Reg No.:_____ Name:_____

0800EET205122003

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester B.Tech Degree Examination December 2020 (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		State the functions of a transistor biasing circuit.	(3)
2		With the help of a circuit diagram and relevant equations show that fixed bias is not stable against temperature variations.	(3)
3		Draw and explain the frequency response characteristics of RC coupled amplifier.	(3)
4		With a neat diagram, explain the constructional features of n-channel JFET.	(3)
5		What is Barkhausen's criterion? Explain.	(3)
6		Draw the circuit of crystal oscillator.	(3)
7		List any six characteristics of an ideal operational amplifier.	(3)
8		Derive the expression for the output voltage of a closed loop non-inverting amplifier using op-amp.	(3)
9		With neat circuit diagram and waveforms, explain zero crossing detector.	(3)
10		Explain the operation of ideal integrator circuit using op-amp with circuit diagram.	(3)

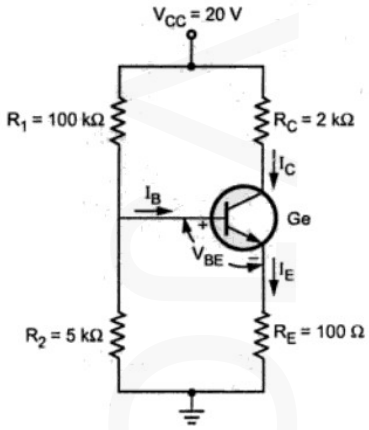
PART B

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

Module 1

11	(a)	Derive the expressions for current gain, input impedance, voltage gain and output impedance using complete *h*-parameter equivalent circuit of CE amplifier.	(10)
	(b)	Draw the collector to base bias circuit of transistor amplifier using the given values and determine the following. i) I_C ii) V_{CE}. Given β=80, R_B=100kΩ and R_C=10kΩ and V_{CC}=15V	(4)
12	(a)	For the circuit shown in figure, V_{CC}=20V, R_C=2kΩ, β=50, V_{BE}=0.2V,	(10)

R_1=100kΩ, R_2=5kΩ and R_E=100Ω. Calculate I_B, V_{CE}, I_C and stability factor, S.



(b) With neat diagrams, explain DC load line in a transistor and significance of Q point. (4)

Module 2

13 (a) With necessary graphs and equations, explain the transfer characteristics of JFET. (6)

(b) Draw the equivalent circuit and Derive the expression for (i) input impedance (ii) Current Gain (iii) Voltage gain and (iv) Output impedance of the Common Drain JFET amplifier (8)

14 (a) Draw and explain high frequency hybrid pi model of common emitter transistor. (6)

(b) For a JFET connected in voltage divider biasing circuit, calculate I_D, V_{DS} and V_{GS} with V_{DD}=24V, R_1= 910kΩ, R_2= 110kΩ, R_D= 22kΩ, R_S= 1.1kΩ, I_{DSS}= 10mA and pinch-off voltage of the JFET is 3.5V (8)

Module 3

15 (a) Define conversion efficiency of power amplifier. Prove that the maximum conversion efficiency of a transformer coupled class A amplifier is 50%. (10)

(b) List the applications of multistage amplifiers. (4)

16 (a) Draw the circuit of two stage RC coupled amplifier and explain its operation. (7)

(b) Prove that the class B push pull amplifier has higher efficiency than class A amplifiers. (7)

Module 4

17 (a) Draw the circuit diagram and derive the voltage gain equation of Non-Inverting amplifier. Design a Non-Inverting amplifier with gain of 6. (9)

(b) Discuss the effect of negative feedback in an OpAmp circuit. Compare the properties of OpAmp circuit with and without negative feedback. (5)

18a) A differential amplifier has a gain of 100. A common input of 5mV is applied to both terminals, which result in an output voltage of 18mV. Determine i) common mode gain ii) CMRR. (8)

If the input signals are changed to 50mV and 100mV with 1mV of noise on each input. Find iii) the output signal iv) the noise on the output

b) For the op-amp circuit shown in the fig.2 find the output voltage equation. (6)

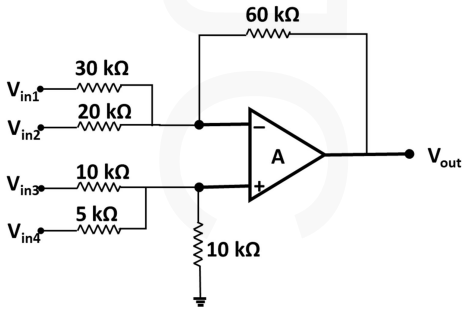


Fig.2

Module 5

19 (a) Draw and explain the operation of a square waveform generator using OpAmp. Derive the expression for frequency. (10)

(b) Draw the circuit diagram of an ideal differentiator and derive the expression for output voltage. (4)

20 (a) Explain inverting Schmitt trigger circuit with relevant waveforms. (6)

(b) With the help of internal functional diagram, explain how a monostable multivibrator works with use of 555 timer. (8)

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