D 811

B.Sc. (Applied Science) DEGREE EXAMINATION, APRIL/MAY 2003.

First Year

Apparel and Fashion Technology

FT 1.6 — BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State Kirchoff's voltage law.

2. Determine the average power delivered to the circuit consisting of an impedance $z = (5 + j8)$ ohms when the current flowing through the circuit is $I = 5\lfloor 30$ amps.

3. What is meant by a separately excited dc generator?

4. Define slip in a three phase Induction Motor.

5. How does a zener diode differ from a rectifier diode?

6. Define the term channel ohmic region of a Field Effect Transistor.

7. What is the PIV of a diode in a centre tapped Full Wave Rectifier?

8. Define Rectification Efficiency.

9. An amplifier has a gain of 4000. With negative feedback the gain reduces to 25. Calculate the fraction of the output that is fed back to the input.

10. Why are power amplifiers known as large signal amplifiers?

PART B — (5 × 16 = 80 marks)

11. (i) A 100 watt, 250 volts lamp is connected in parallel with an unknown resistance R. The total power dissipated in the circuit is 600 watts, when the applied voltage is 250 volts. Find the value of unknown resistance. (6)

(ii) Find the equivalent resistance of the circuit shown in Fig (1). If the total current taken by the circuit is 5 Amperes, what is the current through the individual resistances? (10)
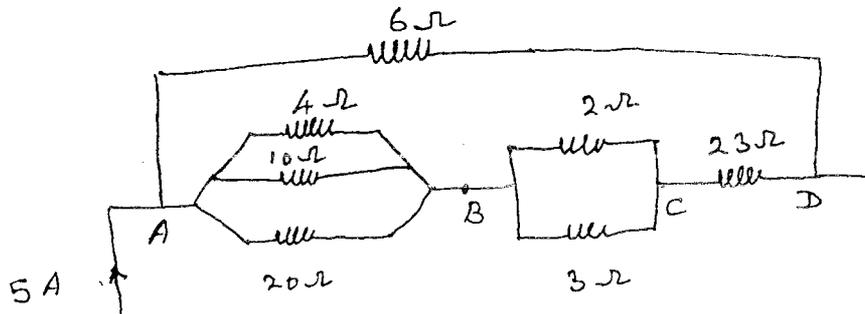

Fig (1)

12. (a) (i) Describe the construction of a D.C. Generator. (10)

(ii) Explain the mechanical characteristics of a DC shunt motor. (6)

Or

(b) (i) A single phase transformer has 200 primary and 400 secondary turns. The cross sectional area of the core is 50 sq.cm. If the primary winding is connected to 230 volts 50 Hz a.c. supply, calculate the voltage in the secondary winding and the peak value of flux density in the core. (8)

(ii) Explain the working principle of an auto transformer. (8)

13. (a) (i) Discuss how a depletion layer is formed in a pn junction diode. (6)

(ii) Describe the operation of a NPN transistor. (6)

(iii) Explain the output characteristics of the common emitter transistor. (4)

Or

(b) (i) Why is a JFET referred to as a voltage controlled device? (3)

(ii) Establish the relationship between the parameters of a JFET. (5)

(iii) Explain the nature of output characteristics and transfer characteristics of an n channel enhancement type MOSFET. (8)

14. (a) (i) Derive an expression for the rectification efficiency of a full wave rectifier. (8)

(ii) Describe the action of the following filter circuits shunt capacitor filter and series inductor filter. (6 + 2)

Or

(b) (i) Describe using a circuit diagram the working of an RC coupled amplifier. (8)

(ii) Explain its frequency response characteristics. (5)

(iii) Bring out its advantages. (3)

15. (a) (i) Derive from first principles expressions for the input and output impedance of a voltage series feedback amplifier. (8)

(ii) A negative feedback is used to reduce the noise from an amplifier by 80%. What must be the percentage of negative feedback to accomplish this; if the voltage gain is 100? Also what will be the voltage gain with feedback. (8)

Or

(b) Explain using a circuit diagram the operation and characteristics of a class A single ended power amplifier. Develop an expression for power gain. (16)

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