


Name:		
Enrolment No:		

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Term Examination, May 2021

Course: Analog System and Application	Semester: IV
Program: B.Sc H (Physics)	Time 03 hrs.
Course Code: PHYS2006	Max. Marks: 100

SECTION A

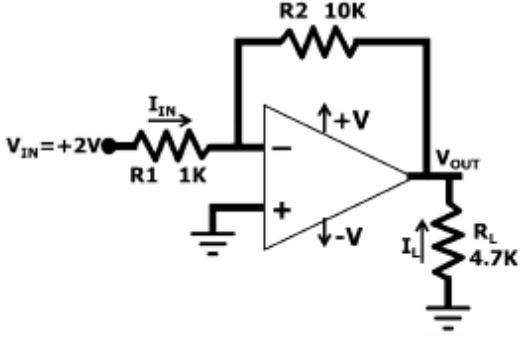
- 1. Each Question will carry 5 Marks**
- 2. Instruction: Complete the statement / Select/write the correct answer(s)**

S. No.	Question	Marks	CO
Q 1	For an ideal Op-Amp, value of input impedance, output impedance, bandwidth, offset voltage and open loop voltage gain are (a)....., (b)....., (c)....., (d).....and (e)respectively.	5	CO1
Q2	Basic conditions to be satisfied for faithful amplification are.....	5	CO1
Q3	In a BJT, emitter region is (a).... doped to have (b)....., while collector region is kept (c).... doped to have (d)	5	CO2
Q4	Photodiode is (a)biased, while LED is (b)..... biased in normal working operations.	5	CO1
Q5	If negative voltage feedback fraction is 0.01 and gain after feedback is 50, the value of voltage gain without feedback will be.....	5	CO4
Q6	The output of a particular OP-AMP increase 8 V in 12 micro sec. The slew rate is a) 90 V/ μ s b) .67 V/ μ s c) 1.5 V/ μ s d) none of these	5	CO4

SECTION B

- 1. Each question will carry 10 marks**
- 2. Instruction: Write short / brief notes**

Q 1	What is the input current and load current for this op-amp shown in fig?	5	CO3
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	 <p>(a) (b) Three input signals 1 V, 2 V, and 3 V are applied to the inverting terminal of the closed-loop inverting amplifier configuration through 3 kΩ resistor each. If $R_f = 1 \text{ k}\Omega$, then calculate the output.</p>	5	CO3
Q 2	<p>(a) A transistor uses voltage divider bias method, with $R_1 = 50 \text{ k}\Omega$, $R_2 = 10 \text{ k}\Omega$ and $R_E = 1 \text{ k}\Omega$. If $V_{CC} = 12 \text{ V}$ and $V_{BE} = 0.1 \text{ V}$, determine the value of I_C.</p> <p>(b) Define base resistor method of biasing with circuit diagram and deduce expression of resistance.</p>	5	CO4
Q 3	<p>(b) Distinguish between insulators, conductors and semiconductors with the help of energy level diagram.</p> <p>(c) Explain the principle of a RC phase shift oscillator.</p>	5	CO2
Q 4	<p>(a) Explain the terms (i) CMRR, (ii) Slew rate.</p> <p>(b) Explain the phase reversal in CE transistor configuration.</p>	5	CO1
Q 5	<p>Explain the working of an npn transistor in common base connection with proper circuit diagram. Deduce the expression for collector current.</p> <p style="text-align: center;">OR</p> <p>What is a full wave rectifier? Explain the functioning of a bridge type full wave rectifier, and deduce the expression for the efficiency and ripple factor.</p>	10	CO2
<p>Section C</p> <p>1. Each Question carries 20 Marks</p> <p>2. Instruction: Write Long answer</p>			
Q 1	<p>(a) Explain the Barkhausen's Criterion for self-sustained oscillation with the help of mathematical and graphical representations.</p> <p>(b) Explain the working of oscillator with the help of a tank circuit.</p> <p style="text-align: center;">Or</p> <p>Explain the term virtual ground in noninverting Op-Amp. Explain the circuit diagram, working and derive an expression for gain of an inverting and noninverting amplifier.</p>	10	CO3
		10	CO3
		20	CO3