



4. List out the application of transformers.
5. Name the four regions of operation of transistors.
6. Differentiate the operation of rectifiers and inverters.
7. Convert the given expression in canonical SOP form  $Y = AC + AB + BC$ .
8. Mention the significance of K-map.
9. Name the constructional parts of induction type energy meter.
10. How are the errors caused in potential transformers?

**PART B — (5 × 13 = 65 marks)**

11. (a) Determine the currents in the  $8\Omega$  resistor in the circuit shown in figure 2. using mesh analysis. (13)

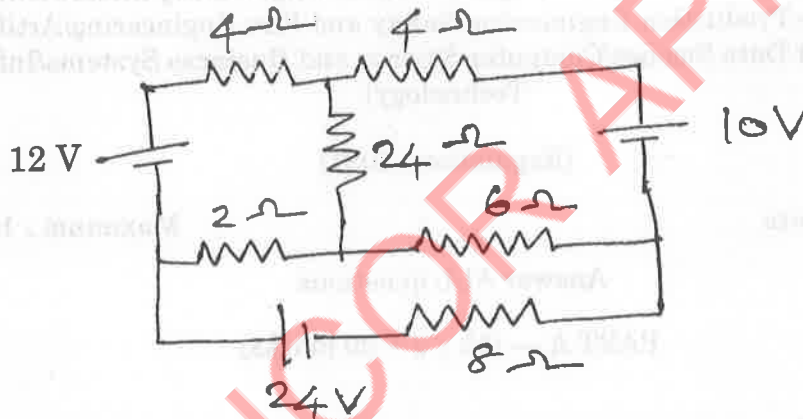


Figure 2

Or

- (b) Find the form factor of the half wave rectified sine wave shown in figure 3. (13)

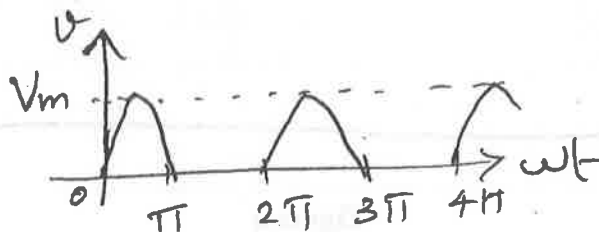


Figure 3

12. (a) With neat diagrams explain the construction and working principle of DC generator.

Or

- (b) (i) Explain the types of DC motors characterized by the connections of field winding in relation to the armature.  
(ii) Compare the operation of transformer and induction motor.
13. (a) Explain in detail the construction, principle of operation and VI characteristics of PN junction diode.

Or

- (b) Explain the constructional details and different modes of operation of MOSFET.
14. (a) Given the logical equation  $Y = (A + \bar{B}C)(C + AB)$
- (i) Design a circuit using AND and OR gates to realize the above function. (8)
- (ii) Realize the above function using only NAND and only NOR gates after simplification. (8)

Or

- (b) For the truth table 1, obtain the simplified sum of products expression using k-map and realize it using only NAND gates. Observe that this is the output of a majority voting circuit.

Truth table 1

A	B	C	Y
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

15. (a) Explain the measurement of power in three phase circuits using two-wattmeter method.

Or

- (b) Draw the functional block diagram of Data Acquisition system and explain the role of each component.

PART C — (1 × 15 = 15 marks)

16. (a) Find the current in the  $10\Omega$  resistance and voltage in the  $2\Omega$  resistance in the circuit shown in Figure 4 using node analysis.

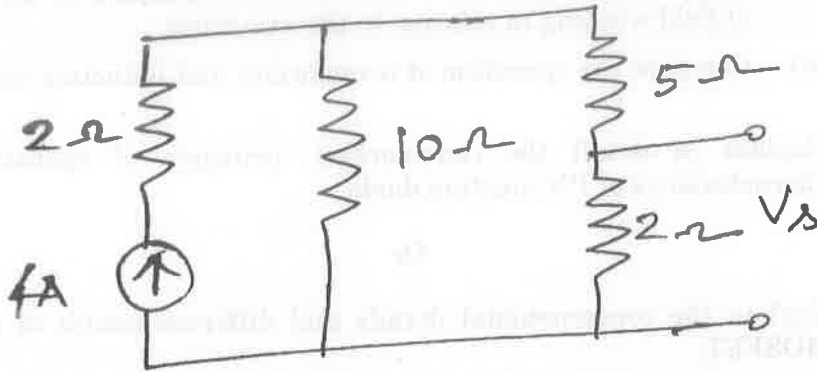


Figure 4

Or

- (b) In the circuit shown in figure 5, determine the total impedance, current  $I$ , phase angle  $\theta$  and the voltage across each element.

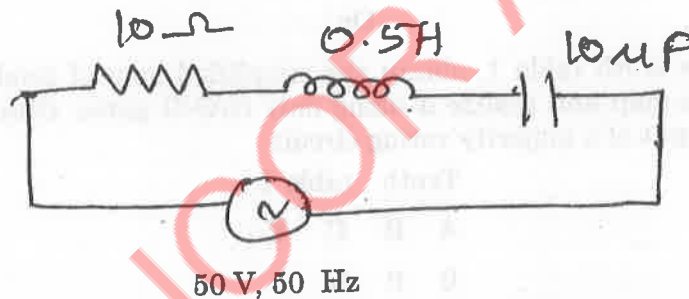


Figure 5

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**Question Paper Code : 70037**

CSE

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Second Semester

Computer Science and Engineering

BE 3251 – BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to: B.E. Aeronautical Engineering/B.E. Aerospace Engineering/  
B.E. Automobile Engineering/B.E. Biomedical Engineering/B.E. Computer and  
Communication Engineering/B.E. Industrial Engineering/B.E. Industrial  
Engineering and management/B.E. Manufacturing Engineering/B.E. Marine  
Engineering/B.E. Material Science and Engineering/B.E. Mechanical  
Engineering/B.E. Mechanical Engineering(Sandwich)/B.E. Medical Electronics/B.e.  
Production Engineering/B.E. Safety and Fire Engineering/B.Tech. Artificial  
Intelligence and Data Science/B.Tech. Computer Science and Business  
Systems/B.Tech. Information Technology)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

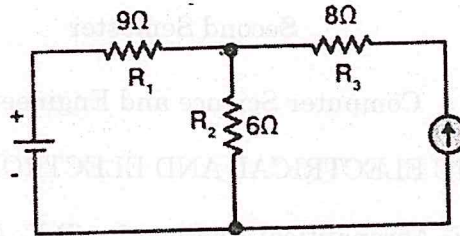
PART A — (10 × 2 = 20 marks)

1. Parallel combination of three  $3 \Omega$  resistors, connected in series with parallel combination of two  $2 \Omega$  resistors. Find the equivalent resistance of the circuit.
2. Write the equation for 25 cycles sine wave current having rms value of 30 A.
3. A 4 pole lap wound dc shunt generator rotates at the speed of 1500 rpm, has a flux of 0.4 mWb and the total number of conductors are 1000. Find the value of emf generated.
4. Differentiate step-up transformer and step-down transformer.
5. Draw the circuit for Zener voltage regulator.
6. JFET is a voltage operated device. Justify.
7. What do you mean by weighted binary code? Give an example.
8. What is meant by combinational logic circuits? Give examples.

9. Mention the functional elements of a measuring system.
10. What do mean by resolution of a data acquisition system?

PART B — (5 × 13 = 65 marks)

11. (a) Using mesh analysis, determine the current and potential difference across each resistor in the given circuit. The battery has 90 V and the current source 5A.



Or

- (b) Discuss about the working of RLC series circuit and derive the relationships. Give the necessary phasor Diagrams.
12. (a) Describe the principle of working of DC motor.

Or

- (b) Describe about the construction of core type and shell type single phase transformers.
13. (a) Explain the operation of BJT in common emitter mode with its characteristics.

Or

- (b) Describe the working of bridge rectifier. Derive its ripple factor.
14. (a) Explain about the error detection and correction codes.

Or

- (b) Simplify the Boolean function,  $f(W,X,Y,Z)=WX'Y+WY+W'YZ'$  using K-map.

15. (a) Describe the construction, working principle of PMMC instruments. Also derive the torque equation.

Or

- (b) Describe the method to measure three phase power by two wattmeter method.

PART C — (1 × 15 = 15 marks)

16. (a) An AC circuit is composed of a serial connection of a resistor with resistance  $50\Omega$ , a coil with inductance  $0.3\text{ H}$  and a capacitor with capacitance  $15\ \mu\text{F}$ . The circuit is connected to an AC voltage source with amplitude  $25\text{ V}$  and frequency  $50\text{ Hz}$ . Determine the amplitude of electric current in the circuit and a phase difference between the voltage and the current. Draw the Phasor diagram of voltages and current in the circuit.

Or

- (b) Design and explain the operation of full adder from its truth table.

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