

## Model Question Paper-2 with effect from 2019-20 (CBCS Scheme)

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**Fourth Semester B.E. Degree Examination**  
**Signal Conditioning and Data Acquisition Circuits**

**TIME: 03 Hours****Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

<b>Module -1</b>			
Q.01	a	Explain different circuits for obtaining supply voltages for op-amp.	8 marks
	b	List out the ideal op-amp characteristics.	4 marks
	c	Explain inverting, non-inverting and voltage follower circuit, deriving the gain equations of each of them.	8 marks
OR			
Q.02	a	Define with their ideal value for op-amp 741- i)CMRR ii)Slew rate iii)PSRR iv)Input bias current	8 marks
	b	For the non-inverting amplifier $R_1=1K \Omega$ , $R_f=10K \Omega$ . i)What is maximum output offset voltage due to $V_{ios}$ and $I_B$ ii)Calculate the value of $R_{comp}$ needed to reduce the effect of $I_B$ ii)What is maximum output offset voltage if $R_{comp}$ calculated in (b) is used in the circuit. Given: The op-amp is LM307 with $V_{ios}=10mv$ , $I_B =300nA$ and $I_{os}=50nA$	6 marks
	c	Explain the working of instrumentation amplifier with neat circuit diagram. Obtain its gain equation.	6marks
<b>Module-2</b>			
Q. 03	a	Explain V-I and I-V converter with necessary diagrams.	8 marks
	b	Explain positive and negative clipper circuits with neat diagram.	6 marks
	c	Design an op-amp differentiator that will differentiate input signal with maximum frequency of 250Hz. Take $C1=0.1\mu f$	6 marks
OR			
Q.04	a	Explain the working of Schmitt trigger with necessary diagram and equations.	6 marks
	b	Design a phase shift oscillator for $f_o=500Hz$ .	6 marks
	c	Explain triangular wave generator using op-amp and derive equation of output frequency.	8 marks
<b>Module-3</b>			
Q. 05	a	Explain the use of three terminal fixed voltage regulators as current source and	10 marks

		boosting output current.	
	b	Describe construction and operation of Switching Regulator.	10 marks
		OR	
Q. 06	a	Explain the second order high pass filter with neat circuit diagram and frequency response. Design the second order high pass filter for cutoff frequency of 4.5KHz.	10 marks
	b	Design wide band pass filter having $f_L=400\text{Hz}$ , $f_H = 2\text{KHz}$ and pass band gain of 4. Justify the given filter is wide band pass filter.	6 marks
	c	Design a 50 Hz active notch filter.	4 marks
		<b>Module-4</b>	
Q. 07	a	Explain functional diagram of 555 timer.	10 marks
	b	Design a Astable multivibrator using 555 timer for duty cycle $D=75\%$ and frequency $f = 1\text{KHz}$	6 marks
	c	Discuss frequency divider using Monostable multivibrator.	4 marks
		OR	
Q. 08	a	Explain switch and balanced modulator type phase detector circuits used in PLL.	10 marks
	b	Describe these applications of PLL- i) Frequency multiplication/division ii) Frequency translation	10 marks
		<b>Module-5</b>	
Q. 09	a	Describe the block diagram of Analog Data Acquisition System.	10 marks
	b	Describe components of Digital Data Acquisition System.	10 marks
		OR	
Q. 10	a	Describe R-2R ladder DAC with necessary diagram.	8 marks
	b	Explain the Flash type A to D converter with neat diagram.	6 marks
	c	Define the following terms- i) Resolution ii) Linearity iii) Monotonocity	6 marks