

- 3 a. Choose the correct answers for the following : (04 Marks)
- The phase sequence of a three phase system is RYB. The other possible phase sequence is _____,
A) YRB B) BRY C) RBY D) None of these
 - When the two wattmeters used to measure three phase power gives equal readings, then the p.f of the circuit is given by _____,
A) 0 B) 0.5 C) 1 D) 0.866
 - The power consumed by a 3- ϕ load is given by the expression _____,
A) $3V_L I_L \cos\phi$ B) $V_L I_L \cos\phi$ C) $\sqrt{3} V_L I_L \cos\phi$ D) $\sqrt{3} V_L \cos\phi$
 - A 3- ϕ apparatus is _____ efficient than a 1 - ϕ apparatus,
A) More B) Less C) Both (A) & (B) D) None of these
- b. What are the advantages of 3- ϕ systems over a single phase system? (06 Marks)
- c. A 3 - ϕ , 400 V, motor takes an input of 40 kW at 0.45 p.f. lag. Find the reading of each of the two single phase wattmeters connected to measure the input. (05 Marks)
- d. Obtain the relationship between line current and phase current in a balanced 3- ϕ delta connected system. (05 Marks)
- 4 a. Choose the correct answers for the following : (04 Marks)
- The totating disc of the energy meter is made of _____.
A) Copper B) Silver C) Aluminum D) Platinum
 - One unit of electrical energy is equivalent to _____.
A) 3.6 kWs B) 3600 W.S C) 1 kWh D) 10 WH
 - An intermediate switch is used in _____ of lamps.
A) Three way control B) Two way control
C) One way control D) Four way control
 - The value of "Fusing Factor" is always _____,
A) Less than 1 B) Equal to 1 C) Zero D) More than 1.
- b. With the help of neat diagram, explain the construction and principle of operation of a single phase induction type energy meter. (08 Marks)
- c. Write the circuit diagram and switching table for two-way and three-way control of lamp. Where is it used? (08 Marks)

PART - B

- 5 a. Choose the correct answers for the following : (04 Marks)
- The purpose of commutator in a d.c. generator is to _____,
A) Increase output voltage B) Convert emf from AC to DC
C) Reduce sparking at brushes D) Increase the speed
 - In a lap winding, the number of parallel paths is equal to _____,
A) $\frac{P}{2}$ B) 2P C) P D) 4P
 - The speed of a d.c _____ motor is almost constant.
A) Shunt B) Series C) Compound D) None of these
 - The torque produced by DC motor is directly proportional to _____.
A) $V I_a$ B) $I_a R_a$ C) ϕI_a D) $E_b I_a$
- b. Derive the expression for the e.m.f of a DC generator. (04 Marks)
- c. Sketch the various characteristics of DC shunt motor and mention its applications. (06 Marks)
- d. A DC shunt motor takes an armature current of 110 A at 480 V. The armature resistance is 0.2Ω . The machine has 6 poles and armature is lap connected with 864 conductors. The flux per pole is 0.05 Wb. Calculate i) speed ii) the torque developed by the armature. (06 Marks)

- a. Choose the correct answers for the following : (04 Marks)
- The transformation ratio in a transformer is equal to _____.
 A) $\frac{E_1}{E_2}$ B) $\frac{N_1}{N_2}$ C) $\frac{N_2}{N_1}$ D) $\frac{I_2}{I_1}$
 - The efficiency of a transformer is maximum when _____.
 A) Iron loss is more than copper loss B) Iron loss is equal to copper loss
 C) Iron loss is less than copper loss D) None of these
 - Core type of transformers are used to handle _____ and _____ voltages.
 A) Low and High B) Low and Medium C) High and Medium D) None of these
 - Copper loss in a transformer is a _____ loss.
 A) Constant loss B) Variable loss C) Friction loss D) None of these
- b. Explain the construction and working of a transformer. (06 Marks)
- c. Find the number of turns on the primary and secondary side of a 440/230 V, 50 Hz single phase transformer, if the net area of cross section of the core is 30 cm² and the maximum flux density is 1 Wb/m². (04 Marks)
- d. A single phase transformer working at 0.8 pf has an efficiency 94% at both three fourth full load and full load of 600 kW. Determine the efficiency at half full –load, unity power factor. (06 Marks)
- 7 a. Choose the correct answers for the following : (04 Marks)
- A non salient pole rotor is used in _____ alternator.
 A) Low speed B) High speed C) Medium speed D) A and B
 - The speed at which a 4–pole alternator has to be driven to generate a voltage at 50 Hz is _____.
 A) 1000 rpm B) 1500 rpm C) 2000 rpm D) 1440 rpm
 - The E. M. F. induced in an alternator is given by the equation _____.
 A) $4.44 f \phi z k_p k_d$ B) $2.22 k_p f \phi z$ C) $2.22 f \phi z k_p k_d$ D) $4.44 f \phi z$
 - The field winding of an alternator is _____ excited.
 A) DC B) AC C) Both DC and AC D) None of these
- b. How are alternators classified? With a neat diagram, show the difference between them. (08 Marks)
- c. A 2 – pole, 3 – phase alternator running at 3000 rpm has armature slots with 2 conductors in each slot. Calculate the flux per pole required to generate a line voltage of 2300 V. Distribution factor is 0.952 and pitch factor is 0.956. (06 Marks)
- d. Define regulation of an alternator. (02 Marks)
- 8 a. Choose the correct answers for the following : (04 Marks)
- The frequency of the rotor current is _____.
 A) $\frac{s}{f}$ B) sf C) sf^2 D) None of these
 - In a 3 – phase induction motor, the slip speed is given by _____.
 A) N_s B) N C) $N_s - N$ D) $N - N_s$
 - The synchronous speed of three phase induction motor is given by _____.
 A) $N_s = \frac{120f}{P}$ B) $N_s = 120 fP$ C) $\frac{120P}{f} = N_s$ D) $N_s = \frac{Pf}{120}$
 - A 3– ϕ induction motor having 4 – poles, 50 Hz runs at 1440 rpm, the slip is _____.
 A) 3% B) 5% C) 4% D) 1%
- b. With a neat diagram, explain the working principle of 3 - ϕ induction motor. (06 Marks)
- c. A 10 pole induction motor is supplied by a 6 – pole alternator which is driven at 1200 rpm. If the motor runs with a slip of 3%, what is its speed? (06 Marks)
- d. Why does an induction motor need a starter? (04 Marks)

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