenoid and Explain the terms.
- 14) State and Explain Gauss's Law in magnetism.
- 15) What is a Transformer? Mention any one Sources of Energy loss.
- 16) Write any two uses of ultra violet rays.
- 17) Give the two differences between Collector region and Emitter region of a Transistor.
- 18) Draw a Block diagram showing the important components in a Generalized Communication System.

**PART – C**

III. Answer any **five** of the following questions :

**(5 × 3 = 15)**

- 19) Mention any Three properties of Electric Field Lines.
- 20) Obtain an expression for effective Capacitance of two Capacitors Connected in series.
- 21) Explain with a circuit diagram how a galvanometer can be converted into an ammeter.
- 22) Write any three distinguishing properties between diamagnetic and ferromagnetic materials.
- 23) Derive the relation between focal length and radius of curvature of a concave mirror.
- 24) Using Huygens principle, show that the angle of incidence is equal to angle of reflection during a plane wave front reflected by a plane surface.
- 25) Name the three types of electron Emission.
- 26) What is NAND gate? Write its logic Symbol and Truth Table.

**PART – D**

IV. Answer any **two** of the following questions : (2 × 5 = 10)

- 27) Obtain an expression for the Electric Field on the equatorial line of an Electric dipole.
- 28) Derive an Expression for the Balancing condition of wheat stone Bridge.
- 29) Derive an expression for instantaneous induced *emf* in an A.C generator.

V. Answer any **two** of the following questions : (2 × 5 = 10)

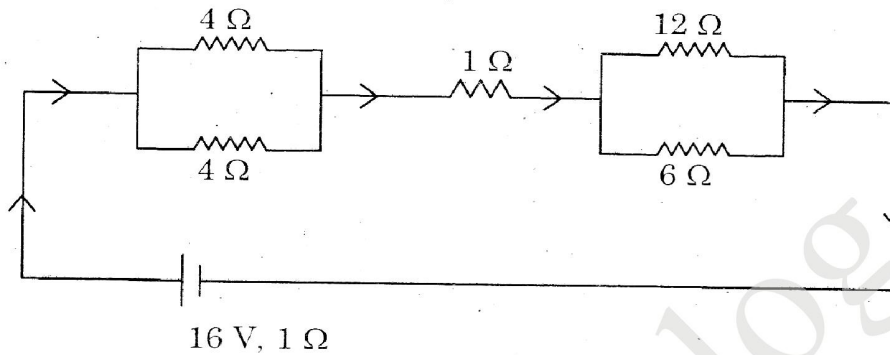
- 30) Derive an Expression for the fringe width of interference fringes in a double slit experiment.
- 31) Derive an expression for the Energy of an electron in  $n^{\text{th}}$  Stationary orbit of hydrogen atom by assuming the expression for radius.
- 32) What is Rectification? Describe with a circuit diagram the working of a  $p-n$  junction diode as half wave rectifier with input and output waveforms.

VI. Answer any **three** of the following questions: (3 × 5 = 15)

- 33)  $ABCD$  is a square of side  $1m$ . Charges of  $+3nc$ ,  $-5nc$  and  $+3nc$  are placed at the corners  $A, B$  and  $C$  respectively. Calculate the work done in transferring a charge of  $12\mu c$  from  $D$  to the point of intersection of the diagonals?

34) A network of Resistors is Connected to a 16V battery with internal resistance  $1\Omega$  as shown in Figure below.

- Compute the equivalent resistance of the network
- Calculate the total current in the circuit



35) A sinusoidal voltage of peak value 283V and frequency 50Hz is applied to a series LCR circuit in which  $R = 3\Omega$ ,  $L = 25.48mH$  and  $C = 796\mu F$ . Find

- Impedance of the circuit.
- The phase difference between the Voltage across the source and the current.

36) An object of 3cm is placed 14cm in front of a concave lens of focal length 21cm. Find the Position, Nature and Size of the Image formed.

37) Calculate the binding Energy of an alpha ( $\alpha$ )particle in Mev from the following data.

Mass of Helium Nucleus =  $4.00260u$

Mass of neutron =  $1.008662u$

Mass of proton =  $1.007825u$ .