

Third Semester B. E. (Computer Science and Engineering) Examination

ELECTRONICS DEVICES AND CIRCUITS

Paper – 3 KS 03

(USC – 10305)

P. Pages : 3

Time : Three Hours]

[Max. Marks : 80

- Note :** (1) Due credit will be given to neatness and adequate dimensions.
(2) Assume suitable data wherever necessary.
(3) Diagrams and Chemical equations should be given wherever necessary.
(4) Illustrate your answer wherever necessary with the help of neat sketches.
(5) Use pen of Blue/Black ink/refill only for writing the answer book.

1. (a) A 15-0-15 volts (rms) ideal transformer is used with full wave rectifier circuit with diodes having forward drop of 1 Volt. The load is a resistance of 100Ω , and capacitor of $10,000 \mu\text{f}$ is used as a filter. Calculate the dc load current and voltage. 7
- (b) What is need of filter circuit ? Explain any one filter in detail. 6

OR

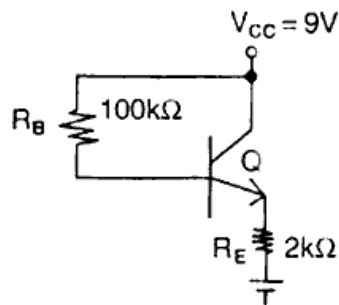
2. (a) Explain full wave bridge rectifier along with circuit diagram and waveforms. Also determine the efficiency of it. 7
- (b) Explain the following terms with reference to zener diode.
- (i) Zener voltage
- (ii) Power dissipation
- (iii) Zener test current (I_{zT}) 6
3. (a) Obtain the expression for collector current (I_C) of a transistor in common emitter configuration. 7
- (b) Define α and β of a transistor. For a transistor the base current is $100 \mu\text{A}$ and collector current is 2.9 mA . Find α and β . 6

OR

4. (a) Calculate the collector current and emitter current of a transistor with $\alpha = 0.95$ and $I_{CEO} = 100 \mu A$ when the base current is $10 \mu A$. 7
- (b) Derive the relationship between I_{CBO} and I_{CEO} . 6
5. (a) What is need of biasing in transistor ? Explain fixed bias circuit and find its stability factor. 7
- (b) Why is the thermal stabilization more essential for CE configuration of a transistor than for CB configuration ? 7

OR

6. (a) Why stability of an operating point necessary for transistor circuit ? List different sources of instability of Q -point. 7
- (b) For the circuit shown in fig.
Find :
(i) I_B (ii) I_E (iii) V_{CE} (iv) V_E and
(v) V_B for $\beta = 49$ and $V_{BE} = 0.7V$



7. (a) Draw the static characteristics of JFET and explain the followings :—
(i) Ohmic region
(ii) Pinch-off Region
(iii) Breakdown region. 7

- (b) For the FET prove that

$$\mu = r_d \times g_m$$

where μ , r_d and g_m are the FET parameters. 7

OR

8. (a) Give the comparison between
(i) JFET and BJT (ii) JFET and MOSFET 7
(b) With the help of neat diagrams explain the operation and drain characteristics of n-channel depletion type MOSFET. Explain the mechanism of "Pinch-off" condition. 7

9. (a) Explain crystal oscillator in detail. State its merits and demerits. 7
(b) Explain wein-bridge oscillator in detail. 6

OR

10. (a) A Rc phase shift oscillator has $R = 10 \text{ k}\Omega$ and $C = 0.001 \text{ }\mu\text{F}$
(i) Find frequency of oscillation
(ii) If oscillations are made to be variable using same value of R what will be its range for tuning of 1 KHz to 100 KHz ? 7
(b) Explain Barkhausens criteria in detail. 6
11. (a) What is LASER ? Explain construction, working principle of it. How LASER is differ from LED ? 7
(b) Explain photovoltaic effect in detail. Explain the construction and operation of photovoltaic cell. 6

OR

12. (a) Give the comparison between photoemissive sensor, photovoltaic sensor and photo conductive sensor. 7
(b) What is phototransistor ? How it is differ from conventional BJT ? Explain construction, working principle of phototransistor in detail. 6

