2020

ELECTRONICS — HONOURS

Paper : CC-6

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer ***question no.* 1** and ***any four*** from the rest, taking ***two*** from **Unit-I** and ***two*** from **Unit-II**.

1. Answer ***any ten*** questions : 1×10

(a) h_{ie} is a/an

(i) impedance parameter (ii) admittance parameter

(iii) hybrid parameter (iv) Z-parameter.

(b) Output impedance of an amplifier equals the ratio of

(i) output voltage to input voltage (ii) input voltage to output voltage

(iii) output current to input current (iv) output voltage to output current.

(c) MOSFET stands for

(i) Metal On Semiconductor Field Effect Transistor

(ii) Metal Oxide Switch Field Effect Transistor

(iii) Metal Oxide Switch Full Effect Transistor

(iv) Metal Oxide Semiconductor Field Effect Transistor.

(d) When a transistor is used as a switch, it is operated in the

(i) active and saturation regions (ii) cut-off and saturation regions

(iii) cut-off and active regions (iv) all of the above regions.

(e) A power-amplifier is a

(i) large signal amplifier (ii) small signal amplifier

(iii) medium signal amplifier (iv) none of these

(f) Negative feedback in an amplifier

(i) decreases gain and decreases bandwidth

(ii) decreases gain and increases bandwidth

(iii) increases gain and decreases bandwidth

(iv) none of the above.

(g) A tuned oscillator is

(i) a R-C oscillator (ii) an L-C oscillator

(iii) an L-R oscillator (iv) none of (i), (ii) and (iii).

(h) A Rectifier circuit converts

(i) a.c to d.c.

(ii) d.c to a.c.

(iii) low frequency a.c. to high frequency a.c.

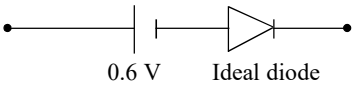
(iv) none of the above.

(i) The different stages in a regulated power supply are (a) step-down transformer (b) rectifier (c) filter (d) regulator. Arrange them in the order they appear.

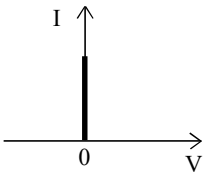
(i) (a), (b), (c), (d) (ii) (b), (d), (a), (c)

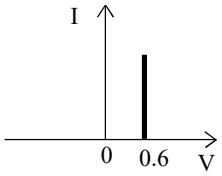
(iii) (a), (b), (d), (c) (iv) None of these.

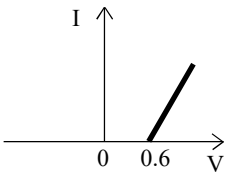
(j) The following circuit :



is an equivalent representation of which of the following piecewise linear models of a p-n diode :

(i) 

(ii) 

(iii) 

(iv) None of (i), (ii) and (iii).

(k) The point of intersection of the load-line and the diode-characteristic curve is called the 'Q-point'. The letter Q stands for

(i) Quiet (ii) Quiescent

(iii) Quality (iv) None of (i), (ii) and (iii).

(l) 'Pinch-off' voltage is related to :

(i) p-n diode (ii) JFET

(iii) BJT (iv) zener-diode.

Unit - I

2. What is a Diode Clamper? Why is it used? Explain the working of a bridge rectifier with the help of a circuit diagram. 2+2+4+2

3. (a) What is meant by biasing with reference to a transistor circuit?

(b) Explain in brief the working of collector-to-base bias in a transistor circuit.

(c) Explain with a diagram how stability is achieved in a self-bias transistor circuit. 2+4+4

4. What do you mean by hybrid parameters of a transistor amplifier in CE configuration? Derive the expression for input impedance, forward current gain, forward voltage gain and output impedance in terms of the four hybrid parameters. 2+(2+2+2+2)

5. Draw a neat diagram of a JFET. Explain the working of a JFET. Write down the expression relating g_m with V_{GS}. Explain the relationship. 3+3+2+2

Unit – II

6. What is negative feedback? Explain the advantages of negative feedback. How does negative feedback reduce distortion? Why is positive feedback used? 2+3+3+2

7. (a) How is a power amplifier different from a small-signal amplifier? Name the different types of power amplifiers and explain their working with the help of output waveforms.

(b) What do you mean by efficiency of a power amplifier?

(c) What is cross-over distortion in an amplifier? (2+4)+2+2

8. (a) Give two examples each of R-C and L-C type oscillators.

(b) What is a regulated power supply?

(c) Explain with a circuit diagram the working of a two-transistor series regulator circuit. 2+2+(4+2)
