Name **23P145**

M. Sc. DEGREE END SEMESTER EXAMINATION : NOVEMBER 2023
SEMESTER 1 : PHYSICS
COURSE : **21P1PHYT04 : ELECTRONICS**
(For Regular - 2023 Admission and Improvement/Supplementary -2022/2021 Admissions)

Duration : Three Hours   Max. Weights: 30

PART A
Answer any 8 questions   **Weight: 1**

1.	Explain briefly why negative feedback is desirable in amplifier applications?	(A, CO 1)
2.	What are Bode plots?	(R, CO 2)
3.	What is meant by circuit stability?	(R, CO 2)
4.	Give two reasons, why an open-loop op-amp is unsuitable for liner applications?	(U, CO 1)
5.	How does the high frequency mode of an op-amp differ from the equivalent circuit of an op-amp? Explain?	(R, CO 2)
6.	What are superheterodyne radio receivers?	(R, CO 4)
7.	What are the characteristics of an ideal op-amp?	(U, CO 1)
8.	Define a filter? How are filters classified?	(R, CO 3)
9.	State two basic criteria required for oscillations in oscillators?	(U, CO 3)
10.	List some of the applications of the 555 timer IC?	(R, CO 4)

(1 x 8 = 8)

PART B
Answer any 6 questions   **Weights: 2**

11.	With the help of circuit diagrams, explain the working of Phase –shift Oscillator?	(An, CO 3)
12.	Discuss the working of a Successive-approximation A/D converter?	(R, CO 4)
13.	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.	(R, CO 2)
14.	The 741C op-amp having the following parameters is connected as a closed loop non-inverting amplifier with R_1=1 KΩ and R_F=10 KΩ: A=200,000, R_i=2 MΩ, R_o=75Ω, fo=5Hz, supply voltage=±15 V, output voltage swing=±13 V. Compute the values of A_F, R_{iF}, R_{oF}, f_{oF} and V_{ooT}.	(R, CO 1)
15.	The non- inverting and inverting input voltages for an open-loop differential amplifier using IC 741, are -25 μV rms and 20 μV rms respectively. Determine the output voltage. Given A=2x10^5	(An, CO 1)
16.	With the support of suitable diagram, discuss the functioning of various processes involved in the stereo FM reception?	(R, CO 4)
17.	Design a wide band-reject filter having fH=200 Hz and fL= 1 kHz.	(R, CO 3)
18.	Explain the working of a low-voltage dc voltmeter?	(R, CO 2)

(2 x 6 = 12)

PART C
Answer any 2 questions   **Weights: 5**

19. What are the two differential amplifier configurations? Briefly compare and contrast these configurations.   (A, CO 1)

20. Explain a voltage-to-current converter with floating load. Discuss how it is used in low voltage ac and dc voltmeters?   (R, CO 2)

21. With the help of suitable diagram, explain the theory and working of a Voltage-to-Frequency Converter?   (R, CO 4)

22. (a) Discuss the theory of operation of a first order high pass Butterworth filter using op-amp. (b)Design a high-pass filter at cutoff frequency of 1 kHz with a passband gain of 2. Also plot the frequency response curve.   (R, CO 3)

                                                                                    (5 x 2 = 10)

OBE: Questions to Course Outcome Mapping

CO	Course Outcome Description	CL	Questions	Total Wt.
CO 1	Understand the theoretical aspects of OP-amps	U	1, 4, 7, 14, 15, 19	12
CO 2	Apply the OP-amp circuits for various practical applications	A	2, 3, 5, 13, 18, 20	12
CO 3	Analyze frequency response of op amps	An	8, 9, 11, 17, 22	11
CO 4	Understand basics of communication physics	U	6, 10, 12, 16, 21	11

Cognitive Level (CL): Cr - CREATE; E - EVALUATE; An - ANALYZE; A - APPLY; U - UNDERSTAND; R - REMEMBER;