

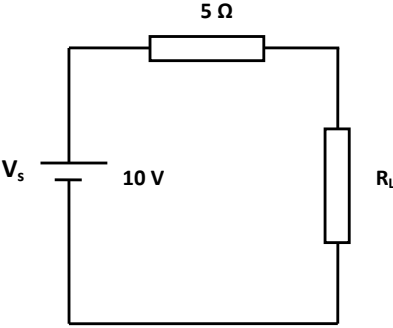
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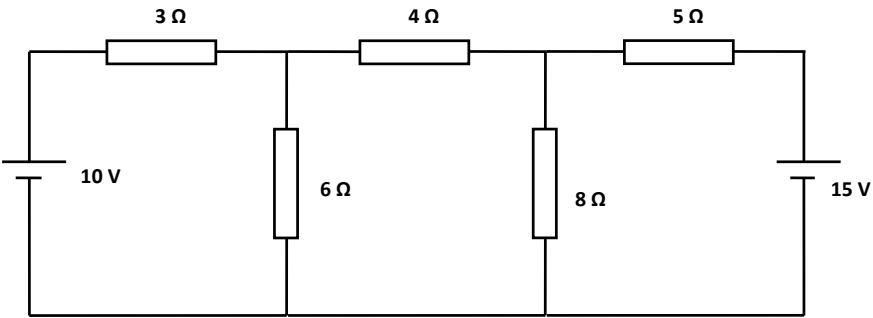
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RV COLLEGE OF ENGINEERING
Autonomous Institution affiliated to VTU
I Semester B.E. April -2023 Examinations
ELECTRICAL AND ELECTRONICS ENGINEERING
BASICS OF ELECTRICAL ENGINEERING
(2022 SCHEME)

Time: 03 Hours**Maximum Marks: 100****Instructions to candidates:**

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. In Part B question number 2 is compulsory. Answer any one full question from 3 and 4, 5 and 6, 7 and 8, and 9 and 10.

PART-A (Objective type for one or two marks) (True & false and match the following questions are not permitted)			
1	1.1	<p>The maximum power drawn by the load R_L in the above circuit will be?</p> 	2
	1.2	A current of 20A flows through two ammeters A and B connected in series. Across A the potential difference is 0.2 V and across B it is 0.3 V. Find how the same will be divided between A and B when they are connected in parallel.	2
	1.3	A 50Hz sinusoidal current has peak factor 1.4 and form factor 1.1. Its average value is 20A. The instantaneous value of current is 15A at $t=0$. Write the equation of current.	2
	1.4	An AC Circuit has a Capacitance of 100 μF and negligible resistance. Calculate its reactance at 25 Hz.	2
	1.5	In a three-phase circuit, the phase current of 10A lags the voltage across the phase winding by 27 degrees. The impedance in each phase must be _____	2
	1.6	In a practical transformer, the iron loss remains practically constant from no-load to full load because _____	2
	1.7	A 3 phase, 4 pole induction motor works on 3 phase 50Hz supply. If the slip of the motor is 4%, then rotor speed will be _____rpm.	2
	1.8	List the types of single-phase induction motor.	2
	1.9	Mention the characteristics of fuse.	2
	1.10	What is Earthing? Mention the types of Earthing.	2
PART-B (Maximum subdivisions is limited to 3 in each question)			
UNIT-I			
2	a	Prove that Maximum Power Transferred to the load is $P_{\max} = V_g^2/4R_L$.	8
	b	A network is arranged as shown in Fig. 1. Determine the current in each resistance.	8

		 <p style="text-align: center;">Fig. 1</p>	
UNIT-II			
3	a	Derive an expression for Effective value and Average Value of an alternating quantity.	8
	b	<p>An alternating current varying sinusoidally has an RMS value of 20A, 50Hz frequency. Write the</p> <p>i) instantaneous value equation</p> <p>ii) current 2.5ms and 12.5ms after passing through first positive maximum value.</p> <p>At what time will the instantaneous value be 14.14A measured from first positive maximum?</p>	8
		OR	
4	a	Show that the power dissipated in a series RC circuit is . Draw the wave forms of voltage, current and power.	6
	b	When a voltage of 100 V at 50Hz is applied to coil A, the current taken is 8 A and the power is 120 W. When applied to coil B the current is 10 A and the power is 500 W. What will be current, and power taken if the two coils are connected in series across 100 V.	10
UNIT-III			
5	a	A three-phase delta connected motor operating on a 400 V supply is delivering 25 HP at an efficiency of 0.87 and power factor of 0.42. Calculate the line current, phase current and the readings of two-watt meters connected to measure the input. Assume, 1hp=746 W.	8
	b	<p>Give reasons:</p> <p>(i) Copper loss is called as variable loss and iron loss is called as Constant loss.</p> <p>(ii) The rating of transformer is in kVA.</p> <p>(iii) Transformer cannot be excited by DC supply.</p>	8
		OR	
6	a	<p>The primary and secondary winding of a 350kVA transformer have resistance of 0.75Ω and 0.005Ω respectively. The primary and secondary voltages are 10500 V and 500 V respectively. If the core loss is 3kW and the power factor on the load is 0.8, calculate the efficiency on</p> <p>(i) Full Load</p> <p>(ii) Half full load</p>	6
	b	Prove that the line voltage in a star connected RYB phase sequence three phase system leads the phase voltage by 30°. Obtain an expression for line voltage in terms of phase voltage.	10
UNIT-IV			
7	a	List the difference between two types of three phase Induction motor. A 3 Φ, 6 pole 50 Hz induction motor has a slip of 1% at no load and 3% at full load. Determine (i) Synchronous speed (ii) No load speed (iii) Full load speed (iv) Frequency of rotor at stand still and Frequency of rotor at full load.	8
	b	Explain the working principle of split phase single-phase induction motor with the help of neat sketch. How can you reverse the direction of rotation of such motor?	8
		OR	
8	a	Prove that a rotating magnetic field of constant magnitude is produced when the stator winding of a 3-	10

		phase induction motor is energized by a balanced 3 Φ supply. Write the advantages of 3 phase induction motor.	
	b	What is Double revolving magnetic field? Describe the working principle of Single-phase induction motor. List the different types of Single phase Induction motor.	6
		UNIT-V	
9	a	Explain the concept of power transmission and distribution through block diagrams.	6
	b	Estimate the monthly electricity bill for the subsequent load fitted in an electrical installation. (i) 15 lamps 50 watts each working 4 hours/ day. (ii) 4 ceiling fans 100 watts each working 8 hours/day. (iii) 2 kw heater working 2 hours/day. (iv) Water pump of 0.5 HP runs for 2 hours per day Rate of charges for light and fans is 3.5 Rs / unit and heater and motor 4 Rs/unit.	10
		OR	
10	a	What is the necessity of earthing electrical apparatus and explain plate earthing with a neat diagram?	8
	b	Write brief notes on : (i) MCB (ii) Fuse (iii) Electric shock	8

Signature of Scrutinizer:

Signature of Chairman

Name:

Name: