GOVERNMENT COLLEGE OF ENGINEERING, JALGAON
(An Autonomous Institute of Government of Maharashtra)
National Highway No.6, JALGAON – 425 002

Phone No.: 0257-2281522	Fax No.: 0257-2281319
Website : www.gcoej.ac.in	E-mail : princoej@redifmail.com

Name of Examination : **Winter 2020** - (Preview)

Course Code & Course Name : **EE201U - Analog Electronics**

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Maximum Marks : **60**   Duration : **3 Hrs**

[Edit] [Print] [View Answer Key] [Close] **Answer Key Submission Type:** Marking scheme with model answers and solutions of numerical

Instructions:

1. *All questions are compulsory.*
2. *Illustrate your answer with suitable figures/sketches wherever necessary.*
3. *Assume suitable additional data; if required.*
4. *Use of logarithmic table, drawing instruments and non programmable calculators is allowed.*
5. *Figures to the right indicate full marks.*

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1)   **Que 1 a) is compulsory. Solve any one from sub-question b) and c).**

   a) The reverse saturation current of a silicon diode is 3 nA at 27°C. Calculate: [8]

     (i) Reverse saturation current at 82°C.

     (ii) Forward current at 82°C if forward voltage applied is 0.25 V.

   b) Draw and explain forward and reverse characteristics of Zener Diode.   [4]

   c) Give the comparison between Half Wave and Full Wave Rectifier.   [4]

2)   **Que 2 is compulsory.**

   a) Draw circuit diagram of BJT common emitter configuration and explain the output characteristics by indicating all the three regions of operation on it. Also, derive the expression for α_{dc} in terms β_{dc}.   [8]

   b) What do you mean by oscillator? State and explain Barkhausen criterion with the help of waveforms.   [4]

3)   **Que 3 is compulsory.**

   a) Explain following non-idealities in an OP-AMP and specify its ideal value and practical value for IC 741:   [8]

     (i) Input Offset Current, (ii) Input Bias Current,

     (iii) Output Offset Voltage, (iv) Slew Rate.

   b) Draw the circuit diagram of OP-AMP based non-inverting amplifier and calculate the output voltage if R_1 = 10 kΩ, R_F = 20 kΩ and V_{in} is 500 mV.   [4]

4)   **Que 4 a) is compulsory. Solve any one from sub-question b) and c).**

   a) Draw the circuit diagram of three OP-AMP based Instrumentation amplifier and derive the expression of its output voltage. Also give the applications of Instrumentation Amplifier.   [8]

   b) Explain with neat diagram of Analog to Digital Converter. Give the classification and enlist various specifications of it.   [4]

   c) Draw the circuit diagram OP-AMP based Wien bridge oscillator and calculate the frequency of oscillations if R_1 = R_2 = 16 kΩ and C_1 = C_2 = 0.1 μF.   [4]

5)   **Que 5 is compulsory.**

   a) What is PLL? Draw and explain the Frequency Shift Keying (FSK) demodulator using IC 565 PLL.   [8]

   b) Draw and explain the working of Zero Crossing Detector (ZCD) with its neat waveforms.   [4]

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