

Model Question Paper-1 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: Answer any **FIVE FULL QUESTIONS**, choosing at least **ONE QUESTION** from each **MODULE**.

Module -1			
Q.01	a	Define op.amp. and explain the functional block schematic diagram of op.amp.	06
	b	Derive an expression for output voltage and closed voltage gain of non-inverting amplifier	06
	c	Mention the features of instrumentation amplifier. Explain the working of instrumentation amplifier using transducer bridge	08
OR			
Q.02	a	Write the symbol of an ideal op.amp. and list out its characteristics	06
	b	Explain the following applications of op.amp. i) Voltage follower ii) Scale changer/Inverter	08
	c	Design an adder circuit using op.amp. to provide an output of $V_o = -(2V_1 + 0.3V_2 + 4V_3)$, where V_1 , V_2 and V_3 are analog input voltages	06
Module-2			
Q. 03	a	Explain the working of op.amp. as V-I converter with floating load	06
	b	What is a precision diode? Explain the working of precision full wave rectifier with circuit and waveforms	06
	c	Show that the op.amp. works as a differentiator and integrator with suitable circuits and equations	08
OR			
Q.04	a	Explain the working of a zero crossing detector with circuit and waveforms	06
	b	Explain the working of astable multivibrator using op.amp. Also obtain expression for period of oscillation	08
	c	Design and draw the Wein bridge oscillator circuit using op.amp. for a frequency of 1KHz using a capacitor of 0.1microfarad	06
Module-3			

Q. 05	a	Explain the working of a series op.amp. voltage regulator circuit	06
	b	Explain the connection diagram and characteristics of 78XX IC voltage regulators	08
	c	What are the limitations of three terminal IC voltage regulators? How are they overcome?	06
		OR	
Q. 06	a	Explain the construction, working and frequency response of first order low pass filter	08
	b	Design a high pass filter at a cutoff frequency of 1KHz with a pass band gain of 2 using a capacitor of 0.01 microfarad	06
	c	What is a notch filter? How do you obtain notch filter from band pass filter?	06
		Module-4	
Q. 07	a	Explain the functional diagram of 555 timer	06
	b	Explain the working of monostable multivibrator as i) Frequency divider ii) Pulse width modulator	08
	c	An astable multivibrator using 555 timer has $R_A=2.2K\Omega$, $R_B=3.9K\Omega$, and $C=0.1\mu f$. Determine T_H , T_L , duty cycle and frequency of oscillation	06
		OR	
Q. 08	a	Explain the operating principle of PLL with a schematic block diagram	08
	b	Explain the following applications of PLL i) Frequency multiplication/division ii) FM demodulation	12
		Module-5	
Q. 09	a	Explain the components of analog data acquisition system with a neat block diagram	08
	b	Explain the working of 3-bit R-2R ladder digital-to-analog converter	06
	c	Explain the specifications of DAC/ADC	06
		OR	
Q. 10	a	Explain the working of digital data acquisition system with a neat block diagram	08
	b	Mention the important features of DAC0800	06
	c	Explain the working of successive approximation analog-to-digital converter	06