AU – 2532

Third Semester B. E. (Information Technology) Examination

ELECTRONICS DEVICES AND CIRCUITS

Paper – 3 IT 04

(USC – 10713)

P. Pages : 3

Time : Three Hours] [Max. Marks : 80

Note : (1) Separate answer book must be used for each section in the subject Geology, Engineering material of Civil branch and separate answer book must be used for Section A and B in pharmacy and Cosmetic Tech.
(2) Due credit will be given to neatness and adequate dimensions.
(3) Assume suitable data 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.

SECTION A

1. (a) Draw forward and reverse characteristics of p – n junction diode and define the following parameters :—

   (i) Cut in voltage

   (ii) Break down voltage

   (iii) Static forward resistance

   Show all these parameters on the characteristics. 8

   (b) What is the need of filter in DC power supply ? Explain the operation of shunt capacitor filter with input–output waveforms. 6

OR

2. (a) Compare half wave and centre tapped full wave rectifier considering all related parameters, circuit diagram and output waveforms. 7

   (b) Explain the principle, working and operation of photodiode. Draw its characteristics and enlist applications. 7

3. (a) Define the terms α and β

Hence prove $\beta = \frac{\alpha}{1-\alpha}$ 6

(b) What is DC load line ? Explain its significance. Also define

(i) Thermal runway

(ii) Stability factor. 7

OR

4. (a) Explain the construction and working of n – channel JFET. State its advantages over BJT. 7

(b) Draw a well labeled output characteristics for common emitter transistor configuration showing cut off, active and saturation regions of operation. Explain it. 6

5. (a) Explain the working of crystal oscillator. State its merits and demerits. 7

(b) Explain various output commands used in P spice. 6

OR

6. (a) State Barkhausan's criterion for sustained oscillations. Draw the circuit and explain the operation of RC phase shift oscillator. 7

(b) State and explain different types of analysis in P spice. 6

SECTION B

7. (a) What is virtual ground concept ? Draw the circuit diagram of non inverting amplifier using Op – Amp and derive the expression for closed loop gain. 7

(b) Draw the circuit and explain the operation of DC level shifter used in Op–Amp. 6

OR

8. (a) List the ideal characteristic of Op–Amp. Also specify their values for Op–Amp IC–741. 7

   (b) Draw the circuit and explain the operation of differential amplifier which is used as an input stage for Op–Amp. 6

9. (a) Draw the circuit and explain the operation of Integrator using Op–Amp. Derive the expression for output. Draw output waveforms for sine wave and square wave inputs. 8

   (b) What is voltage follower using Op – Amp, derive the expression for its gain and state its applications. 6

OR

10. (a) Draw the circuit of summing amplifier using Op – Amp. Derive the expression for its output. How it can be used as an averaging circuit ? Explain. 7

    (b) How IC–7805 can be used as a constant current source ? Draw the circuit and explain the operation with suitable example. 7

11. (a) Draw the circuit and explain the operation of Astable Multivibrator using IC – 555. Derive the expression for output frequency. Suggest the modification in circuit for getting symmetrical square wave at the output. 7

    (b) Define the following terms related with PLL :—

    (i) Lock range (ii) Capture range. 6

OR

12. (a) Draw block diagram of 'Phase Locked Loop' (PLL). Explain it in detail and state the applications of PLL. 6

    (b) Draw the circuit and explain the operation of 'Monostable Multivibrator' using IC–555. Derive the expression of output pulse width. 7