Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – MAY 2025

Date: 29-05-2025 **Time:** 01:00 pm – 04:00 pm

School: SOE/SOCSE	**Program**: B.Tech – Basic Engineering Science Cycle	
Course Code: EEE1007	**Course Name:** Basics of Electrical and Electronics Engineering	
Semester: II	**Max Marks**:100	**Weightage**:50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	24	24	26	26	

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

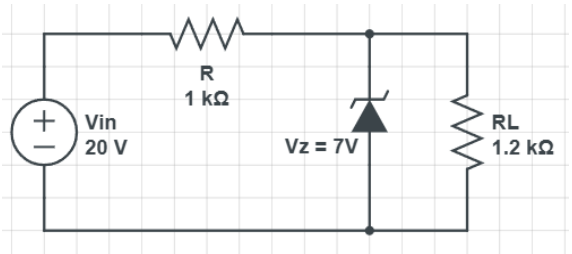
1.	What is the equivalent resistance, if there are three resistors connected in series.	**2 Marks**	**L1**	**CO1**
2.	Write the relationship between line voltage and phase voltage in a three-phase, star-connected network.	**2 Marks**	**L1**	**CO1**
3.	List any two differences between a conductor, insulator and semiconductor.	**2 Marks**	**L1**	**CO2**
4.	Why is a capacitive filter included at the output of a rectifier.	**2 Marks**	**L1**	**CO2**
5.	What is the basic principle behind the working of a transformer.	**2 Marks**	**L1**	**CO3**
6.	Write the expression to calculate the Back EMF of a DC motor.	**2 Marks**	**L1**	**CO3**
7.	What are the two types of rotors used in an induction motor.	**2 Marks**	**L1**	**CO3**
8.	Define a transistor.	**2 Marks**	**L1**	**CO4**
9.	For a BJT to operate in active region, what should be the biasing condition of the emitter-base junction and collector-base junction.	**2 Marks**	**L1**	**CO4**

10.	Name all the three terminals of an E-MOSFET.		**2 Marks**	**L1**	**CO4**

Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	With examples, explain the classification of elements based on (i) Ability to deliver power, (ii) Size of the element	10 Marks	**L2**	**CO1**
	b.	A series R-L-C network consists of 25Ω resistor, 12Ω inductive reactance and 38Ω capacitive reactance. A voltage source (Vrms) of 230V is supplied and a current (Irms) of 6.4A is observed. Calculate (i) impedance, (ii) phase, (iii) power and (iv) power factor of the network.	10 Marks	**L2**	**CO1**
		Or			
12.	**a.**	Draw the circuit diagram and phasor diagram for a series resistive-inductive-capacitive (RLC) network. Explain the phasor diagram.	10 Marks	**L2**	**CO1**
	b.	A 20Ω resistor is connected in series, with a parallel combination of 50Ω and 100Ω resistors. If the voltage supplied to the resistors is 50V, calculate the power consumed by the all the three resistors.	10 Marks	**L2**	**CO1**

13.	**a.**	Sketch the I-V characteristics of a p-n junction diode in both forward-bias and reverse-bias condition. Label and explain (i) Knee voltage, (ii) Static resistance, (iii) Dynamic resistance	10 Marks	**L2**	**CO2**
	b.	Explain the (i) ideal diode model and (ii) piece-wise linear diode model with appropriate diagrams.	10 Marks	**L2**	**CO2**
		Or			
14.	**a.**	With the help of a circuit diagram and appropriate waveforms, explain the working of a half-wave rectifier without and with a capacitive filter.	10 Marks	**L2**	**CO2**
	b.	For the circuit shown below, determine (i) load voltage (V_L), (ii) resistive voltage (V_R) and (iii) Zener current (I_Z). 	10 Marks	**L2**	**CO2**

15.	**a.**	With the help of appropriate diagrams, describe the construction of a single-phase transformer, and explain its working.	10 Marks	**L2**	**CO3**

	b.	Explain the different types of DC machines. Compare the speed-torque characteristics of each motor type.	10 Marks	**L2**	**CO3**
Or					
16.	**a.**	With neat diagram, explain the construction of a three-phase induction motor.	10 Marks	**L2**	**CO3**
	b.	Describe the construction of a permanent magnet DC motor, and explain its working principle.	10 Marks	**L2**	**CO3**

17.	**a.**	Draw the input characteristics and output characteristics of a common-base configured npn transistor. Explain the relationship between the current and voltage in each case.	10 Marks	**L2**	**CO4**
	b.	For a npn transistor, derive the relationship between (i) Common-base gain (α) and Common-emitter gain (β) (ii) Common-emitter gain (β) and Common-collector gain (γ)	10 Marks	**L2**	**CO4**
Or					
18.	**a.**	Draw the transfer characteristics and output characteristics of a n-channel JFET. Label and explain ohmic region, saturation region and breakdown region.	10 Marks	**L2**	**CO4**
	b.	With a neat sketch of a n-channel enhancement type MOSFET, explain the working of the E-MOSFET under the following conditions. (i) V_{GS} = 0V, V_{DS} = positive, (ii) V_{GS} = positive, V_{DS} = positive.	10 Marks	**L2**	**CO4**