Group-I

SG7

1219 Warning:- Please write your Roll No. in the space provided and sign. Roll No----------
(Inter Part – II) (Session 2015-17 to 2017-19) Sig. of Student ----------

Physics (Objective) **(Group I)** **Paper (II)**

Time Allowed:- 20 minutes **PAPER CODE 4475** Maximum 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. Write **PAPER CODE**, which is printed on this question paper, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1

1) Types of quarks are
(A) 2 (B) 4 (C) 6 (D) 8

2) In liquid metal fast breeder reactor the type of uranium used is
(A) $^{235}_{92}U$ (B) $^{238}_{92}U$ (C) $^{234}_{92}U$ (D) $^{239}_{92}U$

3) The force between two charges is 28 N. The paraffin wax of relative permitivity 2.8 is introduced between the charges as medium then force reduces to
(A) 25 N (B) 20 N (C) 10 N (D) 15 N

4) A charge of $10^{-10}C$ between two parallel plates 1 cm apart experience a force of 10^{-5} N. The p.d. between the plates is
(A) 10 V (B) 10^2 V (C) 10^3 V (D) 10^4 V

5) Tolerance for silver colour is
(A) ±10% (B) ±15% (C) ±20% (D) ±5%

6) Two parallel wires carrying currents in opposite direction.
(A) Repel each other (B) Attract each other (C) Neither attract nor repel (D) Stick to each other

7) A 5m wire carrying current 2 A at right angle to uniform magnetic field of 0.5 T. The force on the wire is
(A) 1.5 N (B) 5 N (C) 2.5 N (D) 4 N

8) If the coil is wound on iron core, the flux through it
(A) Decreases (B) Becomes zero (C) Remains constant (D) Increases

9) Energy stored per unit volume in magnetic field is called
(A) Energy density (B) Electric flux (C) Work (D) Power

10) S.I unit of reactance is
(A) Farad (B) Volt (C) Ampere (D) Ohm

11) The device which allows only the flow of D.C. is
(A) Capacitor (B) Resistor (C) Inductor (D) Generator

12) A vacant or partially filled band is called
(A) Fermi Band (B) Valence Band (C) Forbidden Band (D) Conduction Band

13) For normal operation of transistor, the Emitter-Base junction is always
(A) Forward Biased (B) Reverse Biased (C) Unbiased (D) Grounded

14) The S.I unit of current gain is
(A) Volt (B) Ampere (C) Coulomb (D) No unit

15) The factor $\frac{h}{m_o c}$ in Compton effect has the dimensions of
(A) Pressure (B) Length (C) Mass (D) Momentum

16) The materialization of energy takes place in the process of
(A) Photoelectric effect (B) Compton effect (C) Pair production (D) Annihilation of matter

17) Joule-Second is the unit of
(A) Energy (B) Heat (C) Plank's constant (D) Power

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SGD-P1-12-19

1219 Warning:- Please, do not write anything on this question paper except your Roll No.

Physics (Subjective) **(Group I)** (Session 2015-17 to 2017-19) (Inter Part - II) **Paper (II)**

Time Allowed: 2.40 hours **Section ---------- I** Maximum Marks: 68

2. Answer briefly any Eight parts from the followings:- **8 × 2 = 16**

(i) Define Electrostatics and Xerography. **(ii)** Define Gaussian surface and Electric lines of force.

(iii) The potential is constant through out a given region of space. Is the electric field is zero or non-zero in this region? Explain.

(iv) How can you identify that which plate of a capacitor is positively charged?

(v) Define magnetic induction and Tesla. **(vi)** Define Magnetic Flux and Flux Density.

(vii) Why the resistance of an ammeter should be very low?

(viii) Why the voltmeter should have a very high resistance.

(ix) Define electromagnetic induction and Induced emf. **(x)** Define Mutual induction and Henry.

(xi) Four unmarked wires emerge from a transformer. What steps would you take to determine the turns ratio?

(xii) Can a D.C motor be turned into a D.C. generator? What changes are required to be done?

3. Answer briefly any Eight parts from the followings:- **8 × 2 = 16**

(i) What is wheatstone bridge? How can it be used to determine an unknown resistance?

(ii) Is the filament resistance lower or higher in a 500 W, 220 V light bulb than in a 100 W, 220 V bulb?

(iii) Define sources of current and give its two examples.

(iv) Explain the conditions under which electromagnetic waves are produced from a source?

(v) What is meant by A.M and F.M? **(vi)** What is choke? Explain. **(vii)** Explain the term Hysteresis.

(viii) Define stress and strain. What are their SI units? **(ix)** What are superconductors? Write their types.

(x) What is the biasing requirement of the junctions of a transistor for its normal operation? Explain how these requirements are met in a common emitter amplifier?

(xi) The anode of a diode is 0.2 V positive with respect to its cathode. Is it forward biased?

(xii) Write two characteristics of operational amplifier.

4. Answer briefly any Six parts from the followings:- **6 × 2 = 12**

(i) What advantages an electron microscope has over an optical microscope?

(ii) Can pair production take place in vacuum? Explain.

(iii) Find the energy of photon in radiowave of wavelength 100 m.

(iv) Define excitation energy and ionization energy.

(v) Can X-rays be reflected, refracted, diffracted and polarized just like any other waves? Explain.

(vi) Explain briefly fission chain reaction. **(vii)** How can radioactivity help in the treatment of cancer.

(viii) Define hadrons. Also differentiate between baryons and mesons.

(ix) What information is revealed by the length and shape of the tracks of an incident particle in Wilson cloud chamber?

Note: Attempt any three questions. **Section ---------- II** **(8 × 3 = 24)**

5. (a) What is electric potential? Find electric potential at a point due to a point charge.

(b) A rectangular bar of iron is 2.0 cm by 2.0 cm in cross section and 40 cm long. Calculate its resistance if the resistivity of iron is $11\times10^{-8}\Omega m$

6. (a) What is A.C Generator. Discuss the principle, construction and working of an A.C Generator. Also find expression for induced emf and current.

(b) How fast must a proton move in a magnetic field of $2.50\times10^{-3}T$ such that the magnetic force is equal to its weight?

7. (a) Describe R-L-C series circuit, derive the expression for its resonance frequency and write down its properties.

(b) In a certain circuit, the transistor has a collector current of 10mA and a base current of $40\mu A$. What is the gain of the transistor?

8. (a) What is Doping, Explain formation of n-type and p-type semiconductor.

(b) An electron is placed in a box about the size of an atom that is about $1.0\times10^{-10}m$. What is the velocity of the electron.

9. (a) What is nuclear reactor? Describe its principle, construction and working.

(b) The wavelength of K X-ray from copper is $1.377\times10^{-10}m$. What is the energy difference between the two levels from which this transition results?

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Group-II

1219 Warning:- Please write your Roll No. in the space provided and sign. Roll No----------
(Inter Part – II) (Session 2015-17 to 2017-19) Sig. of Student ----------

Physics (Objective) **(Group II)** **Paper (II)**

Time Allowed:- 20 minutes **PAPER CODE 4472** Maximum 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. Write **PAPER CODE**, which is printed on this question paper, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1

1) If the distance between two charges is halved, the force between them becomes
(A) Double (B) Half (C) Four times (D) One time

2) When some dielectric is inserted between the plates of a capacitor then capacitance.
(A) Increased (B) Decreased (C) Zero (D) Infinity

3) Kirchhoff's First Rule is a manifestation of Law of conservation of
(A) Mass (B) Energy (C) Charge (D) Momentum

4) Work done on a charge particle moving in a uniform magnetic field is
(A) Maximum (B) Zero (C) Minimum (D) Negative

5) Output wave form of sweep or time base generator is
(A) Saw tooth wave (B) Digital wave (C) Sinusoidal wave (D) Square wave

6) Energy stored in inductor is
(A) $\frac{1}{2} LI$ (B) $\frac{1}{2} L^2 I$ (C) $\frac{1}{2} L^2 I^2$ (D) $\frac{1}{2} LI^2$

7) Which one is not present in A.C generator.
(A) Armature (B) Magnet (C) Slip rings (D) Commutator

8) At high frequency the value of reactance of capacitor is
(A) Small (B) Zero (C) Large (D) Infinite

9) In three phase A.C generator the phase difference between each pair of coil is
(A) 45^o (B) 60^o (C) 90^o (D) 120^o

10) The substance in which atoms cooperate with each other in such a way, so as to exhibit a strong magnetic field is called
(A) Paramagnetic (B) Diamagnetic (C) Ferro magnetic (D) Non magnetic

11) A sensor of light is
(A) Transistor (B) LED (C) Diode (D) Light dependent resistance

12) Find the gain of inverting amplifier of external resistance $R_1 = 10K\Omega$ and $R_2 = 100K\Omega$
(A) -5 (B) -10 (C) -2 (D) 50

13) The value of Stefen's constant is
(A) $2.9\times10^{-3} mK$ (B) $1.097\times10^{7} m^{-1}$ (C) $6.63\times10^{-34} Js$ (D) $5.67\times10^{-8} Wm^{-2}K^{-4}$

14) The factor $\frac{h}{m_o c}$ has the dimension of
(A) Length (B) Time (C) Mass (D) Energy

15) Which series lies in the ultra violet region
(A) Balmer series (B) Bracket series (C) Pfund series (D) Lyman series

16) Absorbed dose D is defined as
(A) m/E (B) E/m (C) C/m (D) E/C

17) A proton consists of quarks which are
(A) 2 up and 1 down (B) 1 up and 2 down (C) All up (D) All down

SGD-P17-12-19

1219 Warning:- Please, do not write anything on this question paper except your Roll No.

Physics (Subjective) **Group (II)** (Session 2015-17 to 2017-19) **Paper (II)**

Time Allowed: 2.40 hours **Section ---------- I** (Inter Part - II) Maximum Marks 68

2. Answer briefly any Eight parts from the followings:- $8 \times 2 = 16$

(i) Describe the force or forces on a positive point charge when placed between parallel plates with opposite and equal charges.

(ii) Is $\vec{E}$ necessarily zero inside a charged rubber balloon if balloon is spherical? Assume that charge is distributed uniformaly over the surface.

(iii) What is time constant of a capacitor? (iv) Prove that $1\frac{volt}{meter} = 1\frac{newton}{coulomb}$

(v) Suppose that a charge q is moving in a uniform magnetic field with a velocity v. Why there is no work done by the magnetic force that acts on the charge q ?

(vi) Why the resistance of an ammeter should be very low? (vii) Write uses of CRO.

(viii) Define magnetic flux and one tesla. (ix) State Faraday's Law and write its mathematical form.

(x) How power loss due to eddy currents in a transformer can be reduced?

(xi) Does the induced emf always act to decrease the magnetic flux through a circuit?

(xii) How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?

3. Answer briefly any Eight parts from the followings:- $8 \times 2 = 16$

(i) Do bends in a wire affect its electrical resistance.

(ii) What are the difficulties in testing whether the filament of a lighted bulb obeys Ohms law?

(iii) Under what conditions e.m.f of a cell and terminal potential difference become equal.

(iv) What is choke? Write its main use? (v) Define ultimate tensile strength and fracture stress.

(vi) How will you obtain N-type and P-type material from silicon?

(vii) How many times per second will an incandasent lamp reach maximum brilliance when connected to a 50 Hz source?

(viii) A sinusoidal current has rms value of 10 A. What is the maximum or peak value.

(ix) Distinguish between crystalline and polymeric solids.

(x) The anode of a diode is 0.2 V positive with respect to cathode. Is it forward biased?

(xi) Why a photo diode is operated in a reverse biased state?

(xii) Name any two basic characteristics of op-Amplifier. Also give their approximate values.

4. Answer briefly any Six parts from the followings:- $6 \times 2 = 12$

(i) Does brightness of beam of light primarily depends upon the frequency of photons or on the number of photons?

(ii) Why can red light be used in a photographic dark room when developing films but not blue or white light?

(iii) We donot notice the de-Broglie wavelength for a pitched cricket ball. Explain why?

(iv) Why Laser action cannot occur without population inversion between atomic levels?

(v) What is meant by line spectrum? Explain how line spectrum can be used for the identification of elements?

(vi) If a nucleus has a half life of 1 year, does this mean that it will completely decay after 2 years? Explain

(vii) What is radioactive tracer? Describe one application in medicine and agriculture.

(viii) Write a short note on Geiger Muller Counter. (ix) Define Mass defect and Binding energy.

Note: Attempt any three questions. **Section ---------- II** $(8 \times 3 = 24)$

5. (a) Derive an Expression for Energy stored by the capacitor.

(b) 1.0×10^{7} electrons pass through a conductor in $1.0\mu s$. Find the current in ampere flowing through the conductor. Electronic charge is $1.6\times10^{-19}C$

6. (a) Define motional emf. Derive a relation for motional emf.

(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.

7. (a) What is a transistor? Describe the use of transistor as an amplifier and derive its voltage gain

(b) An alternating source of emf 12 V and frequency 50 Hz is applied to a capacitor of capacitance $3\mu F$ in series with a resistor of resistance $1K\Omega$. Calculate the phase angle.

8. (a) What is energy band theory? How it can be used to explain the features of electrical conductors, insulators and semiconductors.

(b) What is the mass of a 70 kg man in a space rocket travelling at 0.8 c from us as measured from earth

9. (a) Define solid state detector. Give its principle, construction and its working.

Find the speed of electron in the first Bohr orbit.

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