

Physics (Subjective)**SECTION-I****2. Write short answers of any eight parts from the following:***RWP-2-24*

(8x2=16)

- Differentiate between electric potential difference and electric potential energy difference and write its relation.
- Why is the potential difference between the plates of capacitor decreased when dielectric material is inserted between the plates?
- Describe the force or forces on a positive point charge when placed between parallel plates with opposite & equal charges.
- If a point charge q of mass m is released in a non-uniform electric field with field lines pointing in the same direction, will it make a rectilinear motion?
- What is the advantage of synchronization control in case of CRO?
- What is digital multimeter? Why is it easier to use?
- How can a current loop be used to determine the presence of a magnetic field in a given region of space?
- What should be the orientation of a current carrying coil in a magnetic field so that torque acting upon the coil is (a) maximum (b) minimum?
- Equal doses of different radiations do not produce same biological effect. Explain.
- Name the six quarks.
- State two sources of "background radiation"
- How can radioactivity help in the treatment of cancer?

3. Write short answers of any eight parts from the following:

(8x2=16)

- What are the difficulties in testing whether the filament of a lighted bulb obeys Ohm's law?
- What is thermistor? Write its principle.
- Explain under what condition, the wheat stone bridge is said to be balanced?
- How many times per second will an incandescent lamp reach maximum brilliance when connected to a 50Hz source?
- What is modulation signal and what are the carrier wave?
- Why the choke is used in A.C. circuits?
- What is meant by strain energy? How can it be determined from the force-extension graph?
- Differentiate between Young's modulus and Bulk's modulus
- What is hysteresis loss?
- What is a net charge on a n-type or a p-type substance?
- How is p-n junction formed?
- Calculate the gain of a non-inverting amplifier when $R_1 = \text{infinity}$ and $R_2 = 0$

4. Write short answers of any six parts from the following:

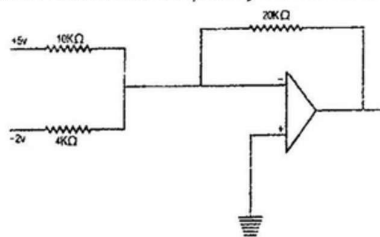
(6x2=12)

- Does the induced emf in a circuit depend on the resistance of the circuit?
- Is it possible to change both the area of the loop and magnetic field passing through the loop and still not have an induced emf in the loop?
- When does light behave as a wave? When does it acts as a particle?
- If an electron and proton have the same de-broglie wavelength, which particle has greater speed?
- How can the spectrum of hydrogen contain so many lines? when hydrogen contain one electron.
- What is the principle of A.C. generator?
- What are inertial and non-inertial frame of references?
- What is the difference between special theory of relativity and general theory of relativity?
- Differentiate between ionization energy and excitation energy.

SECTION-II**Note Attempt any three questions. Each question carries equal marks:**

(8x3=24)

- Derive a relation for electrical potential at a point due to a point charge. (5)
 - The resistance of an iron wire at 0°C is $1 \times 10^4 \Omega$. What is resistance at 500°C , if the temperature co-efficient of resistance of iron is $5.2 \times 10^{-3} \text{ K}^{-1}$? (3)
- Define transformer. Explain its principle, construction and working. (5)
 - What current should pass through a solenoid that is 0.5 m long with 10,000 turns of copper wire so that it will have a magnetic field of 0.4T? (3)
- What is the series resonance circuit? Derive the relation of resonance frequency and write down its properties. (5)
 - Calculate the output of the op-amp circuit shown in figure: (3)



- Write a note on energy band theory and classify conductors, insulators and semiconductors on the basis of this theory. (5)
 - What is the maximum wavelength of the two photons produced when a positron annihilates an electron? The rest mass energy of each is 0.51 MeV. (3)
- Define fusion reaction. Explain it in sun with the help of nuclear reactions. (5)
 - Compute the shortest wavelength radiation in Balmer series? What value of ' n ' must be used. (3)