

Code No: 181AM

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech I Year I Semester Examinations, September - 2023

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.

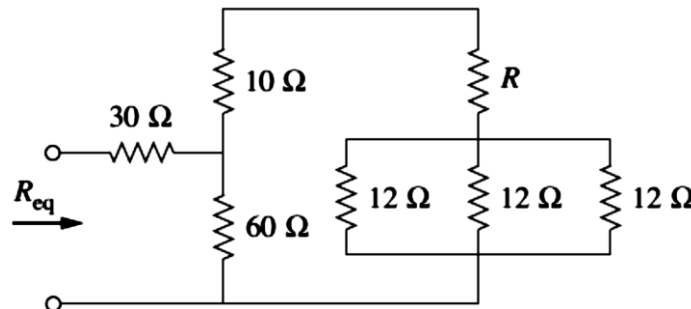
- Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.
- Part-B consists of **ten questions** (numbered from 2 to 11) **carrying 10 marks each**. From each unit, there are two questions and the student should answer one of them. Hence, the student should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

PART- A**(10 Marks)**

- Differentiate Independent and Dependent sources. [1]
- State Kirchoff's Voltage law. [1]
- Define the form factor of a sinusoidal quantity. [1]
- What is power factor? [1]
- What is meant by back EMF? [1]
- What are the types of DC Generators? [1]
- Draw the circuit diagram of half wave rectifier. [1]
- Give the expression for the average output voltage of a full wave rectifier. [1]
- Give different operating regions of BJT. [1]
- In a BJT, the emitter current is 12 mA and the emitter current is 1.02 times the collector current. Find the base current. [1]

PART - B**(50 Marks)**

- If $R_{eq}=50$ ohm, in the circuit shown in figure 1, find R?

**Figure 1**

- Two resistances R_1 and R_2 are connected in parallel and if the current entering the parallel combination is I . Calculate the values of currents I_1 and I_2 flowing in the resistance R_1 , R_2 in terms I , R_1 , R_2 . [5+5]

OR

- 3.a) What are the active and passive elements? Explain.
 b) Find the equivalent resistance between terminals x-y in the resistance network shown in Figure 2 below by using Y- Δ transformation. [5+5]

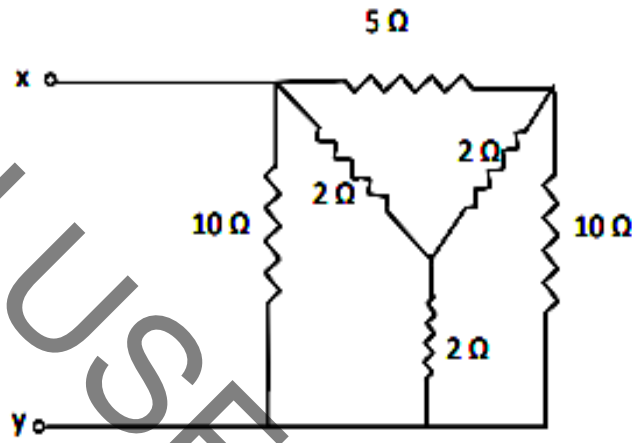


Figure 2

- 4.a) Define RMS value and Average value of an alternating quantity. Determine these values for a full wave rectified sine wave.
 b) A coil having a resistance of 10 ohms and an inductance of 0.2H is connected in series with a 100×10^{-6} F capacitor across a 230V, 50Hz supply, Calculate:
 i) The active and reactive components of the current
 ii) The voltage across the coil. [5+5]

OR

- 5.a) Explain about phasor representation of alternating quantities.
 b) Find i) Current ii) p.f iii) active power and iv) reactive power of the following circuit(Figure 3). [5+5]

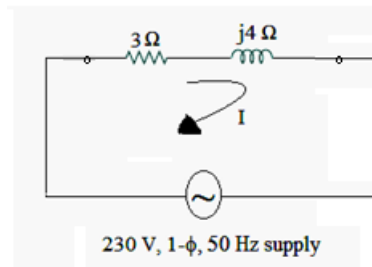


Figure 3

- 6.a) Explain the principle of operation of 3-Phase induction Motor.
 b) Determine the emf generated for an 4 – pole lap connected armature has 1120 conductors, a flux of 28 mWb per pole and a speed of 600 rpm. [5+5]

OR

- 7.a) Explain with a neat sketch the constructional features of a DC machine.
b) A 10-pole, 3-phase induction motor runs at a speed of 485 rpm at 50 Hz supply. Determine i) synchronous speed and ii) slip. [5+5]

- 8.a) Explain the operation of a half wave bridge rectifier with relevant waveforms.
b) Derive expressions for ripple factor and efficiency of rectification for a full wave rectifier. [5+5]

OR

- 9.a) Explain the V-I characteristics of p-n junction diode.
b) Explain the operation of a full wave bridge rectifier with relevant waveforms. [5+5]

- 10.a) Explain the operation of BJT transistor with relevant diagrams.
b) Draw and explain the CC Configuration of BJT. [5+5]

OR

- 11.a) Draw and explain the CE Configuration of BJT.
b) Illustrate the input and output characteristics of BJT in CB configuration. [5+5]

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PAPERS-2023