



12 Physics

Name: _____

Roll #: _____

T2 chp15,16,17 23/04/2020

Time: 2h40m; Marks: 85

Wasim Tahir physics center

Q1) Choose the most appropriate option. Cutting / overwriting is not allowed:

17 Marks

- i) The mean value of A.C. in a cycle is:
 A) 1 B) 0 C) I_0 D) $I_0/\sqrt{2}$
- ii) At high frequency, the current through a capacitor of A.C. circuit will be ____
 A) Large B) Small C) Infinite D) Zero
- iii) The device which allows only the continuous flow of an A.C. through a circuit is ____
 A) Capacitor B) Inductor C) D.C. motor D) Battery
- iv) Choke consumes extremely small ____
 A) Current B) Charge C) Power D) Potential
- v) The atoms, ions and molecules of crystalline materials maintain their long range order due to ____
 A) adhesive forces B) cohesive forces C) electrostatic forces D) Van der Waal's forces
- vi) Eddy currents produced in the core of transformer are responsible for ____
 A) heat loss B) step up process C) step down process D) induction phenomenon
- vii) Resonance frequency of RLC series circuit is $f_r =$ ____
 A) $\frac{2\pi}{\sqrt{LC}}$ B) $\frac{1}{2\pi}\sqrt{LC}$ C) $\frac{1}{2\pi\sqrt{LC}}$ D) $2\pi\sqrt{LC}$
- viii) A diode characteristic curve is plotted between:
 A) Current and time B) Voltage and time C) Voltage and current D) Forward voltage and reverse voltage
- ix) Commutator was invented in ____
 A) 1736 B) 1834 C) 1935 D) 1885
- x) The energy density of an inductor is ____
 A) $\frac{B}{2\mu_0}$ B) $\frac{\mu_0}{2B}$ C) $\frac{\mu_0}{2B^2}$ D) $\frac{B^2}{2\mu_0}$
- xi) The magnetism produced by electrons within atom is due to ____
 A) spin motion B) orbital motion C) spin and orbital motion D) vibratory motion
- xii) To construct a step down transformer ____
 A) $N_s \leq N_p$ B) $N_p \leq N_s$ C) $N_s = N_p$ D) $N_s \cdot N_p = 1$
- xiii) The most common source of an A.C. voltage is ____
 A) Motor B) Cell C) Generator D) Thermocapsule
- xiv) Power dissipation in a pure inductive or in a pure capacitance circuit is ____
 A) Infinite B) Zero C) Minimum D) Maximum
- xv) The ability of a body to return to its original shape is called ____
 A) Strain B) Stress C) Elasticity D) Plasticity
- xvi) When a motor is just started, back emf is almost ____
 A) maximum B) zero C) minimum D) infinite
- xvii) The mutual induction plays role in ____
 A) Generator B) Galvanometer C) Transformer D) D.C. Motor

Q2) Write short answers of the following:

44 Marks

- i) What is motional emf? Give its formula.
- ii) Write down four factors on which mutual inductance depends.
- iii) Write the principle of electric generator.
- iv) Define self-inductance and its units.

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- v) Can an electric motor be used to drive an electric generator, with the output from the generator being used to operate motor?
- vi) Can a step up transformer increase the power level?
- vii) What is back emf effect in a motor?
- viii) Distinguish between slip rings and split rings.
- ix) How does doubling the frequency affect the reactance of (i) capacitor (ii) inductor?
- x) In a RC circuit, will the current lag or lead the voltage? Illustrate your answer by a vector diagram.
- xi) How the reception of a particular radio station is selected on your radio set?
- xii) Name the device that will: (i) permit flow of D.C. but opposes the flow of A.C. (ii) permit flow of A.C. but not the D.C.
- xiii) What is resonance condition in RLC series circuit?
- xiv) What is a choke coil and where is it used?
- xv) A circuit contains an iron cored inductor, a switch and a D.C. source arranged in series. The switch is closed and after an interval reopened. Explain why a spark jump across the switch contacts?
- xvi) Write the characteristics of series resonance circuit.
- xvii) Draw figure showing electrical conduction by holes in semi-conductor.
- xviii) Distinguish between conductor and super conductor.
- xix) What is squid and where is it used?
- xx) Define stress and differentiate between volume stress and shear stress.
- xxi) What are superconductors? Write two uses of super conductors.
- xxii) How does the motion of an electron in an n-type substances differ from the motion of holes in a p-type substance?

Give explanatory answer of the following:

24 Marks

- 3A) What type of energy is stored in an inductor? Find the relations for energy and energy density in an inductor.
- 3B) What is an inductor? Find energy stores in the inductor.
- 4A) Calculate the impedance and phase angle of R-C series circuit and draw its impedance diagram
- 4B) Derive an expression for impedance and phase angle for R-C and R-L series circuit when excite by A.C. supply.
- 5A) What stress would cause a wire to increase in length is 12×10^{10} Pa. What force would produce this stress if the diameter of wire is 0.56 mm?
- 5B) The length of a steel wire is 1m and its corss-sectional area is $0.03 \times 10^{-4} \text{ m}^2$. Calculate the work done in stretching the wire when a force of 100N is applied within the elastic region. (Young's modulus of steel is $3 \times 10^{11} \text{ Nm}^{-2}$).

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