E 4147 (Pages : 4) Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2012

Third Semester

Vocational Course – LINEAR INTEGRATED CIRCUITS

(For the Vocational Subject – Applied Electronics of Model-II B.Sc. Physics)

Time : Three Hours Maximum Weight : 25

Part A (Objective Type Questions)

Answer all *questions.*

Weight 1 *for each bunch.*

BUNCH I

1. Epitaxial growth involves growth from :
   (a) Solid phase. (b) Gas phase.
   (c) Liquid phase. (d) None of these.
2. When a differential amplifier is operated single ended?
   (a) The O/P is grounded.
   (b) Both inputs are connected.
   (c) The O/P is not inverted.
   (d) One I/P is grounded and signal is applied to the other.
3. A very small difference voltage between the two inputs drives the amplifier to saturation due to :
   (a) Low open loop voltage gain. (b) Feedback.
   (c) High open loop voltage gain. (d) None of these.
4. The frequency of oscillation of an astable multivibrator depends on :
   (a) Transistor current gain. (b) Duration of the input signal.
   (c) Values of R and C. (d) None of these.

BUNCH II

5. Thin film capacitors are :
   (a) Voltage independent. (b) Voltage dependent.
   (c) Current dependent. (d) None of these.

Turn over

6. For an OP-AMP with neagtive feedback, the output is :

   (a) Equal to the input. (b) Fed to the inverting input.

   (c) Fed to the non-inverting input. (d) None of these.

7. The most popular ICs are :

   (a) Thin film. (b) Thick film.

   (c) Hybrid. (d) Monolithic.

8. The 555 timer has :

   (a) Low current output. (b) High current output.

   (c) An operating voltage below +5. (d) None of these.

BUNCH III

9. In ICs *npn* construction is preferred to :

   (a) *pn* construction. (b) *np* construction.

   (c) *pnp* construction. (d) All the above.

10. With zero volts on both inputs, an OP-AMP ideally should have an output equal to :

   (a) CMRR. (b) The positive supply voltage.

   (c) The negative supply voltage. (d) Zero.

11. A crystal oscillator :

   (a) Gives high output voltage.

   (b) Works at high frequency.

   (c) Works with very low frequency.

   (d) Gives constant frequency substantially.

12. The term hysteresis is associated with :

   (a) PLL. (b) Comparator.

   (c) Oscillator. (d) Schmitt trigger.

BUNCH IV

13. A voltage follower :

   (a) Has a voltage gain one. (b) Has no feedback resistor.

   (c) Is non-inverting. (d) All of these.

14. The input element in an OP-AMP differentiator is :

   (a) Resistance. (b) Capacitance.

   (c) Inductance. (d) None of these.

15. A bistable multivibrator :
    (a) Has two stable states.
    (b) Has two unstable states.
    (c) Is used for generating square waves.
    (d) All the above.
16. For an ideal OP-AMP the output impedance is :
    (a) One. (b) Infinity.
    (c) Zero. (d) None of these.

$(4 \times 1 = 4)$

Part B (Short Answer Questions)

Answer any **five** *questions.*
Weight 1 *each.*

17. State any *four* advantages of IC.
18. What are the characteristics of an ideal OP-AMP?
19. Briefly explain how an OP-AMP can be used for summation.
20. An OP-AMP can be converted into an integrator. How?
21. Explain the working of a Wien bridge oscillator.
22. How oscillations are established in a crystal oscillator?
23. How Schmitt trigger acts as a squaring circuit?
24. Briefly discuss on monolithic PLL.

$(5 \times 1 = 5)$

Part C (Short Essay / Problems)

Answer any **four.**
Weight 2 *each.*

25. Explain the fabrication of resistor is an IC.
26. Differentiate between non-linear and linear integrated circuits.
27. What is CMMR for an OP-AMP? Explain slew rate.
28. What is a comparator? Explain the features of a comparator.
29. What is pass band and stop band for a filter? Illustrate.
30. Briefly describe the role of PLL by suggesting an application.

$(4 \times 2 = 8)$

Turn over

Part D (Essay Questions)

Answer any **two** *questions.*

Weight 4 each.

31. Describe the different processes involved in preparing the surface of a semiconductor wafer for fabricating IC.

32. Discuss the difference between the integrator and differentiator and give one application of each.

33. Explain the working of a free running multi-vibrator and obtain the expression for duty cycle.

$(2 \times 4 = 8)$