

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2020 COURSE)
B.Tech.Sem - III ELECTRICAL : : SUMMER - 2022
SUBJECT : DC & AC MACHINES

Day : Monday
Date : 30-05-2022

S-24540-2022

Time : 02:30 PM-05:30 PM
Max. Marks : 60

N. B. :

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Draw neat labeled diagrams **WHEREVER** necessary.
 - 4) Assume suitable data if necessary.
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Q.1 a) Write a Short note on : **(05)**
i) Armature voltage control
ii) Field control method of speed control of DC Motor.

b) Derive torque equation of DC motor. **(05)**

OR

a) A four pole generator having wave-wound armature winding has 51 slots, each slot containing 20 conductors. What will be the voltage generated in the machine when driven at 1500 rpm. Assuming the flux per pole to be 7.0 mWb? **(05)**

b) Explain Brake Test of DC Motor for the determination of efficiency. **(05)**

Q.2 a) Explain relation between rotor copper loss, rotor input and gross mechanical power developed along with power flow of induction motor. **(05)**

b) Write a short note on Star-Delta starter. **(05)**

OR

a) A 3 phase, 50 Hz induction motor runs at 1000 rpm and delivers 10 kW output. What starting torque will the motor develop when switched directly on to the supply, if maximum torque is developed at 960 r. p. m.? **(05)**

b) Draw torque slip characteristics and explain starting torque, maximum torque of three phase induction motor. **(05)**

Q.3 a) Why open circuit (OC) and short circuit (SC) tests conducted on three phase induction motor? Explain in brief. **(05)**

b) Briefly elaborate high torque cage motors. **(05)**

OR

a) Discuss the computation of performance parameters of three phase induction motor by circle diagram? **(05)**

b) Explain torque speed/slip characteristics of single phase induction motor and state the application of shaded pole motor. **(05)**

P.T.O.

- Q.4** Explain two reaction theory model of salient pole synchronous machine and draw its phasor diagram under lagging pf load. (10)

OR

Discuss the no-load characteristic and load characteristics of alternator for different power factors. (10)

- Q.5** Write a short note on :
i) Significance of synchronizing power coefficient (04)
ii) Power flow equations for salient pole alternator. (06)

OR

A 1000 kVA, 3000 V, 50 Hz, three phase star connected alternator gave the following open circuit test data: (10)

I_f (A)	15	30	50	75	90	120	150
V_{oc} Line (V)	345	690	1200	1675	1900	2130	2200

The short circuit test gives full load current at a field current of 50 A. the armature resistance per phase is 0.25Ω . Determine the percentage voltage regulation of the alternator on full load at 0.8 lagging pf and UPF by MMF method.

- Q.6** Draw the phasor diagrams of a synchronous motor for lagging and UPF. Explain the effect of change in load if excitation is constant. (10)

OR

- a) Derive the commonly used expression for the power developed by a synchronous motor. (06)
- b) Discuss the salient features and applications of synchronous motor. (04)

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