Name: Enrolment No:	UPES

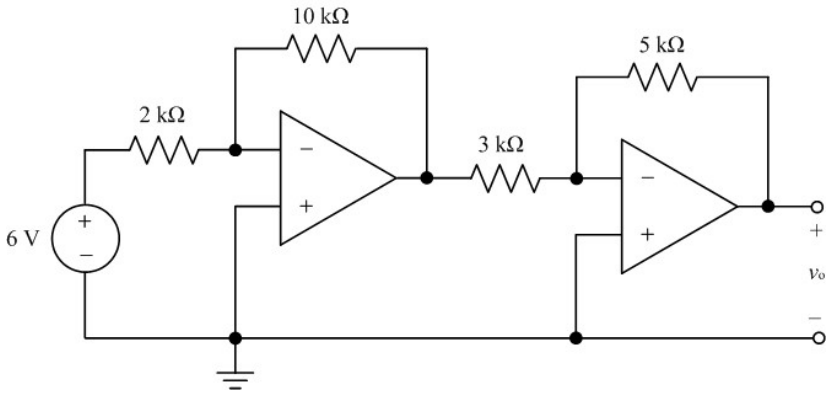
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

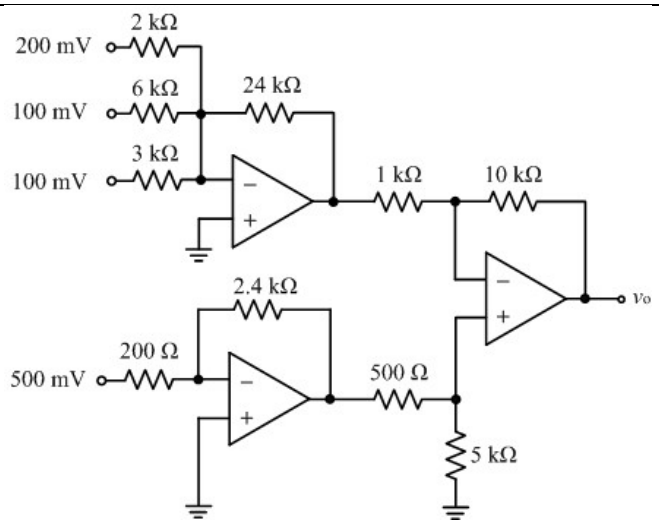
End Semester Examination, May 2021

Programme Name: B.Tech ECE **Semester: IV**
Course Name: Analog Electronics II **Time: 03 hrs**
Course Code: ECEG 2014 **Max. Marks: 100**
Nos. of page(s): 1

SECTION A (6X5): Attempt all the questions

S. No.		Marks	CO
1	Fill in the Blanks 1.1 The monostable multivibrator has ……. Quasi-stable state and ……stable state. 1.2 ……filter is able allow the band of the frequencies. 1.3 …….. Criterion is required for sustained oscillations. 1.4 The operating point of the BJT must lies in……..region to perform the operation of amplifier.	**5**	**CO1**
2	True/false 3.1 To design amplifiers positive feedback network is employed? (T/F) 3.2 Microphone kept in front of the speaker is an example of negative feedback system. (T/F) 3.3 Common emitter configured BJT amplifier produced 180 degree phase shift across input and output nodes. (T/F) 3.4 IC 741 belongs to operational amplifier (OPAMP) (T/F)	**5**	**CO2**
3	Choose correct answer (MCQ type) 3.1 The feedback factor of a Wien bridge oscillator using Op-Amp is A. 1/3 B. 1/2 C. 1 D. 1/4 3.2 Colpitts oscillator is also called as A. Tank circuit oscillator B. LC oscillator C. Resonant circuit oscillator D. All of the above 3.3 The Barkhausen criterion for an oscillator A. Loop gain should be unity B. Loop gain should be less than unity C. The phase of a feedback signal with respect to input should be 0° or 360° D. Both A and C	**5**	**CO1**

4	Define the Slew rate for OPAMP. Compute the maximum input frequency if Vo = 100mSin2πft for SR = 10V/us.?	**5**	**CO2**
5	Compute the outpout volatege Vo for the given OPAPM based schematic in Fig 1 ,?  **Fig. 1**	**5**	**CO3**
6	Enumerate the characteristics of Oparational amplifier (OPAMP).	**5**	**CO3**
	SECTION B (5X10): Attempt all the questions		
7	Prove that the pulse width (To) of the monostable schmitt trigger is given by To~RCln(1/1-$\boldsymbol{\beta}$), where $\boldsymbol{\beta}$ is feedback factor. Derscribe the charging and discharging path to support your drivation.? *OR* Expain the DAC and ADC convertors. Why these covertors are required for appplications based on micro-controllers?	**10**	**CO2**
8	8.a An amplifier has an internal gain A of 200. Its output impedance is 1KΩ. Negative feedback with feedback factor 0.02 is introduced in the circuit. Calculate the output impedance of the feedback amplifier. 8.b Explain negative feedback with respect to non-linear distortion and bandwidth?	**10**	**CO1**
9	9.a Sketch the output waveforms (V_{O1} and V_{O2}) from a differentiating circuit when the input is a saw-tooth wave and a triangular wave by using OPAMP circuit? 9.b. Obtain the Vo = $4V_{O1}$ - $6V_{O2}$ by OPAMP implementation.	**10**	**CO2**
10	10. a Sketch the voltage transfer charcatersitics of the Schmitt trigger of OPAMP? 10.b Compute the outpout volatege Vo for the given OPAPM based schematic in Fig 2 ?	**10**	**CO3**

	 **Fig. 2**		
11	Draw the schematic for OPAMP Band pass filter for the Bandwidth = 20 MHz and Gain = 600 (pass band gain). Sketch the Frequency spectrum of the filter?	**10**	**CO3**
	SECTION C (X20)= 20 MARKS		
12	Design a network of 8 LEDs (common cathode type) by employing a 555 timer IC of following specifications: a. Ist 4 LED blink in ON state for 5 ms and OFF state for 3 ms. b. Remaining 4 LED blink in ON state for 10 ms and OFF state for 5 ms. c. Draw schematic and the sketch for Output volate waveform in both the cases (case a and case b) (Choose the appropriate values of the passive components, number of 555 ICs etc)	**20**	**CO4**