

F.Y. Diploma : Sem. II
[DE/EJ/IE/IS/CO/IF/CM/CW/ET/EN/EX]
Elements of Electrical Engineering
Prelim Question Paper



Time: 3 Hrs.]

- Instructions :** (1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data, if necessary.
(5) Preferably, write the answers in sequential order.

1. Attempt any **FIVE** of the following : [10]
- (a) Define Magnetic flux and Permeability.
 - (b) Define form factor and peak factor.
 - (c) Define 3-phase balanced and unbalanced load.
 - (d) State the difference between step up and step down Transformer.
 - (e) Write EMF equation of transformer. State the meaning of each notation in it.
 - (f) Define FHP Motor.
 - (g) State various types of Fuses.
2. Attempt any **THREE** of the following : [12]
- (a) A 30 ohm resistance is connected in series with 0.1 H inductance and the combination is connected across a 230v, 50 Hz, 1-phase supply.
Calculate : (i) Current
(ii) Power factor
(iii) active power consumed and
(iv) reactive power
 - (b) Write standard formula for each of the following and state its unit.
(i) Active Power (ii) Reactive Power (iii) Apparent Power and (iv) Copper Loss.
 - (c) Draw a balanced 3-phase delta connected load. Show various line and phase quantities on it. Also write relationship between line and phase values of voltages and currents
 - (d) Draw constructional diagram of DC motor. show different parts on it and write function of each part.
3. Attempt any **THREE** of the following : [12]
- (a) Explain with neat diagram Static and Dynamic Induced EMF.
 - (b) Compare Two winding Transformer with autotransformer.
 - (c) Write principle of operation of Split Phase Induction Motor.
 - (d) Explain importance of Earthing and also list the types of earthing.
4. Attempt any **THREE** of the following : [12]
- (a) A non-magnetic ring has a mean diameter of 44.5 cm and a cross-sectional area of 12 cm² . It is uniformly wound with 500 turns. Calculate the field strength and total flux produced in the ring by a current of 1Amp.
 - (b) Write any two applications of each of the following. i) DC Shunt Motor ii) DC Series Motor.
 - (c) Explain principle of operation of Universal motor with neat diagram.
 - (d) State the types of stepper motor. Explain working of any one type of Stepper Motor.
 - (e) Explain with neat diagram operation of MCB.
5. Attempt any **TWO** of the following : [12]
- (a) A sinusoidal voltage with equation $v=173 \sin (314 t - 300)$ Volt is applied to a load. Calculate: (i) Maximum Voltage (ii) RMS Voltage (iii) Frequency (iv) Time Period (v) Phase and (vi) Angular Frequency.

- (b) Three similar coils each of resistance of 20Ω and an inductance of 0.5 H are connected in star to a 3-phase, 440 V , 50 Hz supply system. Calculate the phase current, line current, phase voltage, line voltage, total phase power and total line power.
- (c) A 1-Phase, 1 kVA , $230/115 \text{ V}$ transformer used in a laboratory. Calculate: (i) Primary winding current (ii) Secondary winding current (iii) Turns Ratio and (iv) Current Ratio.

6. Attempt any **TWO** of the following :

[12]

- (a) Write any two applications of each of the following motor:
 - (i) Universal Motor
 - (ii) Stepper Motor
 - (iii) Capacitor Start Induction Run Motor
- (b) Write any four IE rules relevant to earthing.
- (c) Write any two applications of each of the following:
 - (i) ELCB (ii) MCCB (iii) MCB and (iv) Fuse.

□ □ □ □ □