12161

PHYSICS (New Book)

PART-II

NOTE: There are three sections of this paper. Carefully read the instructions for each section and attempt accordingly. Attempt all questions of Section-A and return it to the Superintendent within given time, even if you have not attempted any question. Select the correct choice and write only A, B, C or D, whichever is appropriate, in the answer box. No marks will be awarded for cutting/erasing or overwriting.

SECTION-A

Time: 20 Minutes **Marks:** 18

1. The value of relative permittivity for vacuum is: A) 0, B) 1, C) 2, D) 4.8 ..... B
2. Pair production occurs only when energy of photon is at least equal to: A) 1.02 keV, B) 1.02eV, C) 1.02MeV, D) 1.02GeV C
3. The temperature coefficient of thermistor is: A) very low, B) neither low nor high, C) very high, D) none of these C
4. The powers of two electric bulbs are 100W and 200W, which are connected to power supply of 220V. The ratio of resistance of their filament will be: A) 1:2, B) 2:1, C) 1:3, D) 4:3 ..... B
5. The unit of magnetic flux density is: A) Tesla, B) Wbm^{-2}, C) WmA^{-3}, D) all these ..... D
6. When charge particles enter perpendicular to magnetic field, the path followed by it is: A) a helix, B) a circle, C) straight line, D) ellipse ..... B
7. To measure the earthquakes, we use a device which is called: A) EEG, B) Seismometer, C) Potentiometer, D) none of these ..... B
8. The device which induced emf is statically induced emf is: A) transformer, B) AC generator, C) alternator, D) dynamo ..... A
9. ..... have wavelength longer than 1M. A) microwaves, B) infrared radiation, C) x-rays, D) radio waves ..... D
10. The peak value of alternating current is $5\sqrt{2}$A. The mean square value of current will be: A) 5A, B) 2.5A, C) $5\sqrt{2}$A, D) 5^2 ..... D
11. Which one of the following materials is weakly attracted by magnet? A) ferromagnetic, B) diamagnetic, C) paramagnetic, D) all these C
12. A cable breaks if stretched by more than 2 mm. It is cut into two equal parts. How much either part can be stretched without breaking? A) 25m, B) 1mm, C) 2mm, D) 0.5m ..... B
13. In transistor the central region base is doped ..... A) heavily, B) moderately, C) lightly, D) none C
14. Most of the electrons in the base of an NPN transistor flow ..... A) out of the base lead, B) into the collector, C) into the emit, D) into the base supply ..... B
15. Pair production is not possible in ..... A) air, B) water, C) vacuum, D) none of these C
16. If the K.E of a free electron doubles, its de-Broglie wavelength changes by the factor ..... A) $\sqrt{2}$, B) $\frac{1}{\sqrt{2}}$, C) 2, D) $\frac{1}{2}$ ..... B
17. Unit of decay constant λ = ... A) ms, B) m^{-1}, C) m, D) s^{-1} ..... D
18. How many neutrons are there in the neuclide Zn^{66}? A) 22, B) 30, C) 36, D) 66 C

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Time: 2 Hours 40 Minutes

SECTION-B

Marks: 40

1. Attempt any ten of the following. All carry equal marks.

   i. Describe the process of charging a capacitor.

   ii. What is the difference between an emf and a potential difference?

   iii. Write four practical applications of magnetic field.

   iv. Explain the production of Eddy Currents in terms of Lenz's law.

   v. what do you mean by the term phasor diagram?

   vi. Describe mechanical properties of solids.

   vii. Explain why the base current is weak as compared to collector current?

   viii. If an electron and a proton have the same de-Broglie wavelength, which particle has greater speed?

   ix. Why do solids give rise to continuous spectrum while hot gases give rise to line spectrum?

   x. Explain tracer technique in agricultural research.

   xi. Distinguish between diamagnetic materials and ferromagnetic materials.

   xii. Describe the advantages of digital electronics.

   xiii. What is meant by natural radioactivity?

SECTION-C

Marks: 27

NOTE: Attempt any three of the following questions. All questions carry equal marks.

2. i. Describe the construction of capacitor and derive an expression for energy stored in a capacitor.
   ii. A 10 watt resistor has a value of 120Ω. What is the rated current through the resistor?

3. i. State Ampere's law and use it to derive an expression for the magnetic field of a solenoid.
   ii. A coil of 100 turns is linked by a flux of 20 m Wb. If this flux is reserved in a time of 2 ms, calculate the average emf induced in the coil.

4. i. What is de-Broglie hypothesis? Describe an experiment to show that particle has wave characteristics.
   ii. Calculate the longest wavelength of radiation for the Paschen series.

5. Write notes on any two of the following:
   i. Nuclear Reactor ii. Electric Polarization iii. Energy Band Theory