Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (S,FE) (FT/WP) (S1 PT) Examination May 2025 (2019 Scheme)

Course Code: EET205

Course Name: ANALOG ELECTRONICS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions. Each question carries 3 marks Marks

1	List down the factors affecting the stability of operating point of a transistor.	(3)
2	Describe the role of emitter resistance in bias stabilisation.	(3)
3	Illustrate how the different internal capacitances of BJT are incorporated in its high frequency hybrid pi model.	(3)
4	Define transconductance of JFET and derive its mathematical expression.	(3)
5	State and explain Barkhausen criterion for feedback oscillators.	(3)
6	Explain the terms (i)conversion efficiency and (ii) Harmonic distortion with respect to power amplifiers.	(3)
7	Draw the basic block diagram of a general opamp and briefly explain the function of each block.	(3)
8	Realise a difference amplifier/ subtractor circuit using opamp and deduce the expression for output voltage.	(3)
9	Give the detailed pin description of comparator IC LM311 and mention its salient features.	(3)
10	Explain the effect of slew rate on waveform generation.	(3)

PART B

Answer any one full question from each module. Each question carries 14 marks

Module 1

11(a)	Derive an expression for stability factor for voltage divider bias of a BJT	(7)
11(b)	Calculate (i) input impedance Z_{in} and (ii) voltage gain A_v of the CE BJT amplifier shown in Figure (1). Given the h parameters of the transistor : h_{ie}= 1500Ω, h_{re}=4x 10^{-4}, h_{fe}=100, h_{oe}= 4x10^{-4} S.	(7)

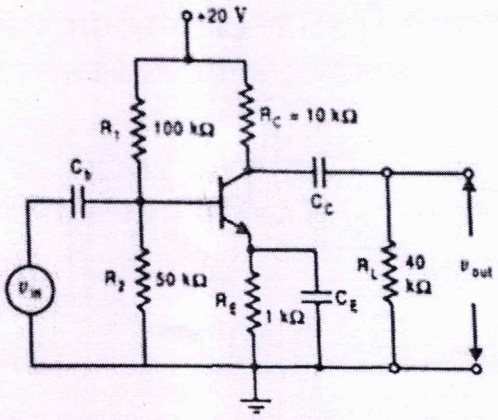

Figure (1)

12(a) Briefly explain Bias compensation using (i) diode and (ii) thermistors (7)

12(b) Derive the expressions for current gain, voltage gain, input impedance and output impedance in terms of h- parameters of BJT (7)

Module 2

13(a) Explain the working of ENMOSFET with the help of its characteristic curves. (7)

13(b) Analyse the low frequency response of CE amplifier . (7)

14(a) Sketch the frequency response of CE amplifier and explain why gain falls at very high frequencies & very low frequencies. (7)

14(b) For the circuit shown in Figure (2), FET has I_{DSS}= 4 mA and V_p= -4V. Calculate I_D, V_{GS} and V_{DS}. (7)

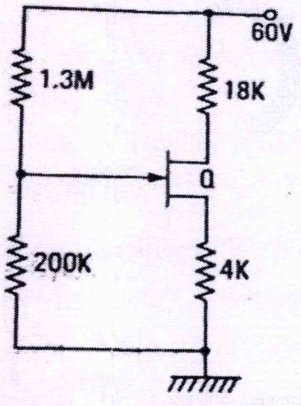

Figure (2)

Module 3

15(a) Explain the working of two-stage transformer coupled amplifier with circuit diagram. (7)

15(b) Draw the circuit diagram of Colpitt's Oscillator and explain its principle of operation. (7)

16(a) Compare the merits and demerits of different types of inter stage coupling in amplifiers (7)

16(b) Describe class A operation of power amplifiers and derive the expression for conversion efficiency of transformer coupled class A power amplifier. (7)

Module 4

17(a) Explain the different modes of operation of a fundamental differential amplifier. (7)

17(b) Define (i) CMRR and (ii) Slew rate. (7)
Give the typical values of above parameters for 741 IC

18(a) Mention the salient features of an instrumentation amplifier. Derive the expression for its output voltage. (7)

18(b) Find the output voltage of the following op-amp circuit shown in Figure (3) (7)

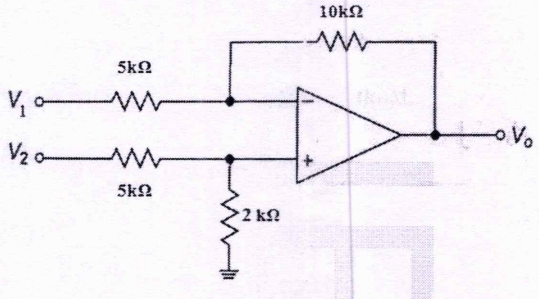

Figure (3)

Module 5

19(a) Explain the operation of op-amp integrator circuit. What practical modifications are to be incorporated into the basic integrator and why? (7)

19(b) Describe the operation of Schmitt trigger circuit. (7)

20 With the help of internal circuit diagram of IC555 explain the operation of astable multivibrator. Derive the expression for frequency of oscillation. (14)

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