Q. Code:541539

Reg. No. | | | | | | | | | | | | | |

B.E./ B.TECH. DEGREE EXAMINATIONS, MAY 2024

Second Semester

EE22251 – BASIC ELECTRICAL AND ELECTRONICS ENGINEERING FOR CHEMICAL ENGINEERS

(Chemical Engineering)

(Regulation 2022)

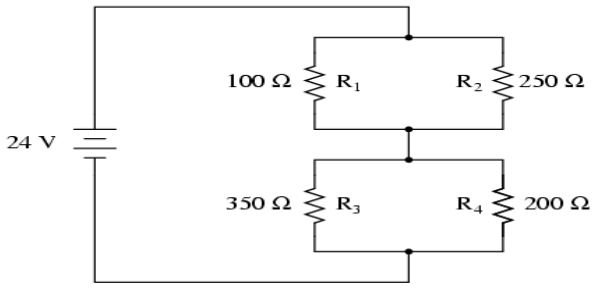
TIME:3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Apply basic electrical laws for the electrical circuits and understand sensors and measurement principles	**3**
CO 2	Analyze the characteristics of various semiconductor devices and develop circuits for an application.	**4**
CO 3	Analyze and select electrical machines for drive applications based on characteristics.	**4**
CO 4	Identify the structure and types of Electrical drives for specific applications.	**3**
CO 5	Apply control methods for Electrical Machine and Drives in chemical process industries	**3**

PART- A(20x2=40Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	State the laws which are used to find unknown currents and voltages in a circuit.	**1**	**2**
2.	Calculate the total resistance of the circuit.	**1**	**3**

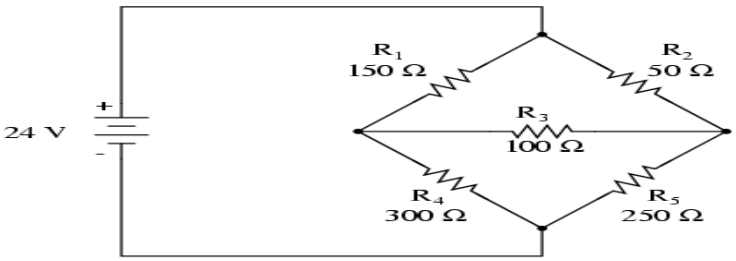


3.	Contrast the lead-lag behaviour of current waveform with respect to voltage waveform in each of R, L and C circuits.	**1**	**3**
4.	What are the factors affecting resistance?	**1**	**2**
5.	Differentiate between zener breakdown and avalanche breakdown.	**2**	**2**
6.	Draw V-I characteristics of SCR.	**2**	**2**
7.	Why IGBT is very popular nowadays?	**2**	**3**
8.	What is meant by step-up and step-down chopper?	**2**	**2**
9.	Write the voltage equation of DC motor and DC generator.	**3**	**2**
10.	Clarify why brushes in a generator are made of carbon?	**3**	**2**
11.	Draw the speed torque characteristics of (a) Constant Torque type load (b) Generator type load (c) Fan type load (d) constant power type load.	**3**	**3**
12.	What is the Necessity of starter?	**3**	**2**
13.	List the factors affecting the selection of electric drives.	**4**	**2**
14.	Mention the function of Power modulator.	**4**	**2**
15.	Give the formula for computing power requirement for a liner movement.	**4**	**2**

16.	What is meant by multimotor drive? Give an example.	**4**	**2**	
17.	Compare the chopper control and phase control schemes for DC motor drives.	**5**	**2**	
18.	Mention the different methods of speed control employed for DC Motor.	**5**	**2**	
19.	List the different methods of speed control of three phase induction motor.	**5**	**2**	
20.	What in the need for PWM inverter control?	**5**	**3**	

PART- B (5x 10=50Marks)

		Marks	CO	RBT LEVEL
21. (a)	Determine the mesh and branch currents for the following Network is shown in figure	**(10)**	**1**	**3**



(OR)

(b)	Explain in detail about Resistance Temperature Detector and its characteristics.	**(10)**	**1**	**3**
22. (a)	Describe the working of a PN junction diode with neat diagrams. Also explain its V-I characteristics.	**(10)**	**2**	**3**

(OR)

(b)	Draw and explain working of full bridge rectifier.	**(10)**	**2**	**3**
23. (a)	Explain about the speed-torque characteristics of a DC Shunt Motor with suitable graph and equations.	**(10)**	**3**	**3**

(OR)

(b)	State the various starting methods of squirrel cage induction motor. Explain any two of them.	**(10)**	**3**	**3**
24. (a)	Derive the expression for the heating time constant and draw the heating and cooling curve.	**(10)**	**4**	**3**

(OR)

(b)	Explain the different classes of duties of a motor with neat sketch.	**(10)**	**4**	**3**
25. (a)	Explain the field control method used for D.C series motor for speed control?	**(10)**	**5**	**3**

(OR)

(b)	What is meant by slip power recovery scheme? Explain with the necessary diagram.	**(10)**	**5**	**3**

PART- C (1x 10=10Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	Explain how an DC Shunt motor is brought to stop by (i) Plugging and (ii) dynamic braking. Explain the conditions to achieve electric regenerative breaking.	**(10)**	**3**	**4**

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