

Reg. No. :

**Question Paper Code : 20207**

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

Second Semester

Agricultural Engineering

BE 8251 – BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to: Civil Engineering/Environmental Engineering/Chemical and Electrochemical Engineering/Fashion Technology/Handloom and Textile Technology/Plastic Technology/Polymer Technology/Textile Chemistry/Textile Technology)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

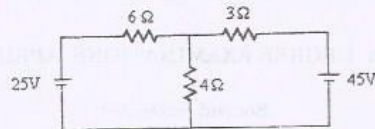
Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State Kirchhoff's first law.
2. Define form factor.
3. Write the significance of back EMF.
4. Why the transformer rated in kVA?
5. What you mean by depletion region?
6. Draw the characteristics of zener diode.
7. Mention the truth tables of all universal gates.
8. List the use of registers in digital electronics.
9. Why the modulation for the signal is required?
10. Mention the difference between frequency modulation and amplitude modulation.

PART B -- (5 × 13 = 65 marks)

11. (a) (i) Using Kirchoff's laws, Find the current in various resistors of the circuit shown in figure. (8)



- (ii) In a circuit the applied voltage of 150 V lags the current of 8A by 40°. Find
- (1) Is power factor lagging or leading?
  - (2) What is the value of power factor?
  - (3) Is the circuit inductive or capacitive?
  - (4) What is the value of active and reactive power? (5)

Or

- (b) (i) A balanced star connected load of  $(4 + j3) \Omega$  per phase is connected to a balanced three phase, 400 V supply. The phase current is 12 A. Find, (1) the total active power, (2) reactive power, and (3) total apparent power. (8)
- (ii) With a neat circuit diagram, explain the working of permanent magnet moving coil (PMMC) instrument. (5)
12. (a) Explain the construction of DC machine with relevant illustration. Also explain the working of DC machine in generator mode. (13)

Or

- (b) (i) Step by step, derive the expression for the EMF induced in the secondary of the two winding transformer. (8)
- (ii) Explain the working of capacitor start capacitor run single phase induction motor. (5)
13. (a) (i) With necessary circuit diagram and waveforms, explain the working of PN junction diode in all possible modes operation. (8)
- (ii) Describe the working of full wave rectifier. (5)

Or

- (b) Elucidate the operation of common emitter configuration of the bipolar-junction transistor (BJT). Also draw and write the inferences from the input and output characteristics of the same. (13)

14. (a) (i) Convert the following octal numbers to decimals.  
(1)  $444_8$   
(2)  $120_8$  (8)  
(ii) Implement  $Y = \overline{AB} + A + (\overline{B+C})$  using only NAND gates. (5)

Or

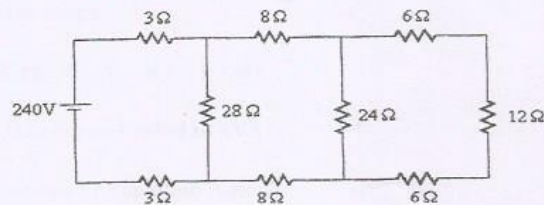
- (b) (i) Explain the working of R — 2R ladder type digital to analog converter. (8)  
(ii) Show how a RS flip-flop and clocked PS flip-flop is realized using NOR gates? (5)
15. (a) Draw the typical communication system and describe the function of each element associated with the above mentioned system. (13)

Or

- (b) Write a technical note on the following:  
(i) Monochrome TV transmission system (8)  
(ii) Functional architecture of Integrated Services Digital Network (ISDN) (5)

PART C — (1 × 15 = 15 marks)

16. (a) Determine the current in  $12\Omega$  resistor for the given circuit by Mesh method. (15)



Or

- (b) Draw and explain the electrical and mechanical characteristics for DC series and DC shunt motor. Also list the real time applications of these motors. (15)