Instruction : **All** questions are **compulsory**.

Marks

1. Attempt **any ten** :   **(2×10=20)**

   a) Define time period and RMS value of an a.c. wave.

   b) Draw neat connection diagram to measure voltage, current, power in an a.c. resistive circuit showing necessary meters.

   c) State applications of D.C. series motor.

   d) Draw schematic diagram of short shunt compound generator.

   e) State working principle of transformer.

   f) Define transformation ratio of a transformer. Write equation for it.

   g) Why transformer rating is in KVA ?

   h) State classification of electric drives on the basis of speed-torque characteristics.

   i) State types of enclosures for electric motors.

   j) State types of tariffs.

   k) State function of ELCB.

   l) State various faults that may occur in an electric motor.

2. Attempt **any four** :   **(4×4=16)**

   a) Distinguish between A.C. and D.C. supply (any four points).

   b) Define following terms used in A.C. circuit.

       i) Cycle   ii) Frequency

       iii) Phase   iv) Average value

   c) An A.C. Voltage of v(t) = 230 sin 314 t volts is applied to a circuit. Calculate

       i) Angular Frequency   ii) Frequency

       iii) RMS value   iv) Average value

   d) A series circuit consisting of resistance 40 Ω and inductance 30 mH is supplied by 230v, 50Hz, a.c. supply. Calculate impedance and current taken by the circuit.

   e) Calculate active and reactive power drawn from 230v, 50Hz a.c. supply when it is loaded by a series circuit consisting of resistance of 10 Ω and a capacitor of 200 mFd.

   f) Differentiate between PMMC and MI type meters (any four points).

P.T.O.

Marks

3. Attempt **any four** :　　　　　　　　　　　　　　　　　　　　　　**(4×4=16)**

   a) Explain construction and working of PMMC meters with neat sketches.

   b) Explain construction and working of M.I. meters with neat sketches.

   c) Compare shell type and core type transformers on the basis of construction.

   d) Compare auto transformer with two winding transformer on the basis of construction, copper savings, cost, voltage levels.

   e) Derive emf equation of transformer.

   f) Draw experimental set up to conduct load test on a single phase transformer for finding efficiency and regulation. Assume 1.5 KVA, 230v/115v, 50Hz transformer. State the ratings of meters used for measurement.

4. Attempt **any four** :　　　　　　　　　　　　　　　　　　　　　　**(4×4=16)**

   a) Explain with neat sketches construction of rotor of three phase induction motor.

   b) A three phase induction motor is rotating at 2960 rpm. Calculate

     i) Ns　　　　　　　　　　　　　ii) Slip speed

     iii) Slip　　　　　　　　　　　　iv) Rotor current frequency

   c) With neat diagram explain working of star-delta starter for three phase induction motor.

   d) Write factors for selection of motor for electric drives.

   e) Draw and explain torque-slip characteristics of three phase induction motor. Also show effect of rotor resistance.

   f) Draw schematic diagram of single phase capacitor start-run induction motor.

5. Attempt **any four** :　　　　　　　　　　　　　　　　　　　　　　**(4×4=16)**

   a) A balanced delta connected load supplied with 440v, 50Hz, three phase a.c. supply has $R = 10\,\Omega$ and $L = 0.6$ mH in its each arm.

    Calculate line and phase currents, active power.

   b) State and explain factors to be considered while selecting an electric motor for different drives.

   c) Explain construction and working of shaded pole induction motor.

   d) Explain operation of universal motor on A.C. and D.C. supply.

   e) Explain process of electroplating.

   f) State working principle of alternator. State the meaning self and separate excitation. State any one application of stepper and servomotor.

6. Attempt **any four** :　　　　　　　　　　　　　　　　　　　　　　**(4×4=16)**

   a) Explain dielectric heating.

   b) Compare resistance welding with arc welding.

   c) Explain any two types of enclosures used for electric motors.

   d) State any four advantages of LED over CFL.

   e) State necessity of earthing. Explain any one type of earthing.

   f) Explain any one type of fire extinguisher.

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