Enrolment No:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, July 2020

Course: Analog Electronics II **Semester: IV**
Program: B.Tech Electronics and Communication Engineering **Time 03 hrs**
Course Code: ECEG 2014 **Max. Marks: 100**

Instructions:

1. Attempt all the questions (Theory, Numerical, Case study etc.) on A4 size blank sheets.
2. Attempt all questions serially as per question paper.
3. Answer should be neat and clean. Draw a free hand sketch for circuits/tables/schematics wherever required.
4. Scan the whole answer script and check the resolution carefully before upload on the blackboard. Note that answer scripts will be considered for evaluation only through Blackboard. No other mode of submission is acceptable.
5. It is always expected to be honest about each attempt which you make to progress in life.
6. The chosen values of resistors and capacitors should be unique as far as design problems are concerned.

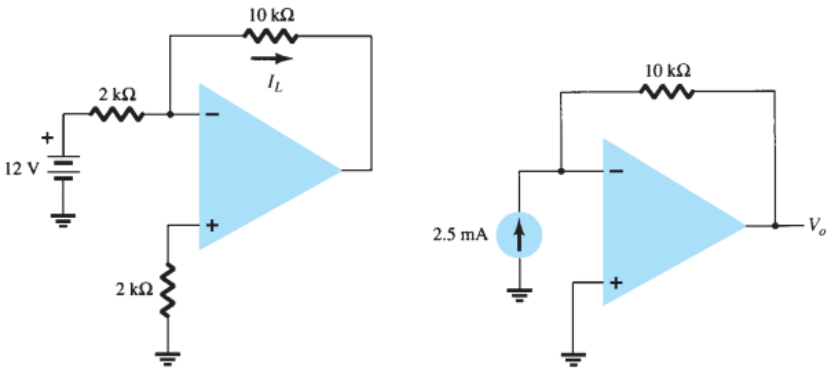
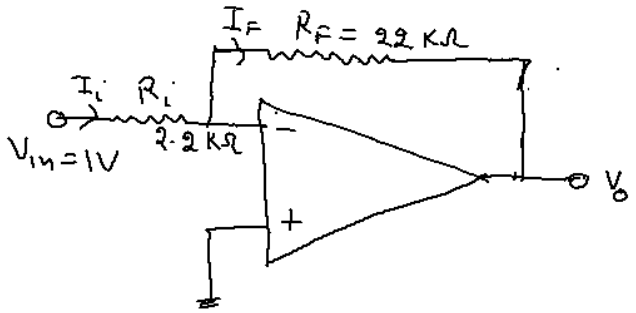
SECTION A

S. No.		Marks	CO
Q. 1	(a) Draw the circuit of second order low pass Butterworth filter and design it at a high cutoff frequency of 1KHz. Draw the frequency response of the designed filter. (b) Draw the schematic diagram of a Wien Bridge oscillator. Prove that the frequency of oscillation and feedback factor is given by $f_0 = \frac{1}{2\pi RC}$ and $\beta = 1/3$ where R and C are passive components of the feedback network.	**10** **10**	**CO3** **CO1**
Q. 2	Draw the circuit diagram of differential instrumentation amplifier and derive the expression of its output. Precisely control of temperature in many industries is critical to ensure the quality of the product. Discuss how you will use the instrumentation amplifier using transducer bridge to measure the temperature. Use block diagram to illustrate your concept.	**20**	**CO 2**

SECTION B

Q. 3	Name the different type of A/D converters. With the help of systematic block diagram, briefly explain the operational principle of successive approximation A/D converter.	**10**	**CO3**
Q. 4	Draw the circuit diagram of a class B, n-p-n push-pull power amplifier using transformer coupled input. For a class B amplifier providing a 20 V peak signal to a 16 Ω load (speaker) and a power supply of V_{CC} = 30V, determine the input power, output power and circuit efficiency.	**10**	**CO 4**
Q. 5	(a) What is a slew rate? List causes of the slew rate.	**5**	**CO2**

NOTE : The submission time of the Question Paper Answer Sheet is 24 Hhrs from the scheduled time (*exceptional provision due to extraordinary circumstance due to COVID-19 and due to internet connectivity issues in the far-flung areas*).
No Submission will be entertained after 24 Hrs

	Find the maximum frequency for a sine wave output voltage of 10-V peak with an op amp whose slew rate is 1V/μs. (b) Draw the pin configuration of timer 555 and describe the monostable operation of it.	**5**	**CO3**
Q. 6	Calculate I_L and V_O in the following circuits 	**10**	**CO2**
Q. 7	Define the following terms related to D/A converter; (i) resolution (ii) accuracy (iii) settling time (iv) offset error (v) gain error	**5**	**CO3**
Q. 8	Determine the approximate values for each of the following quantities in Figure (i) I_i (ii) I_F (iii) V_0 (iv) close loop gain (v) input resistance 	**5**	**CO2**
Q. 9	An amplifier has an open-loop gain of 500 and a feedback of 0.1. If open-loop gain changes by 25% due to temperature etc., find the percentage change in closed-loop gain.	**5**	**CO1**
Q.10	Draw the block diagram of a phase locked loop and discuss the operating principle of it	**5**	**CO3**

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