

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)
B.Tech.Sem - VII ELECTRICAL : : SUMMER - 2022
SUBJECT : AC-DC DRIVES

Day : Monday
Date : 30-05-2022

S-13337-2022

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) Use of non-programmable calculator is **ALLOWED**.
- 4) Draw neat and labelled diagrams **WHEREVER** necessary.
- 5) Assume suitable data, if necessary.

Q. 1 a) What is selection criteria of a electric drive? **(05)**

b) What is load equalization? Explain with example. **(05)**

OR

a) What are different load torque components? Write appropriate equations. **(05)**

b) How do you compare mechanical drives with electrical drives? **(05)**

Q. 2 a) What are different electrical braking methods? Explain any one with circuit diagram. **(05)**

b) What is regenerative braking? Enlist its applications. **(05)**

OR

a) What is drawback of plugging type braking? How to overcome that drawback. **(05)**

b) What are various methods to control speed of 3ϕ Induction motor? **(05)**

Q. 3 a) Draw circuit diagram of 3 Phase fully controlled converter and explain each component. **(05)**

b) A 200 V, 875 rpm, 150 A separately excited DC motor has armature resistance of 0.06Ω . It is fed from 1ϕ fully controlled rectifier with AC source voltage of 220V, 50Hz. Assume continuous conduction, Calculate firing angle for rated torque and 750 rpm. **(05)**

OR

a) Explain chopper control method of DC series Motor with motoring mode. **(05)**

b) How do you compare open loop and closed loop control system? **(05)**

Q. 4 a) Draw block diagram of multilevel inverter and explain its working. **(05)**

b) What is steady state stability? Explain with example. **(05)**

OR

a) What are relative merits and demerits of VSI and CSI of induction motor? **(05)**

b) A star connected squirrel cage Induction motor has following ratings and parameters: **(05)**

$400V$, $50 Hz$, $4 - Pole$, $1370 rpm$,

$R_s = 2 \Omega$, $R_r = 3\Omega$, $X_s = X_r = 3.5 \Omega$, $X_M = 55\Omega$.

It is controlled by CSI at a constant flux. Calculate motor torque, speed, stator current, when operating at $30Hz$ and rated slip speed.

P. T. O.

- Q. 5** a) Why motor of small rating is selected for a short time duty? (05)
b) State and explain disadvantages of using motor with wrong rating. (05)

OR

- a) What are the energy saving methods for Induction Motor drive? (05)
b) How variable speed drive allows saving of energy in pump drives? (05)

- Q. 6** a) Describe an efficient unipolar drive for stepper motors. (05)
b) Draw torque versus stepping rate characteristic of stepper motor. What is slew range? (05)

OR

- a) Draw and explain centrifugal drives used for sugar mills. (05)
b) What type of drives are required in machine tool applications? (05)

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