2017

OLD

Part-II 3-Tier

ELECTRONICS

(General)

PAPER—III

(PRACTICAL)

Full Marks : 100

Time : 3 Hours

The figures in the margin indicate full Marks.

Group—A

(*Semiconductor Devices and Circuits*)

Answer any *one* question.

1. Study the forward 1-V characteristics of a PN junction on diode. Implement the circuit on a bread board. Calculate the value of cut-in voltage, material constant and reverse saturation current from the forward I-V curve.

2. Study the reverse I-V characteristics of a P-N junction diode. Specify break region and break down voltage. Calculate dynamic ressistance from rhe reverse I-V characteristics.

3. Design a voltage regulator circuit using a zener diode. Apply line voltage 5 to 8 volt to achieve regulated voltage output of 5.6 V. Draw the line regulation curve.

4. Study the load regulation characterstics of a zener diode. Assume zener break down voltage to be 5.6 V. Draw the load regulation curve of your circuit and calculate % regulation

5. Construct a half-wave rectifier circuit using a P-N junction diode. Apply a sine wave at the input and observe the output and inpuyt in a CRO. Increase input frequency and observe the output.

6. Construct a full wave bridge rectifier circuit in a bread board using four P-N junction diodes and required resistances. Apply a sine wave at the input and study its wave form at the output using a CRO.

7. Design a circuit on a bread board to study the input characteristics of a N-P-N transistor operating under CE mode for two V_{CE} value. Calculate h_{ie} from your input characteristics curve.

8. Draw the output characteristics curve of a N-P-N transistor operating under CE mode for different I_B value. Specify cut-off, Linear and saturation region in the output characteristics. Calculate h_{fe} from your curve.

Group—B

(*Instrumentation and Digital Electronics*)

Answer any *one* question.

9. Construct an astable-multivibrator with 555 timer IC for a given frequency. Study the output waveform using a Cathode–ray–oscilloscope and measure its duty cycle.

10. Design a circuit for off-set wall adjustment of an operational of amplifier IC 741 for different feed back resistence. Measure the output offset voltage for each case.

11. Study the input-out put characteristics of a non-inverting amplifier for a gain of 2. Apply a sine wave to this circuit. Increase the frequency of the sine wave and calculate voltage gain. Draw gain *vs* frequency plot.

12. Construct a differentiator circuit using an OP-AMP. Apply a traingular wave to this circuit and observe the output in a CRO.

13. Realize an X-OR gate using minimum no of NOR gates. Verify the truth table.

14. Construct a J-K flip flop using NAND gates only and verify its truth tasle.

15. Construct a half-adder circuit using NAND gates only and verify its truth table.

16. Implement the function $F = \left(A + \bar{B}\bar{C}\right)\left(\bar{B} + CA\right)$ in a bread board and verify its truth table.

Marks Distribution

Group A Experiment (Theory : 05 ; circuit : 05 ; Expt : 20 ; Discussion : 05)	:	35
Group B Experiment (Theory : 05 ; circuit : 05 ; Expt : 20 ; Discussion : 05)	:	35
Viva–Voce (10+10)	:	20
Laboratory Note Book (5+5)	:	10
Total	:	100