

2 0 1 2

(3rd Semester)

ELECTRONICS

THIRD PAPER

(Electronic Devices and Amplifier)

(PART : A—OBJECTIVE)

(Marks : 20)

SECTION—I

(Marks : 5)

Each question carries 1 mark

Answer all questions

Tick (✓) the correct answer in the brackets provided :

1. The expression for the voltage gain of FET is

(a) $A_v = \frac{\mu R_L}{r_{dS} + R_L}$ ()

(b) $A_v = -\frac{\mu R_L}{r_{dS} + R_L}$ ()

(c) $A_v = \frac{r_{dS} + R_L}{\mu R_L}$ ()

(d) $A_v = -\frac{r_{dS} + R_L}{\mu R_L}$ ()

where the symbols have their usual meanings.

2. The generated output waveform of an UJT is

- (a) sinusoidal waveform ()
- (b) square waveform ()
- (c) triangular waveform ()
- (d) saw-tooth waveform ()

3. When the Zener diode is in forward biased, its characteristics are just like that of

- (a) ordinary diode ()
- (b) PIN diode ()
- (c) photodiode ()
- (d) laser diode ()

4. In a typical tuned amplifier circuit, only the signals at the resonant frequency is amplified, because at resonance

- (a) tuned circuit is low impedance ()
- (b) tuned circuit is high impedance ()
- (c) tuned circuit is low frequency ()
- (d) tuned circuit is high frequency ()

5. Open-loop gain of an OP-AMP is the gain obtained when

- (a) positive feedback in the circuit ()
- (b) negative feedback in the circuit ()
- (c) no feedback in the circuit ()
- (d) high feedback in the circuit ()

(4)

SECTION—II

(Marks : 15)

Each question carries 3 marks

Answer **all** questions

1. Explain the similarities and dissimilarities between JFET and MOSFET.

(5)

2. For an n -channel JFET, $I_{DSS} = 8.7 \text{ mA}$, $V_p = -3 \text{ V}$, $V_{GS} = -1 \text{ V}$. Find I_D and g_m .

3. Describe briefly the working of liquid crystal display (LCD).

4. Show that the overall maximum efficiency of class B push-pull amplifier is 78.5%.

5. Explain the working of an operational amplifier in non-inverting configuration.

(4)

- (b) Define the input offset voltage in an OP-AMP and also mention the effect of temperature change in an OP-AMP. 2

Or

- (a) Draw a block diagram of typical OP-AMP and explain the function of each block. 4
- (b) Find an expression for the overall gain in an OP-AMP in the case of inverting configuration. 3

III/ ELEC (iii)

2 0 1 2

(3rd Semester)

ELECTRONICS

THIRD PAPER

(Electronic Devices and Amplifier)

Full Marks : 55

Time : 3 hours

(PART : B—DESCRIPTIVE)

(Marks : 35)

The figures in the margin indicate full marks for the questions

1. (a) Describe the construction and working principle of enhancement mode MOSFET and give some applications of MOSFET. 2+2+1=5
- (b) Why do the depletion type MOSFET is so called the dual mode MOSFET? 2

Or

- (a) What are the parameters of FET? Deduce the relation between them. 3+2=5

(2)

- (b) Define the conventional drain current in FET. On what factor does it depend?

1+1=2

2. (a) Describe the different types of biasing in junction diode and hence define the terms 'breakdown voltage' and 'knee voltage'.

1+2+2=5

- (b) What is dynamic resistance of junction diode? Give the condition for linearity of the junction diode.

1+1=2

Or

- (a) Explain the construction and working principle of UJT.

1+2=3

- (b) What is SCR? Using the V-I characteristic curve, explain the conducting mode of SCR and hence define the condition for firing.

1+1+2=4

3. (a) What are light emitting diodes? Explain the construction and working of LED.

1+3=4

- (b) Explain the theory behind the working of solar cell.

3

(3)

Or

- (a) What is PIN diode? Explain the function of I layer in a PIN diode.

1+2=3

- (b) Draw a circuit diagram of transistor series regulator and discuss the use of transistor in transistor series regulator.

1+3=4

4. (a) What are power amplifiers? Show that the efficiency of transformer coupled class A amplifier is 50% in an ideal case.

1+4=5

- (b) Write the importance of blocking capacitor in class A power amplifier.

2

Or

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

1+4=5

- (b) Define the cross-over distortion in class B push-pull amplifier.

2

5. (a) What are differential amplifiers? Draw the basic differential amplifier circuit and find out the expression for common mode voltage.

1+4=5