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(Pre-CBCS)

(3rd Semester)

ELECTRONICS

THIRD PAPER

(Electronics Devices and Amplifiers)

Full Marks : 55

Time : 2½ hours

Simple calculator may be used in this paper

(PART : A—OBJECTIVE)

(*Marks* : 20)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 5)

Put a Tick (✓) mark against the correct answer in the brackets provided : 1×5=5

1. In a JFET operating above pinch-off voltage, the drain current

(a) starts decreasing ( )

(b) increases steeply ( )

(c) disappears ( )

(d) remains practically constant ( )

2. SCR is a device having

(a) three layers ( )

(b) three transistors ( )

(c) four layers ( )

(d) two diodes ( )

3. The property due to which LCD is used for display device is

(a) it requires little power ( )

(b) liquid crystal has a strong directional property ( )

(c) it can withstand high temperature ( )

(d) liquid crystal transmits light easily ( )

4. A class-B push-pull amplifier has the main advantage of being free from

(a) any circuit imbalances ( )

(b) unwanted noise ( )

(c) even-order harmonic distortion ( )

(d) dc magnetic saturation effects ( )

5. Feedback component in an integrator is made up of

(a) resistor ( )

(b) inductor ( )

(c) combination of resistor and capacitor ( )

(d) capacitor ( )

SECTION—B

(*Marks* : 15)

Answer any *five* questions of the following : 3×5=15

1. What is the difference between a JFET and a bipolar transistor?

2. With a suitable diagram, explain half-wave rectifier using *p-n* junction diode.

3. With suitable diagram, explain the *V-I* characteristics of SCR.

4. Explain Zener diode as voltage regulator.

5. What do you mean by hybrid parameters? What are their dimensions?

6. What are the advantages of tuned amplifier?

7. Define the parameters of FET and derive the relation among these parameters.

8. Mention how PIN diode can be used as high-frequency switching device.

(PART : B—DESCRIPTIVE)

(*Marks* : 35)

The figures in the margin indicate full marks for the questions

1. *(a)* Explain the construction and working of a JFET. 5

(b) Write two advantages and disadvantages of JFET. 2

OR

(a) Describe the construction and working principle of depletion type MOSFET. 5

(b) Write two applications of FET. 2

2. *(a)* Write the construction and operation of UJT. 4

(b) Explain the UJT used as relaxation oscillator. 3

OR

(a) Describe the working of SCR from its equivalent circuit. 4

(b) Explain firing and triggering of an SCR. 3

3. *(a)* With a neat diagram, explain construction and working of a solar cell. 5

(b) Explain the function of I layer in a PIN diode. 2

OR

(a) Why is liquid crystal used in LCD? With a diagram, explain the working of Liquid Crystal Display. 1+3=4

(b) What is the function of a transistor in transistor series regulator? 3

4. *(a)* Draw a neat circuit diagram of class-B push-pull amplifier and explain its working. 5

(b) Discuss the frequency response of double-tuned amplifier. 2

OR

(a) Show that in a class-B push-pull amplifier, the power efficiency is 78·5%. 5

(b) Write the difference between tuned amplifiers and other amplifiers. 2

5. *(a)* With a circuit diagram, explain the circuit analysis of OP-AMP as differentiator. 5

(b) Define common mode signal and differential mode signal. 2

OR

(a) What are the characteristics of an ideal OP-AMP? Why is the voltage at the summing point of a negative feedback OP-AMP reduced almost to zero? 3+2=5

(b) What are differential amplifiers? Draw the basic circuit of differential amplifier. 1+1=2

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