NOTE: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink. Cutting or filling two or more circles will result in zero mark in that question.

12

**21.**

**1.** What is the power rating of a lamp connected to a 12V source when it carries 2.5A?

(A) 4.8W      (B) 14.5W      (C) 30W      (D) 60W

**2.** Transformer is used to change the value of:

(A) Charge      (B) Energy      (C) Power      (D) Voltage

**3.** The cathode-ray oscilloscope consists of the components:

(A) 5      (B) 2      (C) 3      (D) 4

**4.** The brain of any computer system is:

(A) Monitor      (B) Memory      (C) CPU      (D) Control Unit

**5.** One byte is equal to _____ bits.

(A) 4      (B) 6      (C) 8      (D) 10

**6.** What happens to the atomic number of an element which emits one alpha particle?

(A) Increases by 1      (B) Stays the same      (C) Decreases by 2      (D) Decreases by 1

**7.** When did Christian Huygens invent the pendulum clock?

(A) 1856      (B) 1656      (C) 1756      (D) 1956

**8.** The speed of sound in wood at 25°C in meter per second is:

(A) 3980      (B) 2000      (C) 1290      (D) 972

**9.** The index of refraction of ethyl alcohol is:

(A) 2.42      (B) 2.21      (C) 1.31      (D) 1.36

**10.** An object is 14cm in front of a convex mirror. The image is 5.8cm behind the mirror. What is the focal length of the mirror?

(A) −20cm      (B) −9.9cm      (C) −8.2cm      (D) −4.1cm

**11.** Capacitance is defined as:

(A) VC      (B) Q/V      (C) QV      (D) V/Q

**12.** An electric current in conductors is due to the flow of:

(A) Positive ions      (B) Negative ions      (C) Positive charges      (D) Free electrons

Roll No.(in Figures): ................................................ (in Words): ............................................................

Maximum Marks: 48     **SUBJECTIVE TYPE**     Time Allowed :1.45 Hours

## (PART- I)

**Q2. Write short answers to any FIVE (5) questions.**     (5×2=10)

    (i) Find time period of a simple pendulum of 1.0m long where $g = 10ms^{-2}$

    (ii) Define longitudinal waves.

    (iii) Define pitch. On what factor it depends?

    (iv) Define intensity. What is its SI unit?

    (v) Define ultrasound.

    (vi) Define electric current. Write its unit.

    (vii) Define Ohm.

    (viii) If the diameter of a copper wire is 2 millimeter, then find its cross sectional area.

**Q3. Write short answers to any FIVE (5) questions.**     (5×2=10)

    (i) State laws of reflection of light.

    (ii) What is meant by farsightedness?

    (iii) Define electrostatic induction.

    (iv) State Coulomb's law.

    (v) What is mica capacitor?

    (vi) What is meant by compact disk?

    (vii) Define word processing.

    (viii) Define hardware.

**Q4. Write short answers to any FIVE (5) questions.**     (5×2=10)

    (i) Describe the working principle of a DC motor.

    (ii) State Lenz's law.

    (iii) What is meant by thermionic emission?

    (iv) How are the electron deflected by electric field?

    (v) NAND gate is reciprocal of AND gate. Discuss briefly.

    (vi) What is meant by nuclear transmutation.

    (vii) Describe two properties of gamma radiations.

    (viii) Write three isotopes of hydrogen.

## (PART - II)

**Note: Attempt any TWO questions.**     (2×9=18)

**Q5. (a)** What is meant by ripple tank? Explain refraction of water waves with the help of ripple tank    4

    **(b)** An object 10cm high is placed at a distance of 20cm from a concave lens of focal length 15cm. Calculate the position and size of the image.    5

**Q6. (a)** Describe four safety measures that should be taken in connection with the house hold circuit.    4

    **(b)** Two capacitors of capacitances 6μF and 12μF are connected in series with 12V battery. Find the equivalent capacitance of the combination. Also find the charge and potential difference across each capacitor.    5

**Q7. (a)** Differentiate between magnetic disc and hard disc.    4

    **(b)** Write five hazards of radiations.    5

Q1.                                                                                          12

1.   The formula of Hooke's law is:

(A) $F = kx$          (B) $F = -kx$          (C) $k = \dfrac{x}{F}$          (D) $x = -Fk$

2.   The speed of sound in air at 0°C is:

(A) $331 \text{ ms}^{-1}$          (B) $346 \text{ ms}^{-1}$          (C) $327 \text{ ms}^{-1}$          (D) $386 \text{ ms}^{-1}$

3.   The critical angle of water is:

(A) 48.8°          (B) 49.5°          (C) 45°          (D) 46°

4.   The speed of light in glass is:

(A) $2 \times 10^{8} \text{ms}^{-1}$          (B) $2 \times 10^{-8} \text{ms}^{-1}$          (C) $3 \times 10^{-8} \text{ms}^{-1}$          (D) $3 \times 10^{8} \text{ms}^{-1}$

5.   If the medium between two charges is air, then the value of k will be:

(A) $9 \times 10^{-9} \text{Nm}^2\text{C}^{-2}$     (B) $9 \times 10^{-8} \text{Nm}^2\text{C}^{-2}$     (C) $9 \times 10^{8} \text{Nm}^2\text{C}^{-2}$     (D) $9 \times 10^{9} \text{Nm}^2\text{C}^{-2}$

6.   SI unit of potential difference is:

(A) Ampere          (B) Volt          (C) Farad          (D) Pascal

7.   SI unit of resistance is:

(A) Farad          (B) Volt          (C) Ohm          (D) Watt

8.   Temporary magnet which cause to flow current through a coil is:

(A) Magnetic field     (B) Electric intensity     (C) Magnet          (D) Electromagnet

9.   The components of cathode ray oscilloscope are:

(A) 2          (B) 3          (C) 4          (D) 6

10.  Email is the abbreviation of:

(A) Extra mail          (B) Emergency mail     (C) Electronic mail     (D) Electrical mail

11.  When did Graham Bell make a simple telephone?

(A) 1867          (B) 1870          (C) 1886          (D) 1876

12.  The number of neutrons in tritium $\left(^{3}_{1}\text{H}\right)$ is:

(A) 2          (B) 3          (C) 4          (D) 5

Roll No.(in Figures): ................................ (in Words): ................................

Maximum Marks: 48     **SUBJECTIVE TYPE**     Time Allowed :1.45 Hours

## (PART- I)

**Q2. Write short answers to any FIVE (5) questions.**     (5×2=10)

(i) Define refraction of waves.
(ii) What is meant by simple pendulum?
(iii) What is meant by echo of sound?
(iv) Define acoustics?
(v) What is meant by quality of sound?
(vi) Define OIhmic and non-Ohmic materials.
(vii) Prove that: $P = \dfrac{V^2}{R}$
(viii) Define conventional current.

**Q3. Write short answers to any FIVE (5) questions.**     (5×2=10)

(i) What is meant by principal focus of a convex lens and a concave lens?
(ii) What is the difference between real and virtual image?
(iii) An object 10cm in front of a convex mirror forms an image 5cm behind the mirror. What is the focal length of the mirror?
(iv) Define potential difference and its unit.
(v) What is gold leaf electroscope?
(vi) What is the differece between data and information?
(vii) What is the difference between hardware and software?
(viii) How light signals are sent through optical fibres?

**Q4. Write short answers to any FIVE (5) questions.**     (5×2=10)

(i) What is the role of relay in a circuit?
(ii) How direction of magnetic field is measured by the right hand grip rule?
(iii) Write any two components of cathode ray oscilloscope.
(iv) Define analogue electronics.
(v) Write truth table of OR operation.
(vi) Define nuclear fusion.
(vii) Define half-life.
(viii) What are two common hazards of radiation? Briefly describe the precautions there are taken against them.

## (PART - II)

**Note: Attempt any TWO questions.**     (2×9=18)

Q5. (a) Derive a relationship between velocity, frequency and wavelength of a wave. Write a formula relating velocity of a wave to its time period and wavelength.     4

(b) The power of a convex lens is 5D. At what distance the object should be placed from the lens so that its real and two times larger image is formed?     5

Q6. (a) Discuss the main features of parallel combination of resistors.     4

(b) Two charges repel each other at a force of 0.1N when they are 5cm apart. Find the force between the same charges when they are 2cm apart.     5

Q7. (a) Explain the phenomena of transmission of electrical signals through wires.     4

(b) The half-life of $^{16}_{7}N$ is 7.3s. A sample of this nuclide of nitrogen is observed for 29.2s. Calculate the fraction of the original radioactive isotope remaining after this time.     5