



GIET UNIVERSITY, GUNUPUR – 765022
B. Tech (Sixth Semester Regular) Examinations, May – 2024
21BELPC36003 – Electrical Drives
(EE)

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right-hand margin indicate marks)

PART – A**(2 x 5 = 10 Marks)**

Q.1. Answer ALL questions	CO #	Blooms Level
a. Mention some of the drawback of conventional Ward-Leonard scheme.	CO3	K2
b. Determine rated current of 5MW, 10KV, 50hz synchronous machine operating with efficiency of 0.96 & power factor of 0.9.	CO4	K3
c. Draw the speed-torque characteristics of DC series motor.	CO2	K3
d. Describe role of microprocessor for speed control of DC motor	CO5	K2
e. Write different stages and drives required for Paper mills.	CO6	K3

PART – B**(15 x 4 = 60 Marks)**Answer **ALL** questions

	Marks	CO #	Blooms Level
2. a. A constant speed drive has the following duty cycle. i) Load rising from 0 to 400KW; in 5 minutes. ii) Uniform load of 500KW; 5 minutes. iii) Regenerative power of 400KW returned to supply; 4 minutes. iv) Remains Idle for; 2 minutes. Estimate power rating of the motor. Assume losses to be proportional to power.	8	CO3	K3
b. State and explain the various classes of motor duty.	7	CO1	K2
(OR)			
c. Discuss the Ward-Leonard speed control system with a neat circuit diagram. Also mention its advantages and disadvantages.	8	CO4	K2
d. Explain VVVF control of 3-phase induction motor.	7	CO5	K3
3.a. Draw the block diagram and explain the basic elements of an electric drive system.	8	CO1	K2
b. A 3-phase, 4 pole, 415V, 50Hz IM has a star connected stator. The rotor impedance at standstill is $(0.1 + j0.9) \Omega$. The stator to rotor turns ratio is 1.75 Calculate external resistances per phase required in the rotor to limit starting rotor current to 60A.	7	CO3	K3
(OR)			
c. Explain the concept of open loop V/F control of synchronous motor.	8	CO4	K3
d. Electrical drives are influenced by a number of factors. What are they?	7	CO1	K3
4.a. Explain the various kind of load torques.	8	CO1	K2

b.	Describe the phasor diagram of a synchronous motor working at various rotor excitation levels with a constant load torque.	7	CO5	K3
(OR)				
c.	A 220V compensated shunt motor drives a 700N-m torque load when running at 1200rpm. The combined armature compensating winding and interlope resistance 0.008Ω and shunt resistance is 55Ω . The motor efficiency is 90%. Calculate the value of dynamic braking resistance that will capable of 375Nm torque at 1050rpm. The friction and windage losses may be assumed to remains constant at both speeds.	8	CO2	K3
d.	Define Active load torque and Passive Load Torque. Explain the various components of load torques?	7	CO1	K2
5.a.	How the speed control of the dc drive is achieved using fully controlled rectifier?	8	CO4	K3
b.	Write short notes on drives used in paper mills.	7	CO6	K2
(OR)				
c.	Draw a typical temperature rise –time curve and derive equation for temperature rise in an electric drive	8	CO2	K3
d.	Describe how microprocessor-based electrical drives operate.	7	CO6	K2

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