Objective
Paper Code
8474

Intermediate Part Second (New Scheme)
PHYSICS (Objective) GROUP - II
Time: 20 Minutes   Marks: 17

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Q.No.1
You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.

S.#	Questions	A	B	C	D
1	The peak to peak value is:	V_0	$-V_0$	$\sqrt{2}\,V_0$	$2V_0$
2	SI unit of modulus of elasticity is:	Coulomb	Volt	Pascal Nm^{-2}	Ampere
3	In transistor the central region is known as:	Base	Emitter	Collector	Inductor
4	The open loop gain of op-amplifier is of the order of:	10^3	10^5	10^6	10^6
5	Amount of energy released due to complete conversion of 1 kg mass into energy is:	9×10^{16} J	9×10^{9} J	9×10^{20} J	3×10^{8} J
6	The unit of Planck's constant is:	Joule	Joule-s	Watt	Candela
7	If transition of electron in hydrogen atom ends at third orbit then radiation emitted lies in:	Balmer	Lyman	Paschen	Bracket
8	The bombardment of nitrogen with α-particle will produce:	Neutron	Proton	Electron	Positron
9	The quantity called the absorbed dose "D" is:	J/m	J/C	m/C	C/E
10	Which one is photoconductor?	Copper	Selenium	Mercury	Aluminium
11	A charge of 4 Coulomb is in the field of intensity 4 N/C. The force on the charge is:	8 N	16 N	4 N	1 N
12	mhom^{-1} is the SI unit of:	Conductance	Conductivity	Resistance	Resistivity
13	The magnetic induction has the same unit as of:	Flux	Flux density	Electric intensity	Magnetization
14	The Lorentz force on charged particle is:	$F = F_e + F_b$	$F = F_e - F_b$	$F = \frac{F_e}{F_b}$	$F = F_e \times F_b$
15	Lenz's law is in accordance with the law of conservation of:	Momentum	Angular momentum	Charge	Energy
16	Working principle of transformer is:	Mutual induction	Self induction	Faraday's law	Lenz's law
17	When the motor is running at maximum speed, the back emf will be:	Maximum	Minimum	No back emf	Varies

SECTION – I

2. Write short answers to any EIGHT parts.   16
  (i)   Electric lines of force never cross. Why?
  (ii)   Do electrons tend to go to region of high potential or of low potential?
  (iii) What is meant by potential gradient?
  (iv)   Define capacitance and its unit Farad.
  (v)   How can you use a magnetic field to separate isotopes of chemical element?
  (vi)   Why the resistance of an ammeter should be very low?
  (vii) What is sweep or time base generator?
  (viii) Distinguish between magnetic flux and magnetic flux density.
  (ix)   Can a D.C motor be turned into D.C generator? What changes are required to be done?
  (x)   Show that "ε" and $\frac{\Delta\phi}{\Delta t}$ have the same units.
  (xi)   Define Henry.
  (xii) How the efficiency of transformer can be improved?

3. Write short answers to any EIGHT parts.   16
  (i)   What are thermistors? How are they made?
  (ii)   Is the filament resistance lower or higher in a 500W, 220V light bulb than in a 100W, 220V bulb?
  (iii) Why does the resistance of a conductor rise with temperature?
  (iv)   What do you understand about the terms (a) phase lag (b) phase lead ?
  (v)   A sinusoidal current has rms value of 10A. What is the maximum or peak value?
  (vi)   How does doubling the frequency affect the reactance of (a) an inductor (b) a capacitor ?
  (vii) What are ductile and brittle substances? Give an example of each.
  (viii) How would you obtain n-type and p-type material from pure silicon? Illustrate it by schematic diagram.
  (ix)   Differentiate between para and ferromagnetism.
  (x)   What is normal operation of a transistor? Show it with diagram.
  (xi)   Why a photodiode is operated in reverse biased state?
  (xii) What is the net charge on a n-type or a p-type substance?

4. Write short answers to any SIX parts.   12
  (i)   Show that any material object cannot be accelerated to the speed of light 'c' in free space.
  (ii)   Which photon, red, green or blue carries the most (a) energy (b) momentum ?
  (iii) If an electron and a proton have the same de-Broglie wavelength, which particle has greater speed?
  (iv)   Differentiate between spontaneous and stimulated emissions.
  (v)   What are the advantages of lasers over ordinary light?
  (vi)   What is natural radioactivity? Name types of radiations emitted from radioactive elements.
  (vii) What are leptons? Write its examples.
  (viii) Why does a Geiger Muller tube for detecting γ-rays not need a window at all?
  (ix)   Find the mass defect of tritium, if the atomic mass of tritium is 3.016049 u.

SECTION – II   Attempt any THREE questions. Each question carries 08 marks.

5. (a) What is Wheatstone Bridge? Give its principle, circuit diagram and working. How it can be used to
       determine an unknown resistance?   05
   (b) A particle having a charge of 20 electrons on it falls through a potential difference of 100 volts.
       Calculate the energy acquired by it in electron volts (eV).   03

6. (a) State Ampere's law and apply it to find the magnetic field due to current carrying solenoid.   05
   (b) A coil of 10 turns and 35cm² area is in a perpendicular magnetic field of 0.5T. The coil is pulled out
       of the field in 1.0 sec. Find the induced emf in the coil as it is pulled out of the field.   03

7. (a) Define rectification and describe the working of a full wave rectifier.   05
   (b) A 10mH, 20Ω coil is connected across 240V and 180/π Hz source. How much power does it dissipate?   03

8. (a) What is meant by strain energy? Derive the relation for strain energy from force extension graph.   05
   (b) The life time of an electron in an excited state is about 10⁻⁸s. What is its uncertainty in energy
       during this time?   03

9. (a) Derive the relations for quantized radii and energies for hydrogen atom.   05
   (b) Find the mass defect and binding energy of the deuteron nucleus. The experimental mass of deuteron
       is 3.3435×10⁻²⁷ kg.   03