



Roll No. _____ to be filled in by the candidate.

Inter. (Part-II)-A-2022

(For all Sessions)

Paper Code 8 4 7 3

Physics (Objective Type)

Time: 20 Minutes

Group-I

R
Rw P-9/1-2 Marks:17

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.

1. An A.C voltmeter has rms value 220 V, its peak value is _____.
(A) 300 V (B) 210 V (C) zero (D) 311.12 V
2. For higher frequency, the inductive reactance will be _____.
(A) high (B) low (C) zero (D) infinite
3. At 0 K, semiconductor is _____.
(A) conductor (B) insulator
(C) perfect insulator (D) perfect diamagnetic and paramagnetic
4. A PN junction cannot be used as _____.
(A) amplifier (B) capacitor (C) rectifier (D) light emitting diod
5. The portion of the transistor with greater concentration is _____.
(A) base (B) collector (C) emitter (D) insulator
6. The maximum energy of photo-electron depends upon _____.
(A) frequency (B) intensity (C) power (D) illumination
7. Compton shift in wavelength is zero when scattering angle of photon is _____.
(A) 30° (B) 60° (C) 0° (D) 90°
8. In population inversion, atoms can reside in metastable state for _____.
(A) 10^{-10} sec (B) 10^{-3} sec (C) 10^{-8} sec (D) 10^{-12} sec
9. The percentage of original quantity of radioactive material left after five half-lives is nearly _____.
(A) 6% (B) 5% (C) 10% (D) 3%
10. Which of the following is used as moderator in nuclear reactor?
(A) heavy water (B) boron (C) cadmium (D) aluminum
11. If the distance between charges is halved and each charge is also doubled, then the force between two charges becomes _____ times.
(A) two (B) sixteen (C) eight (D) four
12. The force between two charges is 36 N and if the dielectric constant 3.6 value is inserted, then force reduces to _____.
(A) zero (B) 72 N (C) 25 N (D) 10 N
13. A thermistor with positive temperature coefficient is heated then its resistance will _____.
(A) decrease (B) increase (C) not be affected (D) become half
14. The magnetic force on a neutron in the magnetic field of 10 T is _____.
(A) zero (B) 1.6×10^{-18} N (C) 100 N (D) 1.6×10^{-19} N
15. A charge particle cannot be accelerated in _____ field.
(A) electric (B) gravitational (C) magnetic (D) scalar
16. The energy stored in the inductor becomes four times if _____.
(A) self-inductance is doubled (B) current is doubled
(C) both inductance and current are doubled (D) current is halved
17. Which type of energy is stored in inductor?
(A) electric energy (B) magnetic energy (C) potential energy (D) gravitational energy

Roll No. _____ to be filled in by the Candidate.

Inter. (Part-II)-A-2022

Physics (Essay Type)

(For All Sessions)

Time: 2:40 Hours

Group-I

Marks: 68

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

SECTION - I

2. Write short answers to any EIGHT questions.

- Electric lines of force never cross why?
- Prove that $1 \text{ ohm} \times 1 \text{ farad} = 1 \text{ second}$.
- Distinguish between electric field and electric field intensity.
- How can you identify that which plate of a capacitor is positively charged?
- What is the function of the grid in a CRO?
- Why the voltmeter should have a very high resistance?
- How can you make an electronic trajectory visible?
- Why does the picture on a T.V screen become distorted when a magnet is brought near the screen?
- How does radioactivity help in the treatment of cancer?
- Why are heavy nuclei unstable?
- Distinguish between a thermal reactor and a fast reactor.
- Define self-quenching.

(2 x 8 = 16)

3. Write short answers to any EIGHT questions.

- Do bends in a wire affect its electrical resistance? Explain.
- A charge of 9C passes through a conductor in one hour. What is the current in the conductor?
- Define temperature co-efficient of resistivity. Give its unit.
- How many times per second will an incandescent lamp reach maximum brilliance when connected to 50 Hz source?
- What do you mean by phase lag and phase lead?
- Explain the power factor in A.C circuit.
- Write down a note on super conductor.
- Distinguish between intrinsic and extrinsic semi-conductor.
- Define curie temp. What is its value for iron?
- Why ordinary silicon diodes do not emit light?
- Draw the symbol and truth table of NAND gate.
- Why charge carries are not present in the depletion region?

(2 x 8 = 16)

4. Write short answers to any SIX questions.

- Can an electric motor be used to drive an electric generator with the output from the generator being to operate the motor?
- Does the induced emf always act to decrease the magnetic flux through a circuit?
- Can a step-up transformer increase the power level?
- How would you position a flat loop of wire in a changing magnetic field, so that there is no emf induced in the loop?
- Can pair production take place in vacuum? Explain.
- Photon 'A' has twice the energy of photon 'B' What is the ratio of momentum of "A" to that of "B"?
- Will bright light ejected more electrons from metal surface than dimmer light of same colour.
- What do we mean when we say that the atom is excited?
- Is energy conserved when an atom emits a photon of light?

(2 x 6 = 12)

SECTION - II

Note: Attempt any THREE (3) questions from Section II.

- (a) What is capacitor? Derive a relation for the energy density in terms of electric field in the capacitor? (5)
(b) The resistance of an iron wire at 0°C is $1 \times 10^4 \Omega$. What is the resistance at 500°C , if the temperature coefficient of resistance is $5.2 \times 10^{-3} \text{ K}^{-1}$? (3)
- (a) Define motional emf. Derive an expression for motional emf. (5)
(b) A galvanometer having an internal resistance $R_g = 15.0 \Omega$ gives full scale deflection with current $I_g = 20.0 \text{ mA}$. It is to be converted into an ammeter of range 10.0 A. Find the value of shunt resistance R_s . (3)
- (a) What is a transistor? Describe the use of transistor as a amplifier and calculate its voltage gain. (5)
(b) What is the resonance frequency of the circuit, which includes a coil of inductance 2.5 H and a capacitance 40 μF . (3)
- (a) Define strain energy. Derive a relation for strain energy in deformed material? (5)
(b) What is the energy of a photon in a beam of infrared radiation of wavelength 1240 nm? (3)
- (a) State Bohr's model of hydrogen atom. Derive relation for quantized energies for hydrogen atom. (5)
(b) Radiation from a point source obeys the inverse square law. If the count rate at a distance of 1.0 m from Geiger counter is 360 counts per minute. What will be its count rate at 3.0 m from the source? (3)

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Roll No. 707357 to be filled in by the candidate.

Inter. (Part-II)-A-2022
(For all Sessions)

Paper Code 8 4 7 6

R

Physics (Objective Type)

Time: 20 Minutes

Rwp-A222

Group-II

Marks:17

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.

1. Which one is not a ductile material?
(A) lead (B) copper (C) steel (D) iron
2. Open loop gain of operational amplifier is of the order of _____.
(A) 10^6 (B) 10^3 (C) 10^7 (D) 10^5
3. Gain of inverting amplifier with external resistance $R_1 = 10 \text{ k}\Omega$ and $R_2 = 100 \text{ k}\Omega$, is given as _____.
(A) -10 (B) 10 (C) -100 (D) 100
4. All motions are _____.
(A) absolute (B) uniform (C) relative (D) variable
5. If an object moves with the speed of light, its mass will be _____.
(A) zero (B) maximum (C) infinity (D) minimum
6. Which of the following has the largest de Broglie wavelength at same speed?
(A) proton (B) α - particles (C) carbon atom (D) electron
7. The dead time of G.M tube is _____.
(A) 10^{-3} sec (B) 10^{-6} sec (C) 10^{-4} sec (D) 10^{-8} sec
8. Slow neutrons can cause fission in _____.
(A) uranium - 238 (B) uranium - 235 (C) neptunium (D) lithium
9. SI unit of electric flux is _____.
(A) $\text{N m}^2 \text{C}^{-1}$ (B) $\text{N m}^2 \text{C}$ (C) $\text{N m}^{-1} \text{C}^{-1}$ (D) NC^{-1}
10. A proton is moved from low potential to high potential between two points having potential difference of 1 volt energy gained by proton is _____.
(A) 1 ev (B) 2 ev (C) 1.6×10^{-19} ev (D) 1.6 ev
11. A rheostat can be used as _____.
 (A) potential divider (B) variable resistance (C) amplifier (D) both (A) & (B)
12. Magnetic field due to current carrying straight varies as _____.
(A) $\frac{1}{r^2}$ (B) r^2 (C) $\frac{1}{r}$ (D) r
13. Charge to mass ratio of neutron is _____.
(A) zero (B) $9.53 \times 10^9 \text{ C kg}^{-1}$ (C) $1.758 \times 10^4 \text{ C kg}^{-1}$ (D) $1.775 \times 10^{-11} \text{ C kg}^{-1}$
14. The motional emf depends upon _____.
(A) length of conductor (B) magnetic field (C) speed (D) all of these
15. Lenz's law is the manifestation of conservation of _____.
(A) current (B) voltage (C) energy (D) all of these
16. The reactance of an inductor is given as _____.
(A) ωL (B) $\frac{1}{\omega L}$ (C) $\frac{\omega}{L}$ (D) $\frac{L}{\omega}$
17. The reactance of an inductor increases with increase in _____.
 (A) frequency (B) voltage (C) resistance (D) capacitance

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Physics (Essay Type)

Time: 2:40 Hours

Inter. (Part-II)-A-2022

(For All Sessions)

Group-II

Marks: 68

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

SECTION - I

(2 × 8 = 16)

2. Write short answers to any EIGHT questions.

- i. Define electron volt (ev). Show that $1 \text{ ev} = 1.6 \times 10^{-19} \text{ J}$.
- ii. Show that $\frac{1 \text{ volt}}{1 \text{ meter}} = \frac{1 \text{ newton}}{1 \text{ coulomb}}$.
- iii. Is \vec{E} necessarily zero inside a charged rubber balloon, if balloon is spherical? Assume that charge is uniformly distributed over the surface.
- iv. Prove that ohm × farad = second.
- v. How can a galvanometer is made more sensitive? Explain briefly.
- vi. Suppose that a charge q is moving in a uniform magnetic field with a velocity v . Why is there no work done by magnetic force that acts on charge q ?
- vii. Draw a circuit diagram of current measuring part of avometer.
- viii. Is it possible to orient a current loop in a uniform magnetic field such that the loop will not tend to rotate? Explain.
- ix. What do you understand by back ground radiations? State any two sources of radiation.
- x. How can radioactivity help in the treatment of cancer?
- xi. Differentiate between mass defect and binding energy.
- xii. Define nuclear fission and nuclear fusion.

(2 × 8 = 16)

3. Write short answers to any EIGHT questions.

- i. Describe a circuit which will give a continuously varying potential.
- ii. A wire of length 10 m has resistance 100Ω . If the wire is stretched to increase its length three times. What will be its new resistance?
- iii. What is meant by an electromotive force (emf)? Give its unit.
- iv. Explain the condition under which electromagnetic waves are produced from a source.
- v. What is meant by phase difference?
- vi. Write four properties of parallel resonance circuit.
- vii. Differentiate between paramagnetic and ferromagnetic substances.
- viii. Define modulus of elasticity. Write down its three kinds.
- ix. Why a photo diode is operated in reverse biased state?
- x. Distinguish between soft magnetic material and hard magnetic material.
- xi. What is solar cell? Give its uses.
- xii. Draw the symbol of pnp and npn transistors six parts.

(2 × 6 = 12)

4. Write short answers to any SIX questions.

- i. Does the induced emf always act to decrease the magnetic flux through a circuit?
- ii. Can a D.C motor be turned into a D.C generator? What changes are required to be done?
- iii. How fluctuations of the output can be reduced in D.C generator?
- iv. What is meant by efficiency of transformer? Write few steps to improve the efficiency.
- v. Which has the lower energy quanta? Radio waves or x - rays.
- vi. Why don't we observe a Compton effect with visible light?
- vii. Find the mass m of a moving object with speed $0.8 c$.
- viii. Find the speed of electron in the first Bohr orbit.
- ix. Is energy conserved when an atom emits a photon of light?

SECTION - II

Note: Attempt any THREE (3) questions from Section II.

5. (a) Define electric potential. Derive the relation of an electric potential at a point due to point charge. (5)
(b) A platinum wire has resistance of 10 ohm at 0°C and 20 ohm at 273°C . Find the value of temperature co-efficient of resistance of platinum. (3)
6. (a) What is transformer? How does it work? Explain its use in transmission of electric load to long distances. (5)
(b) 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 0.4 T ? (3)
7. (a) What is comparator circuit? How can it be used as a night switch? (5)
(b) A 10 mH, 20Ω coil is connected across 240 v and $\frac{180}{\pi}$ Hz source. How much power does it dissipate? (3)
8. (a) What is meant by strain energy? How can it be determined from the force extension graph? (5)
(b) Assuming you radiate as does a black body at your body temperature about 37°C , at what wavelength do you emit the most energy? (3)
9. (a) What is LASER? Describe its working, population inversion and laser action. (5)
(b) Find the mass defect and the binding energy for tritium, if the atomic mass of tritium is 3.016049 u . (3)