

MRD -10th

PHYSICS Paper-X (26)

۱۔ ہر سوال کے سامنے چار دائرے دیئے گئے ہیں، صرف صحیح جواب والا دائرہ بھر دیں۔

۲۔ دائروں کو شیڈ (بھرنے) کے لیے نیلے یا کالے رنگ کا مارکر استعمال کریں۔

۳۔ جواب میں ایک سے زائد دائرے بھرنے سے جواب غلط تصور ہوگا۔

Time: 20 Minutes

SECTION-A

Marks: 12

Q1: Choose the correct option i.e, A,B,C or D?

1. The time period of a simple pendulum is 2s. If its length is increased to four times its original length, the new time period will be.
☐ 2s ☒ 4s ☐ 8s ☐ 16s
2. The frequency of water waves travelling with a speed of 6ms^{-1} is 3Hz. The wavelength of the waves is.
☐ 1m ☒ 2m ☐ 3m ☐ 4m
3. If the intensity of a sound is 100 times the intensity of faintest audible sound, its intensity level in dB is.
☐ 0 ☐ 10 ☒ 20 ☐ 30
4. An object is placed at a distance of 20cm from a convex lens. Its inverted image is formed at a distance of 20cm. The focal length of the lens is.
☒ 10cm ☐ 20cm ☐ 30cm ☐ 60cm
5. The ability of an optical instrument to distinctively separate two very close points is called.
☐ Power of lens ☐ Linear magnification
☐ Angular magnification ☒ Resolving power
6. A capacitor of $3\mu\text{F}$ capacitance is connected to a battery of 6V. the charge stored by the capacitor is.
☐ $5\mu\text{C}$ ☐ $10\mu\text{C}$ ☐ $20\mu\text{C}$ ☒ $18\mu\text{C}$
7. If a conductor obeys Ohm's law, its electrical resistance must.
☐ Increase with voltage ☐ Decrease with voltage
☒ Not change with voltage ☐ Be zero

8. A current carrying coil placed in a uniform magnetic field will experience.
- ☐ Non zero net force ☐ Zero torque
- ☒ Non zero torque ☐ Zero net fore and zero torque
9. The function of indirectly heated cathode in electron gun is to.
- ☒ Emit electrons ☐ Control intensity of electrons
- ☐ Focus electrons ☐ Accelerate electrons
10. A telecommunication device that is used to transmit sound on a beam of light is called.
- ☐ Computer ☒ Photo phone
- ☐ Fax machine ☐ Cell phone
11. The half-life of a radioactive substance is 10 days. This means that after 30 days, the number of remaining atoms in the sample of 800 atoms will be.
- ☐ 800 ☐ 400 ☐ 200 ☒ 100
12. Radioactive nuclide ${}_{60}\text{X}^{123}$ decays to ${}_{58}\text{Y}^{119}$, the type of particle being emitted is.
- ☒ Alpha ☐ Beta
- ☐ Gamma ☐ Both Alpha and Beta

MRD -10th

PHYSICS Paper-X (26)

Note: Time allowed for Section-B & Section-C is 2:40 hours.

SECTION-B

Marks: 32

Q2: Write short answer to any EIGHT of the following parts. All parts carry equal marks.

1. Define the terms intensity, pitch, loudness and quality of sound.
2. Calculate the speed of sound at a temperature of 30°C .
3. A ray of light is incident on water surface from air at the angle of

- incidence of 60° . If the refractive index of the glass is 1.3, calculate the angle of refraction. (Take refractive index of air as 1)
4. State Coulomb's law and express it in mathematical form. List one similarity and one difference between Coulomb force and gravitational force.
 5. The electrical resistance of a metallic wire is R when its length and cross sectional area are L and A respectively. Describe what will be the effect on its electrical resistance when:
(a) Its length is increased to $3L$.
(b) Its cross sectional area is increased to $2A$.
 6. State the functions of live, neutral and earth wires in mains electricity.
 7. Discuss the effect of increasing current, length and magnetic field on the magnitude of force acting on a current carrying conductor placed in a magnetic field. Deduce the condition of maximum force on this conductor.
 8. List the key components of an electron gun and briefly explain the functions of any two components.
 9. Differentiate between hardware and software with two examples of each.
 10. Describe gamma radiation in terms of its:
(a) Nature (b) Charge (c) Relative penetration
 11. Differentiate nuclear fission and fusion. Give one example of each process. What is the source of large amount of energy in these nuclear processes?

SECTION-C

Marks: 21

Note: Answer any THREE questions. All questions carry equal marks.

Q3: (a) Show mathematically that the motion of simple pendulum of

length L is simple harmonic motion for small angles.

(b) Calculate the time period of a simple pendulum of length 1m on planet mercury. ($g_{\text{mercury}} = 3.7 \text{ ms}^{-2}$)

Q4: (a) By drawing the ray diagram, state how does simple microscope form a magnified image of a small object. Write the formula for its magnifying power when the image is formed at near point.

(b) A 5cm high object is placed at 15cm from a convex lens of 5cm focal length. Find the position of the image formed by the lens.

Q5: (a) Explain the concept of electric potential through an example. Write its formula and define its unit volt.

(b) Two capacitors of $6\mu\text{F}$ and $12\mu\text{F}$ are connected in series across 30V battery. Calculate:

(a) Equivalent capacitance of the combination.

(b) Charge stored on each capacitor.

Q6: (a) Define the following.

(i) Transformer

(ii) Mutual induction

(iii) Coefficient of mutual induction and its unit

(b) Two coils of wire wound on an iron core have mutual inductance of 0.50H. If the current in the primary coil is increased from 80A to 100A in 2s, calculate the emf generated in the secondary coil.