Group-II

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) $\frac{1}{2} L I$ (B) $\frac{1}{2} L^2 I$ (C) $\frac{1}{2} L^2 I^2$ (D) $\frac{1}{2} L I^2$

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) $45°$ (B) $60°$ (C) $90°$ (D) $120°$

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 $R_1 = 10 K\Omega$ and $R_2 = 100 K\Omega$
    (A) -5   (B) -10   (C) -2   (D) 50

13) The value of Stefen's constant is
    (A) $2.9 \times 10^{-3} mK$ (B) $1.097 \times 10^7 m^{-1}$ (C) $6.63 \times 10^{-34} Js$ (D) $5.67 \times 10^{-8} Wm^{-2} K^{-4}$

14) The factor $\dfrac{h}{m_o c}$ 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

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SGD-P17-12-19

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

$8 \times 2 = 16$

2.   Answer briefly any Eight parts from the followings:-

(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 $1 \dfrac{volt}{meter} = 1 \dfrac{newton}{coulomb}$

(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?

$8 \times 2 = 16$

3.   Answer briefly any Eight parts from the followings:-

(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.

$6 \times 2 = 12$

4.   Answer briefly any Six parts from the followings:-

(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.

$(8 \times 3 = 24)$

Note: Attempt any three questions.   Section ------------ II

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 $1.6 \times 10^{-19} C$

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 $1 K\Omega$. 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.

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