

Roll No .....

**EE/EX-4002 (CBGS)****B.E. IV Semester**

Examination, May 2018

**Choice Based Grading System (CBGS)****Electrical Machine - I***Time : Three Hours**Maximum Marks: 70***Note:** i) Attempt any five questions.

ii) All questions carry equal marks.

iii) Assume any missing data, if required.

1. a) Describe the principle and working of a single phase transformer and draw the no load phasor diagram of an ideal transformer. rgpvonline.com  
b) Explain with neat circuit diagrams the open circuit and short circuit test on a single phase transformer.
2. a) Derive the condition for maximum efficiency of a transformer at a given power factor.  
b) A 100 KVA, 50 Hz, 440/11000 V single phase transformer has an efficiency of 98.5% when supplying full load currents at 0.8 pf lagging and an efficiency of 99% when supplying half full load current at unity power factor. Find the core loss and copper losses corresponding to full load current. At what value of load current the maximum efficiency be attained?
3. a) Describe the possible ways of connections of 3-phase transformer with relevant relations amongst voltage and current on both LV and HV sites.  
b) With the help of neat diagram. Explain Scott connection in detail.

4. a) Describe constructional features of Squirrel Cage Induction motor and slip ring induction motor. Discuss the merits of one over the other.  
b) Discuss the concept of rotating magnetic field in a 3- $\phi$  Induction motor.
5. a) Derive the equation for the torque developed by an Induction motor. Draw a typical torque-slip characteristics curve and deduce the condition for maximum torque.  
b) Discuss why a starter is needed for a 3- $\phi$  Induction motor. Explain any one method for starting of a 3- $\phi$  Induction motor.
6. a) The power input to a 500 V, 50 Hz 6 pole, 3- $\phi$  squirrel cage induction motor running at 975 rpm is 40 kW. The stator losses are 1 kW and the friction and windage losses are 2 kW.  
Calculate:  
i) Slip  
ii) Rotor copper loss  
iii) BHP  
iv) Efficiency  
b) Describe the construction and working of single phase Induction motor. Give its various applications.
7. a) Describe along with connection diagram, the common starting methods of a single phase Induction motor.  
b) Describe servo motor with its applications.
8. Write short notes on the following: (any two)  
a) All day efficiency of transformer  
b) No load and block rotor test of 3- $\phi$  Induction motor  
c) Double revolving field theory

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