PVP 12

Code: EE4T4

II B.Tech - II Semester – Regular Examinations - JUNE 2015

ELECTRICAL MACHINES – II
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1 a) Draw no-load phasor diagram of a transformer and derive expressions for magnetizing and core-loss components of no-load current. 7 M

b) The no-load current of transformer is 5A at 0.2 pf when supplied at 240V, 50Hz. The number of turns on the primary winding is 250. Determine 7 M
i) the maximum value of flux in the core
ii) the core loss and
iii) magnetizing current

2 a) Define the voltage regulation of a transformer. Deduce the expression for the voltage regulation. 7 M

b) Obtain the equivalent circuit of 1-phase 4 KVA 200/400 V, 50 Hz transformer from the following test results 7 M
OC test : 200V 0.7A 70 W on lv (primary side)
SC test : 15V 10A 80 W on hv (secondary side)

3 a) State the necessary conditions for satisfactory operation of two transformers in parallel. State briefly why all transformers cannot be operated in parallel. 7 M

b) The primary and secondary voltages of an auto-transformer are 500 volts and 400 volts respectively. Show with the aid of a diagram the current distribution in the windings when the secondary current is 100 A and calculate the economy of copper in this case. 7 M

4 a) Why are the tap changing transformers required ? Explain the operation of no-load and on-load tap changing transformers. 7 M

b) Two 100 V single-furnaces are supplied through Scott-connected transformers from 600 V, 3-Phase mains. Calculate the current in each of 3-phase lines when the Power taken by each furnace is 600 Kw at pf of 0.71 (lag). 7 M

5 a) Explain with help of suitable diagrams, how rotating magnetic field is produced in a 3-phase induction motor. 7 M

b) A 3 phase, 50 Hz Induction motor has a full load speed of 1440 rpm. For this motor, Calculate the following: 7 M

i) Number of poles ii) Full load slip & rotor frequency

iii) Speed of stator field iv) Speed of rotor field

6 a) Explain how the parameters of a 3-phase induction motor can be obtained from the no-load & blocked rotor test results. 7 M

b) A 3-phase 400 V induction motor gave the following test readings: 7 M

No-load test:	400 V,	1250 W,	9 A
Blocked Rotor Test:	150 V,	4000 W,	38 A

Draw the circle diagram. If the normal rating is 20.27 hp (metric), find from the circle diagram the full-load values of current, power factor and slip.

7 a) In double-cage polyphase induction motors, explain how the desirable features of high starting torque and low operating slip are attained. 7 M

b) State various methods of starting of a 3-phase induction motor. Explain with the help of diagram the working of an automatic direct-on –line starter. 7 M

8 a) Discuss any two methods of speed control of 3-phase squirrel cage induction motor. 7 M

b) Explain with neat diagram the following types of single phase induction motors. 7 M

i) Split-phase induction motor

ii) capacitor-start induction-run motor. Also draw their torque-speed characteristics.