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B.Sc. (Applied Science) DEGREE EXAMINATION, NOVEMBER/DECEMBER 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.　What is a parallel circuit?

2.　Define RMS value of an alternating quantity.

3.　What is armature reaction in a dc generator?

4.　List the different types of three phase transformer connections.

5.　How is a pn junction formed?

6.　What is biasing in a bipolar junction transistor?

7.　Define transformer utilization factor in a rectifier circuit.

8.　What are the advantages of a Bridge rectifier?

9.　Draw the block diagram of a feedback amplifier.

10.　What are the different types of distortions in a power amplifier?

PART B — (5 × 16 = 80 marks)

11. (i) Establish the relation between voltage and current in a single phase purely inductive and purely capacitive circuit. (4 + 4)

    (ii) A coil having resistance of 15 ohms and an inductance of 31.8 mH is connected across a 200 V, 50 Hz single phase a.c. supply. Calculate

        (1) Current drawn

        (2) Power factor

        (3) Power consumed. (8)

12. (a) (i) A 6 pole lap wound dc generator has 600 conductors on its armature. The flux per pole is 0.02 webers. Calculate the speed at which the generator must run to generate 300 volts and what would be the speed if the generator were wave wound. (8)

    (ii) Explain how torque and speed of a dc series motor varies with its armature current. (8)

Or

    (b) (i) Describe the construction of a three phase induction motor. (8)

    (ii) A three phase induction motor is wound for 4 poles and is supplied from a 50 Hz system. Calculate the synchronous speed, the speed of the motor when slip is 4% and rotor frequency when the motor runs at 600 rpm. (8)

13. (a) (i) Describe the operation of Zener diode as a voltage regulator. (8)

    (ii) Explain using a circuit diagram the output characteristics of a commonbase transistor. (8)

Or

    (b) (i) Explain using a diagram the principle of operation of a JFET. (10)

    (ii) In a JFET, I_{DSS} = 15 mA, $V_{GS\ (OFF)}$ = –5 V. Determine the drain current for V_{GS} = 0 V, – 1 V and –4 V. (6)

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14. (a) (i) What should be the value of inductance used in a inductor filter connected to a full wave rectifier operating at 50 Hz, if the ripple is not to exceed 5% for a 100 ohms load. (7)

(ii) Explain the need for a voltage regulator. (9)

Or

(b) (i) Describe the operation of a transformer coupled amplifier. (8)

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

(iii) Bring out its advantages. (3)

15. (a) (i) With diagrams explain voltage and current feedback in a circuit. (8)

(ii) Discuss the effect of feedback on bandwidth and distortion. (8)

Or

(b) (i) Derive expressions for power dissipation, output power and efficiency of a class B push pull power amplifier. (8)

(ii) A class B amplifier has an efficiency of 60%. If the maximum collector power dissipation of each transistor is 2.5 watts, calculate the d.c. input power and a.c. output power. (8)

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