

Code No: RT22025

R13**SET - 1****II B. Tech II Semester Supplementary Examinations, April-2018****ELECTRICAL MACHINES - II**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)2. Answer **ALL** the question in **Part-A**3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

1. a) What current flows in the transformer primary when its secondary is open? (3M)
- b) What is all – day efficiency? Explain its significance (3M)
- c) A single – phase induction regulator has an input voltage of 230V and a turn ratio of 5: 1. Find the range of output voltage. If the load current is 10A, find the rating of secondary winding and primary winding current and input current (4M)
- d) What is the difference between cage rotor and wound rotor? (3M)
- e) Explain its effect on three phase induction motor. (4M)
- f) What are the factors that affect the choice of air gap flux in air gap of an induction motor? (3M)

**PART -B**

2. a) Draw and explain the phasor diagram of a transformer for leading loads (8M)
- b) A transformer has iron loss of 95 W at 65 Hz supply and 55 W at 35 Hz supply and both losses are measured at same peak flux density. Calculate the total iron loss in the transformer at 50 Hz supply (8M)
3. a) Explain how temperature rise is obtained from sumpner's test (6M)
- b) A 1000V, 25 Hz transformer has copper, hysteresis and eddy current losses of 1.5, 0.7 and 0.4 % of output. What will be the percentage losses if transformer is used on 2000V, 50 Hz system, assuming the full load current to be the same in the two cases. Compare the full – load efficiency at the two frequencies if power factor is unity. (10M)
4. What are the distinguishing features of Y – Y, Y –  $\Delta$ ,  $\Delta$  – Y and  $\Delta$  –  $\Delta$ , three phase connections? Compare their advantages and disadvantages. (16M)
5. a) Explain the Torque – slip characteristics of a three phase induction motor with a neat diagram (8M)
- b) An induction motor has an efficiency of 0.9 when the output is 50 hp. At this load the stator and rotor copper loss each equals the iron loss. The windage and friction losses are one – third of no – load losses. Calculate the slip.

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6. a) Explain the procedure of drawing the circle diagram of an Induction motor. What information can be obtained from the circle diagram and how? (8M)
- b) The rotor resistance per phase of an 8 – pole, 50 Hz slip ring motor is 0.22 ohms and its full load speed is 750 rpm. Calculate the external resistance per phase that must be added to lower the speed to 700 rpm. Given that the torque is the same in the two cases. (8M)
7. a) Write a short note on choice of specific electric loading. (8M)
- b) The current densities in the primary and secondary windings of a transformer are 2.2 and 2.1 A/mm<sup>2</sup> respectively. The ratio of transformation is 10:1 and the length of mean turn of the primary is 10 percent greater than that of the secondary. Calculate the resistance of the secondary windings given that primary winding resistance is 8Ω. (8M)