VIT

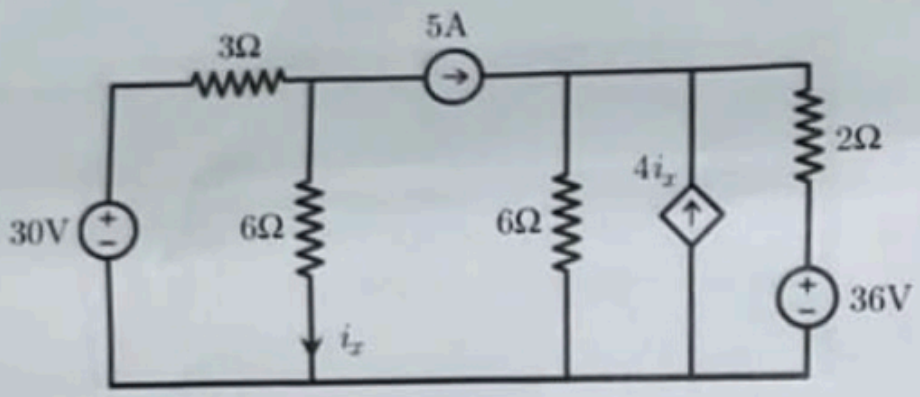
Reg. No. :

Final Assessment Test (FAT) – January/February 2023

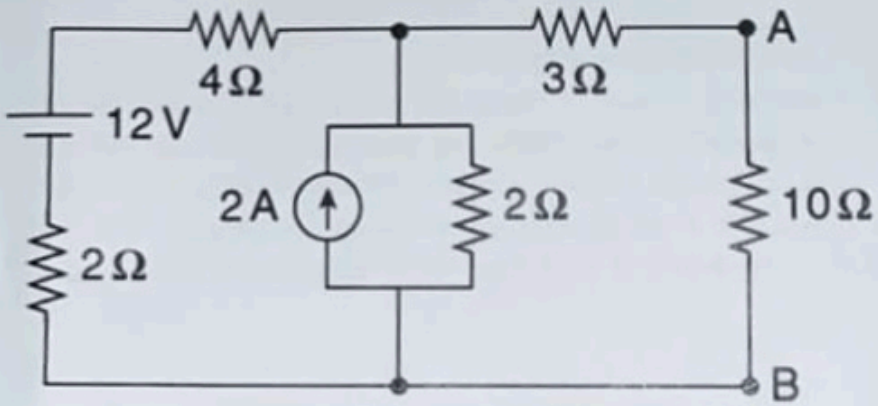
Programme	**B.Tech.**	Semester	**Fall Semester 2022-23**
Course Title	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	Course Code	**BEEE102L**
Faculty Name	**Prof. MOHAMMED ANEESH Y**	Slot	**E1+TE1**
		Class Nbr	**CH2022231700047**
Time	**3 Hours**	Max. Marks	**100**

Part - A (10 X 10 Marks)
Answer All questions

1. Find current, i_x and the power supplied by the current dependent current source for the circuit shown in Figure. **[10]**



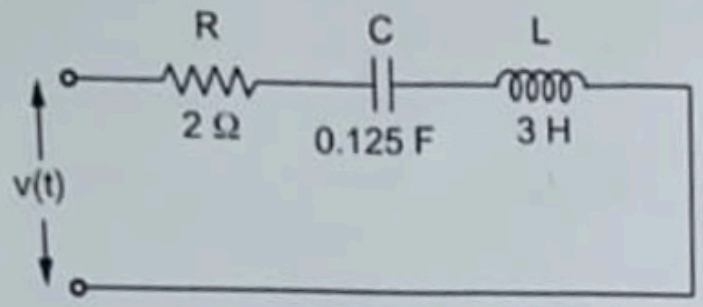
2. Calculate the current flowing through the load resistor (R_L), 10 Ω connected across AB in the circuit given below using Thevenin's theorem. Find the value of R_L for maximum power transfer and also the maximum power which can be supplied at AB. **[10]**



3. A series RLC circuit is connected across a voltage source, v (t) = 12sin (2t+30°) as shown in Figure. **[10]**

a) Find impedance, power factor, power supplied by the source and the voltage across the capacitor.

b) Write the time domain equations for current and voltage across the inductor.



4. A three phase star connected supply with abc phase sequence having phase voltage, V_{an} = $230\angle 0°$ V (rms) is supplying a balanced delta connected load. The load draws 5 kW power per phase at 0.8 power factor lagging. Find the line currents and the currents in each phase of the load. What is the load impedance per phase? **[10]**

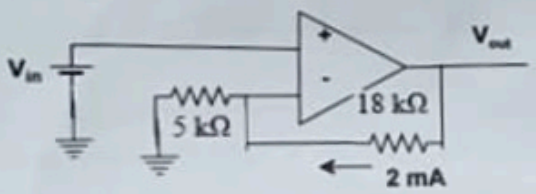
5. a) Implement the following Boolean function with 8 X 1 multiplexer. Use x, y, z as select inputs for the multiplexer. **[10]**

   $f(x, y, z, w) = \sum m (0, 2, 3, 5, 6, 7, 8, 10, 11)$

   b) Obtain the minimal SOP expression for 'f' using K- Map and implement the same using logic gates.

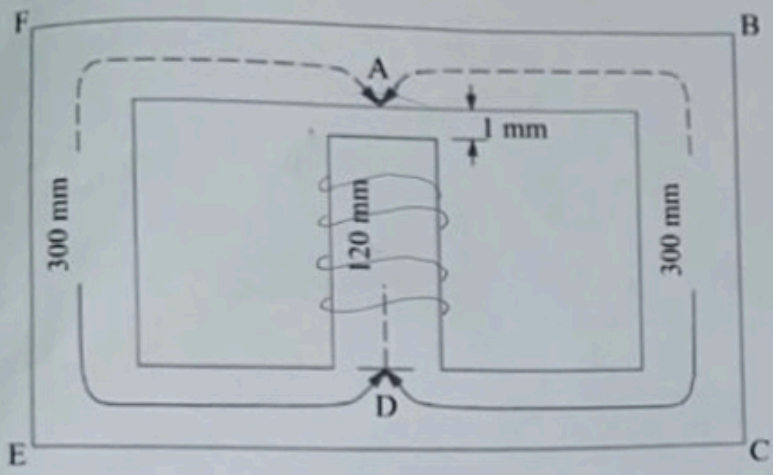
6. The induced emf in a DC machine while running at 750 rpm is 220 V. Calculate **[10]**
   a) the speed at which the induced emf is 250 V by assuming constant flux.
   b) the percentage increase in field flux for an induced emf of 250 V and speed of 700 rpm.

7. a) Determine the input and output voltage for the circuit given below. **[10]**



b) Explain the operation of a variable reluctance stepper motor.

8. A magnetic circuit made of mild steel is shown in Figure. The central limb is wound with 500 turns and has a cross sectional area of 800 mm^2. Each of the outer limbs has a cross sectional area of 500 mm^2. The air gap has a length of 1 mm. Calculate the current required to set up a flux of 1.3 mWb in the central limb assuming no magnetic leakage and fringing. Mild steel required 3800 AT/m to produce flux density of 1.625 T and 850 AT/m to produce flux density of 1.3 T. **[10]**

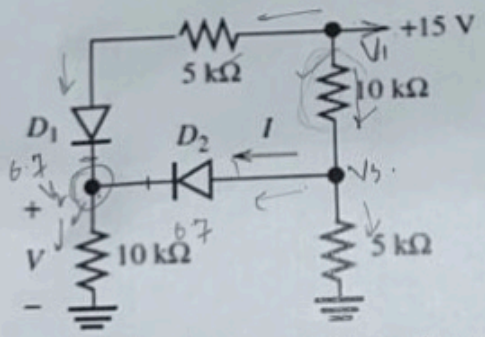


9. a) Convert 10101.011_2 to i) decimal ii) octal and iii) hexadecimal format. **[10]**

   b) Perform these operations by using 8- bit signed 2's-complement arithmetic and check for overflow in each case:

   (i) $15_{10} - 63_{10}$ (ii) $-17_{10} - 15_{10}$

10. a) Find the values of I and V for the circuit of Figure, assuming that the diodes are ideal. **[10]**



   b) What is a Zener diode? For what is it typically used? Draw the volt ampere characteristic of an ideal 5.8-V Zener diode.

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