Reg. No ..... Name **25P162**

M.Sc. DEGREE END SEMESTER EXAMINATION- NOVEMBER 2025

SEMESTER 1 : PHYSICS

COURSE : **24P1PHYT04 : ELECTRONICS**

(For Regular - 2025 Admission and Improvement/ Supplementary 2024 Admission)

Time : Three Hours Max. Weights: 30

PART A

Answer any 8 questions **Weight: 1**

1.	What is frequency stability? Explain its significance?	(A)
2.	Explain a differential input and differential output amplifier?	(R)
3.	Briefly explain the difference between the dc and ac amplifiers?	(U)
4.	What is meant by pass band and a stop band for a filter?	(U)
5.	Define input offset voltage and explain why it exists in all op-amps?	(R)
6.	Define break frequency and bandwidth?	(U)
7.	Give two reasons, why an open-loop op-amp is unsuitable for liner applications?	(U)
8.	What is meant by frequency modulation?	(A)
9.	Define supply voltage sensitivity? What is meant by poorly regulated power supply?	(R)
10.	List any two applications of Phase locked loops?	(U)

(1 x 8 = 8)

PART B

Answer any 6 questions **Weights: 2**

11.	For a differential amplifier using two op-amps, R_1= R_3= 6.8 KΩ, V_x=-1.5 V pp, and V_y=-2 V pp sine waves at 1 KHz. The op-amp is 741C. Calculate (a) the voltage gain and the input resistance and (b) the output voltage of the amplifier. Assume that the output is initially nulled (VOOT=0 V). Given A=200,000, R_i=2 MΩ, R_o=75Ω, fo=5Hz, supply voltage=±15 V, output voltage swing=±13 V.	(An)
12.	Determine the low cutoff frequency f_L of a second order high pass Butterworth filter. Also draw the frequency response plot of the same.	(U)
13.	Draw the basic block diagram of an FM receiver? Explain how it is different from AM receiver?	(R)
14.	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)
15.	Design a low-pass filter at a cutoff frequency of 1 kHz with a pass band gain of 2. Using the frequency scaling technique, convert the 1-kHz cutoff frequency of the low-pass filter to a cutoff frequency of 1.6 kHz.	(R)
16.	Explain the working of a low-voltage ac voltmeter?	(R)
17.	With the help of basic block diagram, explain the working of a simple Automatic Gain Control (AGC) system?	(R)

18. For a closed loop inverting amplifier using 741C has the following specifications. A=200,000, Ri=2 MΩ, Ro=75Ω, fo=5Hz,UGB= 1 MHz, supply voltage=±15 V, output voltage swing=±13 V, R_1=1 kΩ and RF= 1 KΩ. Compute the values of A_F, R_{iF},R_{oF},f_{oF} and V_{ooT}. What is the name of this circuit? (R)

(2 x 6 = 12)

PART C

Answer any 2 questions **Weights: 5**

19. With the help of suitable diagram, explain the theory and working of a Frequency-to-Voltage Converter? (An)

20. What are the important characteristics of a Butterworth filter? With the help of a diagram explain the operation of a first and second order low pass Butterworth filter. (R)

21. (a)With the help of suitable diagrams, obtain the equation, which can be used to design the offset-voltage compensating network in an op-amp. (b) Design a compensating network for the LM307 op-amp. Draw the circuit diagram. The op-amp uses ± 10 V supply voltages. (The input offset voltage specified in the data sheet for LM307 is 10 mV). (A)

22. Explain the difference between (i) inverting and differential summing amplifier and (ii) inverting and non-inverting averaging amplifier. (R)

(5 x 2 = 10)

OBE: Questions to Course Outcome Mapping

CO	Course Outcome Description	CL	Questions	Total Wt.

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