

H

Roll No. 2294038

TEE-101

B. TECH. (FIRST SEMESTER)

END SEMESTER

EXAMINATION, Jan., 2023

BASIC ELECTRICAL ENGINEERING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among
(a), (b) and (c) in each main question.

(iii) Total marks in each main question are
twenty.

(iv) Each sub-question carries 10 marks.

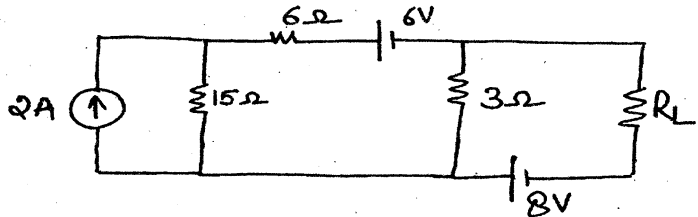
1. (a) Calculate value of R_L to have maximum
power delivered to load in the given

P. T. O.

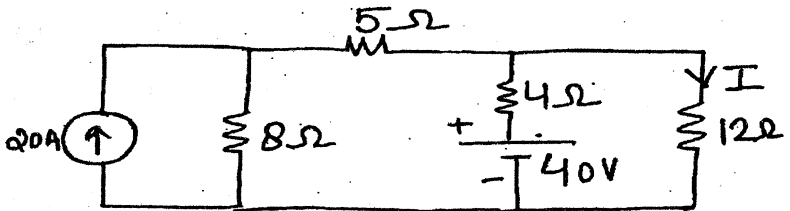
(2)

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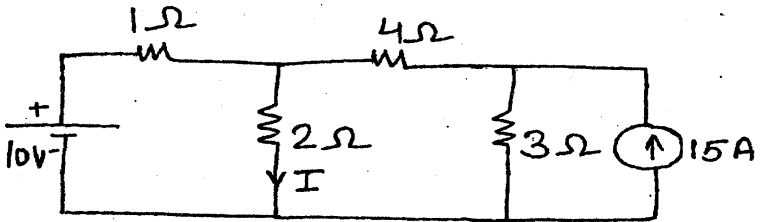
circuit. Also calculate the value of maximum power. (CO1)



(b) Calculate current in 12 ohm branch using superposition theorem. (CO1)



(c) Calculate current across 2 ohm using Thevenin's theorem. (CO1)



2. (a) Consider the circuit consisting of R, L and C connected in series across a supply

voltage of V (RMS) volts. The resulting current I (RMS) is flowing in the circuit. Do a proper analysis of circuit, explaining the three cases : (CO2)

(i) When $X_L > X_C$

(ii) When $X_L < X_C$

(iii) When $X_L = X_C$

(b) A 50 Hz sine voltage $V = 311 \sin \omega t$ is applied to a RL series circuit. If the magnitude of $R = 5$ ohm and that of $L = 0.02$ H. Calculate : (CO2)

(i) RMS and Average Value of I and Phase angle

(ii) Expression of instantaneous current

(iii) Magnitude of Voltage drop across resistor and inductor.

(c) Explain RMS value of AC. Derive expression for RMS and Average value of half wave sinusoidal AC. (CO2)

3. (a) Distinguish between wires and cables. Also discuss about the characteristics of wires in detail. (CO2/CO3)
- (b) What are the different types of wirings? Discuss about advantages and disadvantages of each. (CO2/CO3)
- (c) A pure resistance of 50 ohms is in series with a pure capacitance of 100 microfarads. The series combination is connected across 100 V, 50 Hz supply. Find : (CO2/CO3)
- (i) Impedance
 - (ii) Current
 - (iii) Power factor
 - (iv) Phase angle
 - (v) Voltage across resistor and inductor.
4. (a) What is MCB? Discuss its working with a suitable diagram. (CO4)
- (b) What do you mean by Earthing? Explain the following with suitable diagram (wherever necessary) : (CO4)
- (i) Need for earthing
 - (ii) Components of earthing
 - (iii) Types of Earthing

- (c) Write a note on staircase wiring, along with a suitable circuit. (CO4)
5. (a) What do you understand by Electromechanical Energy Conversion and explain the working principle of DC motor. (CO4)
- (b) (i) Derive EMF equation of DC machine.
(ii) The armature of 4 pole DC machine has total slots 50 and 10 conductors per slot, the speed is 1200 rpm, the flux generated is 0.471 Wb. Calculate EMF generated for : (CO4)
- (I) lap wound machine
(II) wave wound machine
- (c) Explain working and construction of lead acid battery. (CO4)