Reg. No .... Name **20P1045**

M. Sc DEGREE END SEMESTER EXAMINATION - OCT 2020 : FEBRUARY 2021

SEMESTER 1 : PHYSICS

COURSE : **16P1PHYT04 : ELECTRONICS**

(For Regular - 2020 Admission and Supplementary - 2016/2017/2018/2019 Admissions)

Time : Three Hours Max. Marks: 75

PART A

Answer All (1 mark each)

1. . If A_{DM} = 3500 and A_{CM} = 0.35, the CMRR is ……….
   a. 1225
   b. 10,000
   c. 80 dB
   d. answers a and b

2. In differential-mode, …………….
   a. Opposite polarity signals are applied to the inputs
   b. The gain is one
   c. The outputs are of different amplitudes
   d. Only one supply voltage is used

3. How the performance of an op-amp circuit can be improved?
   a. By using non-compensating network
   b. By using frequency network
   c. By using compensating network
   d. None of the mentioned

4. Input resistance of op-amp is
   a. Very high
   b. Very low
   c. Zero
   d. One

5. Which filter performs exactly the opposite to the band-pass filter?
   a. Band-reject filter
   b. Band-stop filter
   c. Band-elimination filter
   d. All of the mentioned

(1 x 5 = 5)

PART B

Answer any 7 (2 marks each)

6. What is an Operational amplifier? Draw its schematic symbol?
7. List the three open-loop Op-amp configurations? Why they are not widely used in linear applications?
8. Define supply voltage sensitivity? What is meant by poorly regulated power supply?
9. Why is the output offset voltage generated by the input bias current always larger than that generated by the input offset current?

10. What is the difference between compensated and non-compensated op-amps?
11. Explain a differential input and differential output amplifier?
12. Explain the working of a low-voltage ac voltmeter?
13. What is Butterworth response?
14. What is a basic comparator?
15. What is meant by zero-crossing detector?

(2 x 7 = 14)

PART C

Answer any 4 (5 marks each)

16. Determine the output voltage for an open loop inverting amplifier, if (a) v_{in} =20 mV dc and (b) v_{in} = -50 µV peak sine wave. Assume the Op-amp is 741 (A=200000).
17. In a differential amplifier with single op-amp, R_1= R_2= 1 kΩ, R_F= R_3= 10 kΩ and the op-amp is 741C. (a)What are the gain and input resistance of the amplifier (b) calculate the output voltage if v_x=2.7 pp and v_y= 3 V pp sine waves at 100 Hz.
18. (a) With suitable circuit diagrams, explain ac and dc amplifiers (b) Describe an ac amplifier with a single supply voltage?
19. A differential input and output amplifier is used as pre-amplifier and requires a differential output of at least 3.7 V. Determine the gain of the circuit if the differential input V_{in} =100 mV.
20. Design a second order low-pass filter at a high cutoff frequency of 1 kHz. Also draw the frequency response of the same.
21. With the help of circuit diagrams, explain the working of Phase –shift Oscillator?

(5 x 4 = 20)

PART D

Answer any 3 (12 marks each)

22.1. What are the two differential amplifier configurations? Briefly compare and contrast these configurations with corrosponding circuit diagrams

OR

2. What is an instrumentation amplifier? Explain the working of instrumentation amplifier using Transducer Bridge.

23.1. Explain a voltage-to-current converter with floating load. Discuss how it is used in low voltage ac and dc voltmeters?

OR

2. Explain briefly the working of a voltage-controlled oscillator?

24.1. Distinguish between first order and second order filters. Discuss the theory of operation of a first order low pass filter using op-amp.

OR

2. (a) Discuss the theory of operation of a second order high pass Butterworth filter using op-amp. (b) Determine the low cutoff frequency f_L of a second order high pass Butterworth filter. Also draw the frequency response plot of the same.

(12 x 3 = 36)