Hall Ticket No | | | | | | | | | | |

Question Paper Code: AECB02

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech III Semester End Examinations (Regular), February – 2021

Regulation: IARE–R18

ANALOG ELECTRONICS

Time: 3 Hours **(EEE)** **Max Marks: 70**

Answer any Four Questions from Part A
Answer any Five Questions from Part B

PART – A

1. With a neat circuit diagram explain the input and output characteristics of BJT in CC configuration. **[5M]**
2. Explain the construction of depletion type P-channel MOSFET. **[5M]**
3. Briefly explain about cascade amplifiers. **[5M]**
4. Explain in detail about voltage shunt feedback amplifier. **[5M]**
5. Explain the operation of non-inverting Op-amp. **[5M]**
6. A transistor employs a 4 kΩ load and V_{CC} = 13V. What is the maximum input signal if $\beta = 100$? **[5M]**
7. Draw the small-signal model of common source FET amplifier. **[5M]**
8. Draw and explain the operation of an op-amp as differentiator for sine wave input. **[5M]**

PART – B

9. Explain the operation of PN junction diode under forward and reverse bias conditions and sketch the V-I characteristics. **[10M]**
10. A p-n-p germanium transistor is used in the self biasing arrangement with V_{CC} = 5V, R_1 = 27kΩ, R_2 = 3kΩ, R_E = 270Ω, R_C = 2kΩ, β=50. Find V_{CEQ} and I_{CQ}. **[10M]**
11. Draw the small-signal model of common drain FET amplifier. Obtain the expressions for voltage gain and output resistance? **[10M]**
12. A common drain amplifier uses FET having dynamic drain resistance r_d = 200 k-ohm and μ = 20. Calculate the output impedance and voltage gain for following values of load resistor R_s : i) 200 ii) 400 iii) 600 **[10M]**
13. Explain the two stage amplifier with Darlington connection. What are the drawbacks of a Darlington amplifier? **[10M]**
14. Draw the circuit diagram of direct coupled class-A power amplifier and explain its operation. Show that the maximum conversion efficiency is 25%. **[10M]**
15. Determine the expression for frequency oscillation of Hartley oscillator using transistor. **[10M]**
16. A quartz crystal has the following constants. L=50mH, C_1=0.02pF, R=500 and C_2=12pF. Find the values of series and parallel resonant frequencies. If the external capacitance across the crystal changes from 5pF to 6pF, find the change in frequency of oscillations **[10M]**
17. With a neat diagram explain about square wave generator and determine the frequency of oscillation. **[10M]**
18. Design an op-amp differentiator that will differentiate an input signal with f_{max}=100Hz. Draw the output waveform for sine wave of 1 V peak at 100 Hz applied to the differentiator. Also repeat it for square wave input. **[10M]**

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