B.Sc. ELECTRONICS
Third Semester
ANALOG ELECTRONICS
(BSE - 302)

Duration: 3Hrs.   Full Marks: 70

Part-A (Objective) =20
Part-B (Descriptive) =50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.   Marks: 50

Answer any *four* from *Question no.* 2 to 8
Question no. 1 is compulsory.

1. What are the different types of oscillator? Explain the working principle of oscillatory circuit. (4+6=10)

2. a) Explain the operation of RC coupled amplifier in middle frequency range.
   b) Explain the concept of virtual ground with the help of diagram. (6+4=10)

3. a) What are the various configurations of open loop OP-AMP? Discuss.
   b) Write short notes on CMRR. (6+4=10)

4. a) Derive the expression of out voltage for Summing amplifier.
   b) State Barkhausen criterion of oscillation. (6+4=10)

5. a) Derive the expression of gain in voltage-shunt feedback circuit.
   b) Write the advantages of negative feedback. (6+4=10)

6. a) What do you mean by Class C operation of power amplifier? Derive the expression of overall efficiency of Class B amplifier.
   b) A Class A power amplifier has zero signal power dissipation of 10 watt. If the a.c. output power is 3 watt, find
      1) collector efficiency.
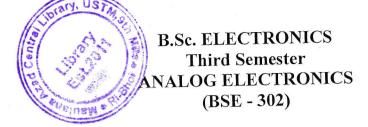   2) power rating of transistor.

   (1+5+4=10)

7. a) Explain the operation of Multistage amplifier.
   b) What is a Differentiator? Explain briefly.

   (6+4=10)

8. a) Discuss the effect of negative feedback on input impedance in voltage-series
   feedback.
   b) A tuned collector oscillator makes use of an LC tuned circuit with L=58.6H and
   C=300pF.Calculate the frequency of oscillation.

   (6+4=10)

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Duration: 20 minutes

Marks – 20

(PART A - Objective Type)

1×20=20

I. Choose the correct answer:

1. A CE amplifier provides a phase reversal of input signal which is
   a) 360 degree out of phase
   b) 180 degree out of phase
   c) 0 degree out of phase
   d) 270 degree out of phase

2. If a Multistage amplifier consists of two amplifiers in cascade having gain A_1 and A_2, then overall gain will be
   a) $A_1 * A_2$
   b) $A_1 + A_2$
   c) $A_1 - A_2$
   d) A_1 / A_2

3. In RC coupled amplifier, coupling components used are
   a) resistor
   b) capacitor
   c) inductor
   d) both resistor and capacitor

4. The effect of coupling capacitor in RC coupled amplifier is negligible in
   a) high frequency range
   b) middle frequency range
   c) low frequency range
   d) all the above

5. Regarding the negative feedback in amplifier which statement is wrong?
   a) It widens the separation between 3-db frequencies.
   b) It increases the gain bandwidth product.
   c) It improves the gain stability.
   d) It reduces distortion.

6. For a negative feedback, which statement is correct
   a) $A_F > A$
   b) $A_F < A$
   c) $A_F = A$
   d) none of the above

7. An amplifier works as an oscillator in positive feedback, if
   a) AB=0
   b) AB=1
   c) AB>1
   d) AB<1

8. In RC-Coupled transistor amplifier, emitter bypass capacitor offers
   a) low reactance path to signal
   b) high reactance path to signal
   c) does not affect input signal
   d) all the above

9. In Voltage-shunt feedback, there is
   a) voltage sampling plus current mixing
   b) voltage sampling plus shunt mixing
   c) current sampling plus shunt mixing
   d) none of the above

10. In voltage series feedback, input resistance
    a) increases
    b) decreases
    c) remains same
    d) none of the above

11. The reciprocal of sensitivity is called
    a) stabilization of gain
    b) desensitivity
    c) distortion
    d) all the above

12. In Colpitt's Oscillator , the tank circuit consists of
    a) one inductor and two capacitors.
    b) one capacitor and two inductors.
    c) one inductor and one capacitor.
    d) one inductor, one capacitor and one resistance.

13. The total phase shift in Hartley Oscillator is
    a) 360 degree
    b) 180 degree
    c) -180 degree
    d) 0 degree

14. The gain of an Ideal OP-AMP is
    a) infinite
    b) zero
    c) one
    d) all the above

15. In Inverting Amplifier, voltage gain is given by
    a) $-(R_F/R_1)$
    b) (R_F/R_1)
    c) $1+(R_F/R_1)$
    d) (R_F+R_1)

16. Virtual ground implies that the potential difference between two terminal is
    a) zero
    b) infinity
    c) unity
    d) none of the above

17. The CMRR value for an Ideal OP-AMP is
    a) zero
    b) one
    c) infinite
    d) less than 1

18. Barkhausen criterion of oscillation is
    a) AB=0
    b) AB=1
    c) AB=∞
    d) none of these

19. Audio frequency range is given by
    a) 20 Hz to 200 Hz
    b) 20 Hz to 20 KHz
    c) 2 Hz to 20 KHz
    d) 20 Hz to 20 MHz

20. In RC Coupled amplifier, the phase angle in each RC segment is
    a) 90 degree
    b) 360 degree
    c) 60 degree
    d) 0 degree

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