Code No: 181AM **R22**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech I Year I Semester Examinations, January/February - 2024
FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to BT, PCE)

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)	Write the relationship between voltage and current in a inductor.	[1]
b)	What is a mesh?	[1]
c)	Define peak factor.	[1]
d)	What is meant by phase difference?	[1]
e)	What a commutator does in d.c generator?	[1]
f)	What are the parts of an alternator?	[1]
g)	How a diode behaves in reverse bias?	[1]
h)	What is an ideal diode?	[1]
i)	How many junctions are there in BJT?	[1]
j)	What are the types of BJT?	[1]

PART - B

(50 Marks)

2.a) What are the types of electrical sources? Explain.
b) Using mesh analysis, find the current 'I' in the circuit below figure 1. [5+5]

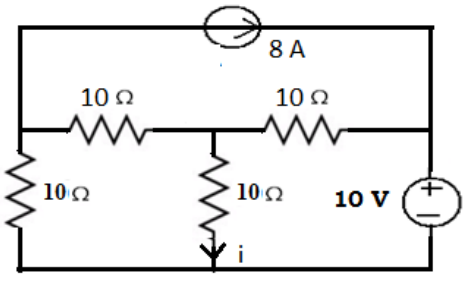

Figure 1

OR

3.a) What are Kirchoff's laws? Explain with examples.

b) Using nodal analysis, find the current 'I' in the circuit below figure 2. [5+5]

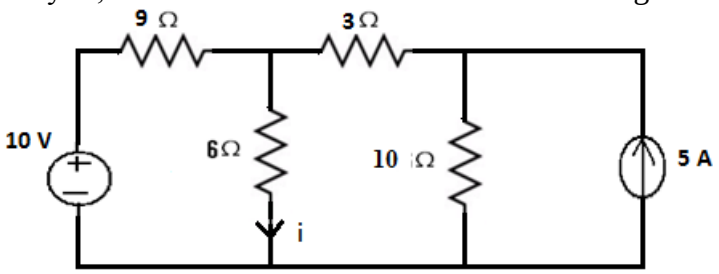

Figure 2

4.a) Derive the expression for the steady state current in series RL circuit with sinusoidal voltage source.

b) The current flowing through a circuit is $10\angle 30^0 A$ when a voltage of $200\angle -15^0 V$ is applied. Calculate the components of the circuit if frequency of the supply is 50 Hz. [5+5]

OR

5.a) What is the average value of sinusoidal voltage source? Derive it.

b) Determine the voltage across resistor and capacitor in the circuit below figure 3. [5+5]

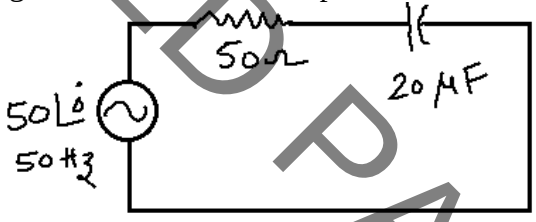

Figure 3

6.a) Explain the constructional features of DC machines in detail.

b) How 3-ϕ induction motor works? Explain. [5+5]

OR

7.a) How EMF is induced in DC generator? Explain.

b) Explain the principle of operation of transformer. [5+5]

8.a) How a PN Junction diode works? Explain.

b) Explain the working of half wave rectifier? [5+5]

OR

9.a) Draw the V-I characteristics of PN junction diode and explain.

b) Explain the working of full wave bridge rectifier? [5+5]

10.a) How a BJT works? Explain in detail.

b) Explain the CB configuration of BJT with the help of neat circuit diagram. [5+5]

OR

11.a) Explain about the doping level and size of the layers of BJT.

b) Discuss about the differences between different configurations of BJT. [5+5]

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