



B.E DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Third Semester

MECHATRONICS ENGINEERING

U18MCI3201: Electronic Devices and Circuits

COURSE OUTCOMES

- CO1: Use passive elements and basic theorems to solve electric circuits.
 CO2: Understand the basic principles of semiconductor devices.
 CO3: Use diode to construct regulators, rectifiers, and other applications.
 CO4: Analyze small signal amplifiers and oscillators constructed using transistors.
 CO5: Apply op-amp to construct various applications.

Time: Three Hours

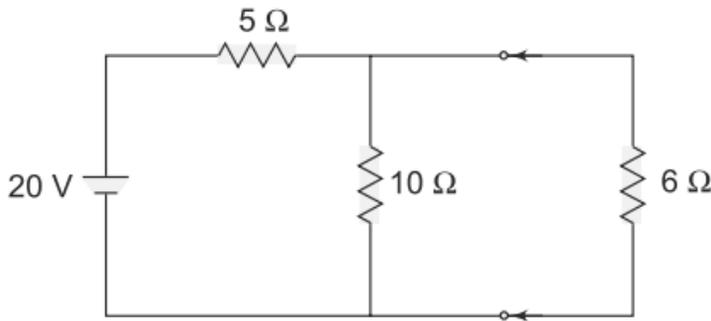
Maximum Marks: 100

**Answer all the Questions:-
 PART A (10 x 2 = 20 Marks)
 (Answer not more than 40 words)**

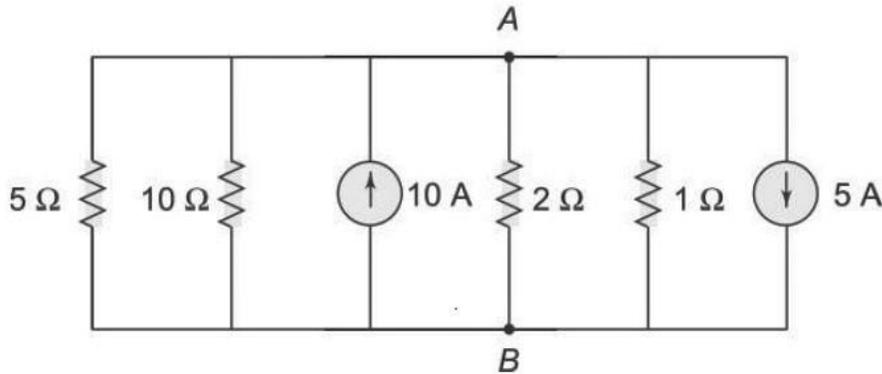
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|---|-----|-------------------|
| 1. State Superposition theorem. | CO1 | [K ₁] |
| 2. Two resistors of 4 Ω and 6 Ω are connected in parallel . If the total current in the circuit is 30A, find the current through each resistor. | CO1 | [K ₂] |
| 3. Write the diode current equation. | CO2 | [K ₁] |
| 4. What is the need for biasing a transistor? | CO2 | [K ₂] |
| 5. How will you construct Voltage doubler circuit using Diodes? | CO3 | [K ₂] |
| 6. Distinguish between half wave rectifier and full wave rectifier. | CO3 | [K ₂] |
| 7. What is the Difference between amplifier and oscillator? | CO4 | [K ₂] |
| 8. Define Common Mode Rejection Ratio. | CO4 | [K ₂] |
| 9. Mention the condition to maintain oscillation in a RC phase shift oscillator. | CO5 | [K ₂] |
| 10. List the applications of Astable Multivibrator. | CO5 | [K ₂] |

**Answer any FIVE Questions:-
 PART B (5 x 16 = 80 Marks)
 (Answer not more than 400 words)**

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|---|----|-----|-------------------|
| 11. a) Find the current across 6 ohm resistor, by using Norton's theorem. | 10 | CO1 | [K ₃] |
|---|----|-----|-------------------|



- b) Find the voltage across the 10 ohm resistor and the current passing through it. 6 CO1 [K₃]



12. a) Describe the action of PN junction diode under forward bias and reverse bias. 8 CO2 [K₂]
 b) Explain the characteristics and operation of enhancement-mode MOSFET 8 CO2 [K₂]
13. a) Draw and explain the following diode circuit with input and output waveforms: 8 CO3 [K₂]
 (i) Positive and Negative Clamper Circuit (ii) Positive Clipper Circuit with positive bias.
 b) How does the Zener diode act as a voltage regulator? Explain. 8 CO3 [K₂]
14. a) Define and explain the h-parameters of BJT with CE configuration and discuss their importance. 8 CO4 [K₂]
 b) What is meant by cascading amplifiers? Explain about RC coupled 2 stage Amplifier. 8 CO4 [K₂]
15. a) Discuss in detail about the working of the differential amplifier. 8 CO4 [K₂]
 b) Explain self biasing technique for BJT. 8 CO2 [K₂]

Please indicate knowledge level (K₁toK₆) and Course Outcome level (CO1 to CO5) against each question for each subdivision.

16. a) Explain how an op amp can be used as an inverting amplifier, summing amplifier, Integrator and differentiator. Also derive the expressions for output voltages. 16 CO5 [K₂]

Please indicate knowledge level (K₁toK₆) and Course Outcome level (CO1 to CO5) against each question for each subdivision.