Reg. No. : E N G G T R E E . C O M

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)

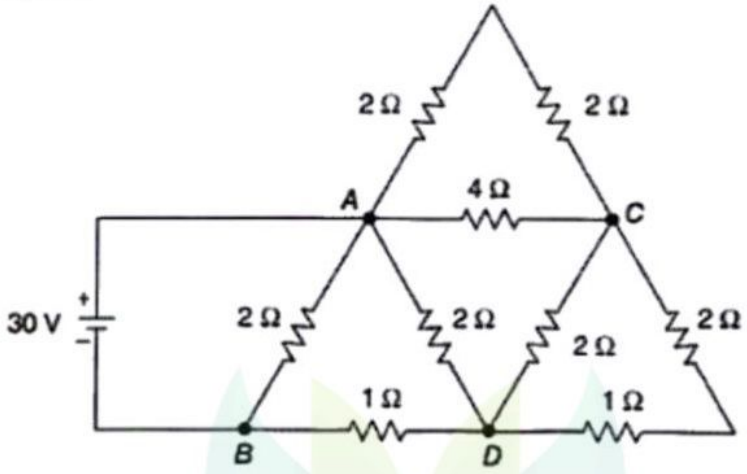
1. Two capacitances C_1 and C_2 of values 10 μF and 5 μF, respectively, are connected in series. Determine the equivalent capacitance of the combination.
2. State Kirchoff's laws.
3. Define MMF.
4. Mention few characteristics of fuse material.
5. List few applications of DC generator.
6. State the working 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.

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 μf. 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)