Code No: 182AC **R22**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech I Year II Semester Examinations, September - 2023
BASIC ELECTRICAL ENGINEERING
(Common to ECE, EIE, CSE (AI&ML), CSE(IOT), AI&DS, AI&ML)

Time: 3 Hours **Max. Marks: 60**

Note: This question paper contains two parts A and B.
i) **Part- A** for 10 marks, ii) **Part - B** for 50 marks.
- Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.
- Part-B consists of **ten questions** (numbered from 2 to 11) **carrying 10 marks each**. From each unit, there are two questions and the student should answer one of them. Hence, the student should answer five questions from Part-B.

PART- A

(10 Marks)

1.a)	Draw the equivalent circuit of Norton's theorem.	[1]
b)	Write the time constant of RC circuit.	[1]
c)	Define Peak factor.	[1]
d)	Write the line voltage and phase voltage relation in star connections.	[1]
e)	What is ideal transformer?	[1]
f)	The efficiency of the transformer is high compared to other electrical machines. Give the reason.	[1]
g)	What are the parts of synchronous generator?	[1]
h)	Define Slip.	[1]
i)	Differentiate ELCB and MCCB.	[1]
j)	Differentiate fuse and earthing.	[1]

PART - B

(50 Marks)

2.a) Find the power supplied by the 2V source in the circuit shown below. (Figure 1)

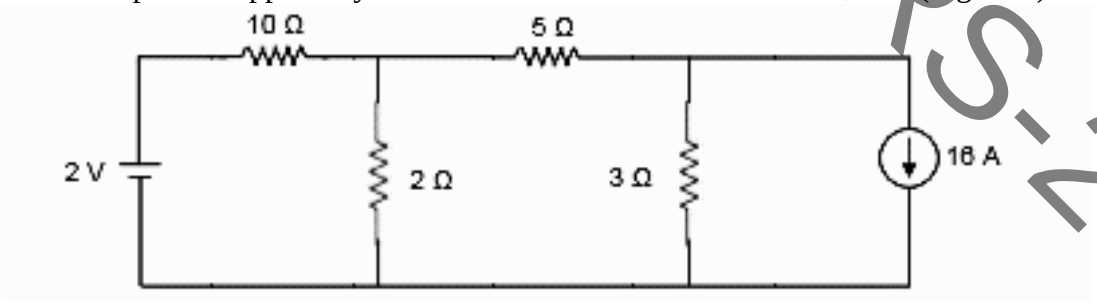

Figure 1

b) A capacitor in an RC circuit with R = 25 Ohm and C = 50 micro Fared is being charged with initial zero voltage. What is the time taken for the capacitor voltage to reach 40 percentage of its steady state value? [5+5]

OR

3.a) Determine the current I and I_0 for the following circuit.(Figure 2)

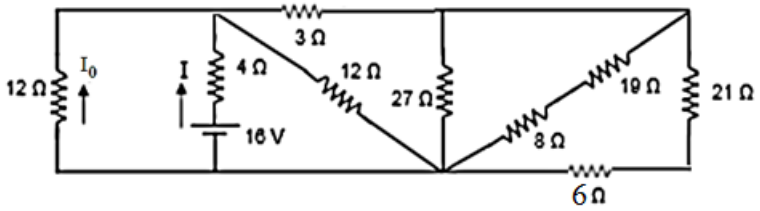

Figure 2

b) Calculate the power consumed by the 2 Ohm resistor.(Figure 3) [5+5]

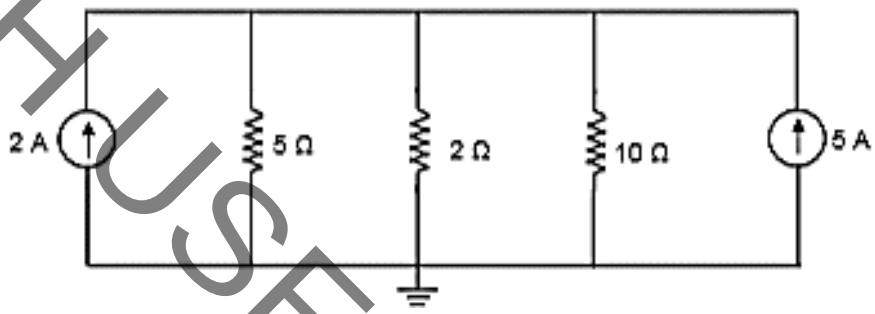

Figure 3

4. A balanced three phase load connected in star consists of (6 + j8) ohms impedance in each phase. It is connected to a three phase supply of 400 V, 50 Hz. Find:
a) Magnitude of phase current and line current
b) Per phase power and
c) Total power [10]

OR

5.a) A variable frequency 200 V supply is connected to a RLC series circuit with R = 10 ohms and L = 10 milli henry and C= 1 micro Fared. For resonance condition, calculate the current and the voltages across R. Take the supply voltage as reference.
b) Obtain the form factor of sinusoidal waveform. [6+4]

6.a) Explain the working principle of Auto transformer.
b) In a 25 KVA, 2000/200 V transformer, the constant and variable losses are 350 W and 400 W respectively. Calculate the efficiency on u.p.f at full load and half load. [5+5]

OR

7.a) Explain hysteresis and eddy current losses in a transformer.
b) The percentage resistance and reactance of a transformer are 2 % and 4 % respectively. Find the approximate regulation on full load at unity power factor. [5+5]

8.a) Explain the working principle of three phase induction motor.
b) A 6 pole lap wound D.C. Generator has 720 conductors, a flux of 40 m Wb per pole is driven at 400 RPM. Find the generated e.m.f. [5+5]

OR

9.a) A 4 pole lap wound d.c shunt generator supplies to 50 lamps of 100 watts, 200V each. The field and armature resistance are 50 Ohms and 0.2 Ohms respectively. Allowing a brush drop of 1 V each brush, calculate the generated e.m.f.

b) Explain the significance of Torque slip characteristics of three phase induction motor. [5+5]

10.a) Write short notes on SFU and MCB.

b) Explain the various types of cables used in distribution of power. [5+5]

OR

11.a) Explain the various types of wires used in electrical installations.

b) Brief about the characteristics of batteries. [5+5]

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