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

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2023

First Semester

EE18152 – BASIC ELECTRICAL ENGINEERING

(Electronics and Communication Engineering)

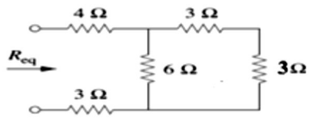
(Regulation 2018/2018A)

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

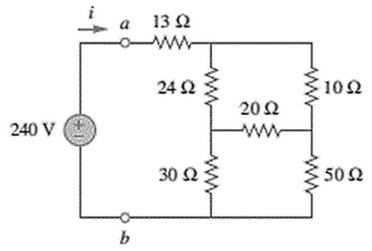
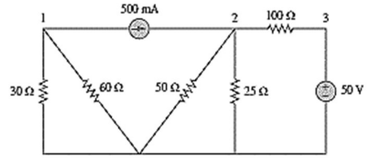
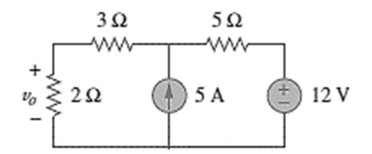
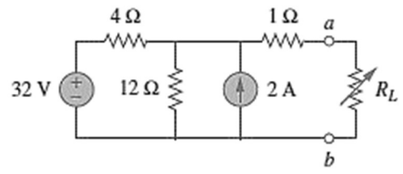
COURSE OUTCOMES	STATEMENT
CO 1	Apply various circuit analysis technique to solve problems in DC and AC Circuits.
CO 2	Apply various network reduction technique and network theorem to solve problems in DC and AC Circuits.
CO 3	Illustrate the construction, working principle, characteristics and applications of Transformer and Separately excited DC Motor.
CO 4	Illustrate the construction, working principle, characteristics and applications of Induction motor and Synchronous Generator.
CO 5	Explore the significance of the Electrical Installation and different power converter.

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		Marks	CO	RBT LEVEL
1.	 Solve the given circuit to determine Req.	**1**	**2**
2.	Summarize the formulas required for converting delta network to star network.	**1**	**2**
3.	What are the limitations of Reciprocity theorem?	**2**	**2**
4.	State Thevenin Theorem and draw its equivalent circuit.	**2**	**1**
5.	Outline the assumptions considered for an ideal transformer.	**3**	**2**
6.	Justify why the induced emf in a dc motor is called back or counter emf.	**3**	**3**
7.	How will you find the speed of an ac machine with given frequency and poles. Justify it?	**4**	**2**
8.	Why Single Phase Induction Motor is not Self Starting?	**4**	**2**
9.	Distinguish MCB and MCCB	**5**	**2**
10.	Sketch the circuit diagram of buck converter and boost converter.	**5**	**2**

PART- B (5 x 14 = 70 Marks)

		Marks	CO	RBT LEVEL
11. (a)	 Calculate the value of current i flowing in the circuit shown.	**(14)**	**1**	**3**
	(OR)			
(b)	 Calculate the nodal voltages in the circuit shown.	**(14)**	**1**	**3**
12. (a)	 Using superposition theorem, calculate v_o in the circuit shown.	**(14)**	**2**	**4**
	(OR)			
(b)	 Find the Thevenin equivalent circuit across a-b and find the current through the load resistor R_L=16 Ω.	**(14)**	**2**	**4**
13. (a)	A single phase 50-Hz transformer has 20 primary turns and 200 secondary turns. If the primary winding is connected to a 230V supply, calculate (i) The value of maximum core flux (ii) The voltage induced in the secondary winding (iii) the primary current when the secondary current is 13A.	**(14)**	**3**	**3**

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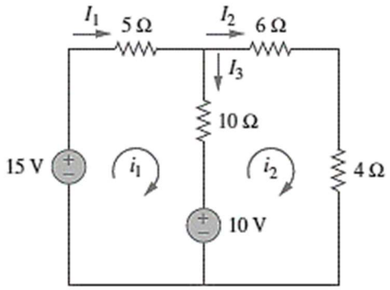
		(OR)			
(b)		Derive the equation relating back-emf and speed of dc motor and discuss the speed control method used separately excited dc motor.	**(14)**	**3**	**3**
14. (a)	**(i)**	Draw a typical torque-slip characteristics curve of 3-phase induction motor and deduce the condition for maximum torque.	**(8)**	**4**	**3**
	(ii)	Show that the three-phase currents flowing in three phase windings generate a rotating magnetic field.	**(6)**	**4**	**3**
		(OR)			
(b)	**(i)**	Explain construction and working principle of Synchronous Generator.	**(7)**	**4**	**3**
	(ii)	Discuss the various types of losses that can occur in an induction motor. Identify the loss that impact motor efficiency.	**(7)**	**4**	**3**
15. (a)		Draw the circuit diagram of a buck boost converter and explain its operation with equivalent circuit for different modes and waveforms	**(14)**	**5**	**3**
		(OR)			
(b)		Briefly explain the components of LT Switchgear and its types.	**(14)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)
(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.		**(10)**	**1**	**5**

For the circuit shown, calculate the branch currents I_1, I_2, and I_3 using mesh analysis.

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