Question Paper Code : **70038**

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

Second Semester

Civil Engineering

BE 3252 – BASIC ELECTRICAL, ELECTRONICS AND
INSTRUMENTATION ENGINEERING

(Common to: Environmental Engineering/ Geoinformatics Engineering/
Petrochemical Engineering/ Agricultural Engineering/Bio Technology/Biotechnology
and Biochemical Engineering/Chemical Engineering/Chemical and Electrochemical
Engineering/Fashion Technology/Food Technology/Handloom and Textile
Technology/Petrochemical Technology/Petroleum Engineering/Pharmaceutical
Technology/Plastic Technology/Textile Chemistry/Textile Technology)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define power factor.

2. Mention the limitations of series connected circuit.

3. Define MMF.

4. List any two Electrical safety precautions.

5. State the Faraday's law of electromagnetic induction.

6. Define voltage transformation ratio of transformer.

7. Zener diode is referred as voltage regulator. Justify your answer.

8. Why PN junction gets damaged at high breakdown voltage?

9. Define transducer.

10. Compare active and passive transducer.

PART B — (5 × 13 = 65 marks)

11. (a) Find the equivalent values of following elements   (13)

        (i) Three resistances in series

        (ii) Three inductances in series

        (iii) Three capacitances in series

Or

    (b) Obtain the potential difference VAB in the circuit shown in Figure Q. 11 (b) below using Kirchhoff's laws.   (13)
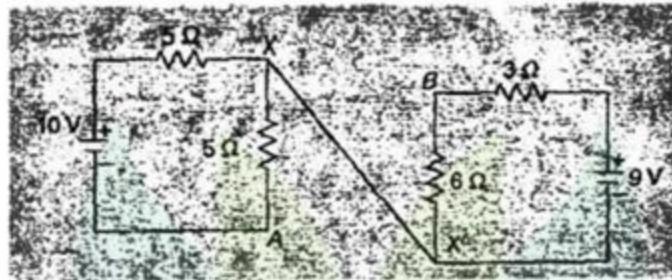

Figure Q. 11 (b)

12. (a) (i) Classify circuit breaker

        (ii) Explain the working of circuit breaker with required sketch. (3+10)

Or

    (b) (i) Infer the functions earthing.

        (ii) Classify the methods of earthing.   (3+10)

13. (a) Discuss the constructional features of a DC generator.   (13)

Or

    (b) (i) Explain the working principle of a single phase transformer.

        (ii) Derive the EMF equation of a single phase transformer.   (7+6)

14. (a) Explain the working of a depletion type MOSFET with relevant sketches.   (13)

Or

    (b) Discuss the operation of common base configuration transistor.   (13)

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15. (a) Infer the output of LVDT under three different cases (i) no displacement (ii) upward displacement (iii) downward displacement. (13)

Or

(b) Explain the operation of optical encoder with a neat sketch. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Determine the value of R and current through it for the circuit shown in Figure Q. 16 (a) when the current is zero in the branch CD. (15)
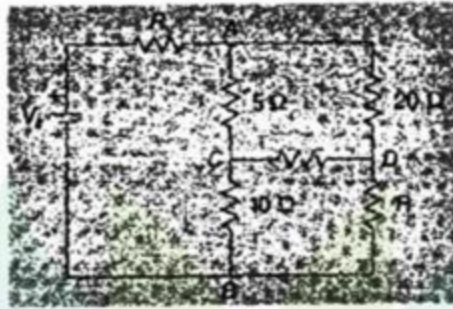

Figure Q. 16 (a)

Or

(b) Performance of full-wave is better than half-wave rectifier. Justify the statement by ripple factor and efficiency of rectifier. (15)

Question Paper Code : 60017

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Second Semester

Civil Engineering

BE 3252 – BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING

(Common to : Agricultural Engineering / Environmental Engineering / Geoinformatics Engineering / Petrochemical Engineering / Bio Technology / Biotechnology and Biochemical Engineering / Chemical Engineering / Chemical and Electrochemical Engineering / Fashion Technology / Food Technology / Handloom and Textile Technology / Petrochemical Technology / Petroleum Engineering / Pharmaceutical Technology / Plastic Technology / Textile Chemistry / Textile Technology)

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Two capacitances C_1 and C_2 of values 10 μF and 5 μF, respectively, are connected in series. Determine the equivalent capacitance of the combination.

2. State Kirchoff's laws.

3. Define MMF.

4. Mention few characteristics of fuse material.

5. List few applications of DC generator.

6. State the working principle of a DC motor.

7. In a CB transistor circuit, the emitter current IE is 10 mA and the collector current IC is 9.8 mA. Find the value of the base current IB.

8. Why FET is known as unipolar device?

9. Compare passive and active sensors.

10. Define gauge factor of strain gauge.

PART B — (5 × 13 = 65 marks)

11. (a) A series RLC circuit has R = 25 Ω, L = 0.221 mH and C = 66.3 μF with frequency of 60 Hz. Determine the power factor.

Or

(b) Determine the current delivered by the source in the circuit shown in Figure.
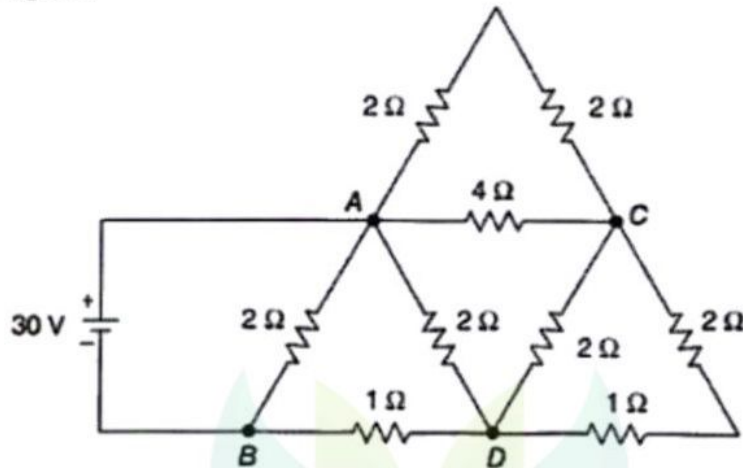
12. (a) With a neat sketch, explain pipe earthing its functions and its need.

Or

(b) Discuss the role of circuit breaker under normal and faulty condition.

13. (a) A 250 V, four-pole wave-wound DC series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 Ω. The motor takes a current of 40 A. Determine its speed and gross torque developed, if it has a flux per pole of 25 mWb.

Or

(b) Explain the construction and operation of a single phase transformer.

14. (a) Explain the working principle of MOSFET and sketch the V-I characteristics of enhancement type MOSFET.

Or

(b) With a neat sketch, discuss the operation of BJT in CB configuration.

15. (a) Explain the working of piezoelectric transducer with suitable sketch and write its applications.

Or

(b) Discuss the construction and operation of a LVDT with suitable sketch.

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PART C — (1 × 15 = 15 marks)

16. (a) A balanced 3 phase load consists of 5 Ω resistor and 10 Ω reactor (inductive) connected with each phase. The supply is 440 V, 3 phase, 50 Hz. Find the line current, phase current and total power for both star and delta connected load. (8 + 7)

Or

(b) A 230 V, 50 Hz supply is applied to an RLC circuit of R = 10 Ω; L = 2mH, C = 30 μ f. find the

(i) input current

(ii) voltage across each element

(iii) impedance

(iv) current

(v) power factor for circuit connected as

(1) RL series circuit. (7)

(2) RLC series circuit. (8)

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