

II B. Tech II Semester Supplementary Examinations, Nov/Dec-2016
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) Derive an expression for emf equation of single phase transformer. (4M)
- b) What are the necessary conditions for conducting O.C and S.C tests (4M)
- c) What is the need for Star/Delta transformer? Explain briefly. (4M)
- d) What is slip speed? A 3-phase, 4-pole, 50Hz induction motor is running at 1440 rpm. Determine the slip speed. (4M)
- e) List different starting schemes for a squirrel cage induction motor. (3M)
- f) Define the specific electric loading and magnetic loading (3M)

PART – B

2. a) State and prove the condition for maximum efficiency of transformer. (8M)
- b) A 100KVA, 1-phase transformer has full load primary current of 400A and total resistance referred to primary is 0.006. If the iron loss amounts to 500W, find the efficiency at full load and half load at
 (i) Unity power factor and (ii) 0.8 power factor. (8M)
3. a) A 240/120V, 12 kVA transformer has full-load unity pf efficiency of 96.2%. It is connected as an auto-transformer to feed a load at 360V. What is its rating and full-load efficiency at 0.85 pf lagging? (8M)
- b) A 120 KVA, 2000 / 200V, 1 phase transformer takes a current of 50 A and 2400 W at 100V when the low voltage winding is short circuited. Determine the load voltage and % regulation when delivering full load current at 0.8p.f lagging, the supply voltage being 2000V. (8M)



4. a) What are the advantages of three-phase transformers over single-phase transformer units? (6M)
- b) Explain the implementation of three-phase Star/Star and Star/Delta transformers. Also list their applications. (10M)
5. a) What is meant by stand still reactance of induction motor rotor? How does it vary with speed? (6M)
- b) Draw the phasor diagram of an induction motor showing applied voltage, magnetizing, coreloss, load current and the line current. Label each component. (10M)
6. a) Show that the maximum torque occurs at a slip $s = \frac{R_2}{X_2}$ and further show that T_{max} is independent of s . (8M)
- b) What is cogging? How to eliminate cogging? (4M)
- c) What is crawling? Explain briefly. (4M)
7. a) Write and explain the output equation of a transformer. (6M)
- b) The current densities in the primary and secondary windings of a transformer are 2.2 and 2.1 A/mm² respectively. The ratio of transformation is 10:1 and the length of mean turn of the primary is 10 per cent greater than that of the secondary. Calculate the resistance of the secondary winding given that primary winding resistance is 8 Ω . (10M)

