

B.TECH DEGREE EXAMINATION, MODEL QUESTION

First and Second Semester

EN010 108: BASIC ELECTRICAL ENGINEERING

(Common to all Branches)

Time: Three Hours

Maximum: 100 Marks

Part A

Answer **all** questions. Each question carries 3 marks

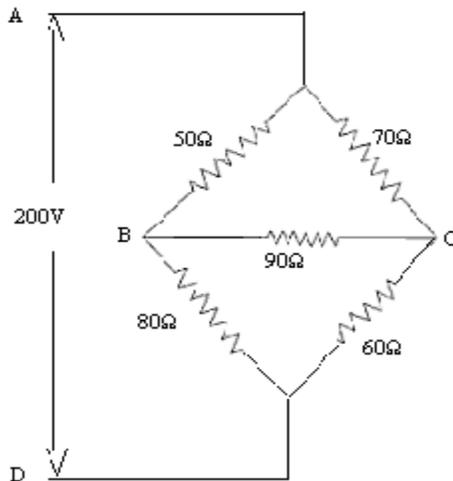
1. Write the equation for converting a Delta connected network to equivalent star connected network and vice versa.
2. Define RMS value, Average value and Form factor.
3. Explain the necessity of starter in a DC motor.
4. What are the different types of single phase induction motor?
5. Distinguish between a feeder, distributor and service mains.

(5 × 3 = 15 marks)

Part B

Answer **all** questions. Each question carries 5 marks

6. In the circuit shown in fig: find the total current from the supply and the current in 90Ω resistor.

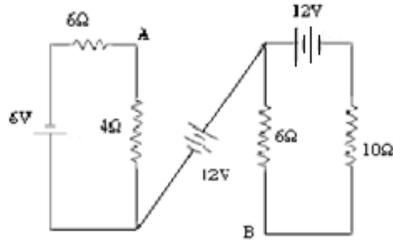


7. Derive the expression for the RMS value of a sinusoidal voltage.
8. Derive the emf equation of single phase transformer.
9. A 50Hz, 4 pole 3phase Induction motor has a rotor current of frequency 2Hz. Determine i) the slip and ii) the speed of the motor.
10. What are the requirements of a good lighting system?

(5 × 5 = 25 marks)

Part C

11. a) State and Explain Kirchoff's laws.
 b) In the network shown in figure find the voltage across AB



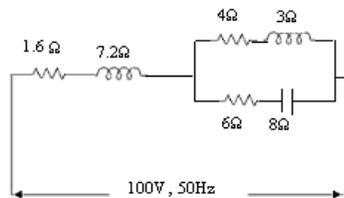
Or

- 12.a) Distinguish between electric and magnetic circuit.
 b) A magnetic core in the form of closed ring has a mean length of 20cm and a cross section of 1cm². The μ_r of iron is 2400. What current will be needed in a coil of 2000 turns uniformly wound round the ring to create a flux of 0.2mWb in the iron. If an air gap of 1mm is cut through the core perpendicular to the direction of this flux, what will be the current needed to maintain the small flux in the gap?

- 13.a) Distinguish between statically induced emf and dynamically induced emf.
 b) From the fundamentals derive an expression for the average power in an ac circuit.

Or

- 14.a) For the circuit shown in figure find the total impedance, current power and power factor.



- 15.a) Explain the different types of DC generators.

b) A 400V shunt motor has an armature resistance of 0.8Ω and field resistance of 200Ω .

.Determine the back emf when giving an output of 7.46kW at 80% efficiency.

Or

16.a) What are the losses in a transformer ? On what factors these losses depend?

b) A 25kVA transformer has 500 turns on the primary and 50 turns on the secondary windings. The Primary is connected to 3000V, 50Hz supply. Find the full load primary and secondary currents, the secondary emf and the maximum flux in the core. Neglect the leakage drops and the no load primary current.

17.a) Obtain the relation between line and phase voltages and currents in star connected system

b) A 220V 3 phase voltage is applied to a balanced delta connected 3 phase load of phase

Impedance $(15+j20)\Omega$.

i) Find the phasor current in each line

ii) The power consumed /phase

iii) Draw the phasor diagram

Or

18.a) Why a single phase induction motor is not self starting?

b) Describe the different rotor constructions in an alternator.

19) Describe the various non conventional energy sources.

Or

20.a) Explain the working principle of mercury vapor lamp.

b) Explain the energy management techniques applied to a residential building.

(5 × 12 =60 marks)