


Name:	 UPES <small>UNIVERSITY WITH A PURPOSE</small>
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, Dec 2021--Jan 2022

Course: Electronics
Program: M. Sc. (Physics)

Semester: I

Time : 3.00 Hrs.
Course Code:

Max. Marks: 100

Instructions: Read the instructions given below carefully:

1. Write all the answers in Answer Sheet
2. Mention your Name, Roll No and SAP ID on top of your answer sheet. At the end of answer sheet put your signature.

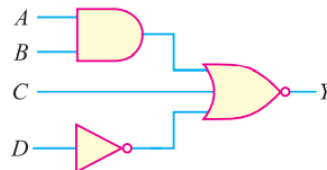
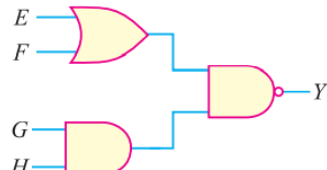
SECTION A

1. Section A is consists of 5 questions and each of 4 marks. (5x4=20)
2. All the questions are compulsory

S. No.		Marks	CO
Q.1	Write the stability criterion of amplifier circuits.	4	CO2
Q.2	What is an oscillator?. Write its types.	4	CO2
Q.3	Write the principle of RC oscillators.	4	CO2
Q.4	Give the working of phase shift oscillator.	4	CO2
Q.5	Give the working of the Wein bridge oscillator.	4	CO2

SECTION B

1. Section B contains five questions and each of 10 marks.
2. Attempt any four questions. (4x10=40)

Q.6 [i]	<p>Write the Boolean expressions for the logic circuits shown in figure</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>(i)</p> </div> <div style="text-align: center;">  <p>(ii)</p> </div> </div>	4	CO3
Q.6 [ii]	<p>Minimise the four-variable logic function using K-map.</p> $f(A, B, C, D) = \sum m(0, 1, 2, 3, 5, 7, 8, 9, 11, 14)$	6	
Q. 7	<p>Write the short notes on</p> <p>[a] JK flip- flop</p> <p>[b] Synchronous and Asynchronous counters</p>	10	CO3

Q.8	What do you understand by sideband frequencies in an AM wave?. Derive an expression for the fraction of total power carried by the sidebands in amplitude modulation.	10	CO4
Q.9	The equation gives a frequency modulated voltage wave: $e = 12 \cos (6 \times 10^8 t + 5 \sin 1250 t)$ Find (i) carrier frequency (ii) signal frequency (iii) modulation index (iv) maximum frequency deviation (v) power dissipated by the FM wave in 10-ohm resistor	10	CO4
Q.10	Explain in brief DAC and ADC converter with its application.	10	CO3
	SECTION-C 1. Section C consists of questions of 40 marks (2x 20 = 40 marks). 2. Question 11 has internal choice		
Q. 11	[i] Write the principles of negative voltage feedback in amplifiers. Discuss the Logarithmic and antilog amplifier. [ii] An amplifier has a current gain of 240 and an input impedance of 15 k Ω without feedback. If negative current feedback ($m_i = 0.015$) is applied, what will be the input impedance of the amplifier ? <p style="text-align: center;">OR</p> Discuss the operation of an OP-amp integrator and OP-amp differentiator with circuit analysis. Write its two applications also.	20	CO1
Q. 12	[i] Write the working of LED with its two applications. [ii] What do you understand by transistor biasing ? What is its need ? [iii] Why does RC coupling give constant gain over the mid-frequency range? [iv] Describe the functioning of full adder with its application. [v] What do you mean by feedback? Write about the negative and positive feedback.	20	CO1