

CBCS SCHEME

BEE303

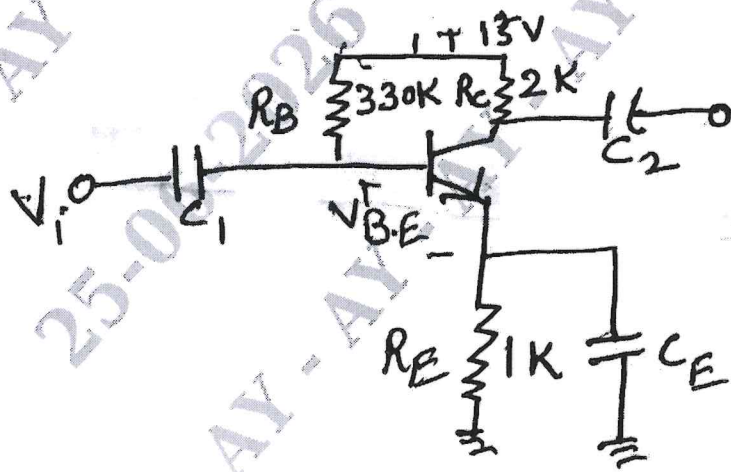
Third Semester B.E./B.Tech. Degree Examination, June/July 2026 Analog Electronic Circuits

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

Module - 1

			M	L	C
Q.1	a.	Draw the circuits and explain the operation of i) Positive clamper ii) Series clippers.	8	L2	CO1
	b.	Design a voltage divider bias circuit for the following specifications collector supply voltage = $V_{CC} = 15$ Volts, Collector current $I_C = 5$ mA, V_E is 10% V_{CC} collector emitter voltage = $V_{CE} = 7$ Volts, $\beta = 150$, $V_{BE} = 0.7$ V.	8	L3	CO1
	c.	Write a note on Transistor Switching Circuits.	4	L2	CO1
OR					
Q.2	a.	Obtain expression for $S^{I_{CO}}, S^{I_{B,E}}, S^{\beta}$ for voltage divider bias.	10	L2	CO1
	b.	For the circuit shown in Fig Q2(b) determine I_C , V_E and I_B , V_{CE} , V_C , V_B , V_{BC} . Assume $\beta = 100$.  Fig Q2(b) $V_{CC} = 15$ V $V_{BE} = 0.7$ V	6	L3	CO1
	c.	Explain the : i) Operating point ii) Load line analysis.	4	L2	CO1

Module – 2					
Q.3	a.	Define h-parameters and hence derive h-parameter model of a CE BJT.	6	L2	CO2
	b.	Explain the effect of various capacitors on frequency response.	4	L2	CO2
	c.	Derive the expressions for A_v , A_i , Z_i and Z_o for CE fixed bias configuration using complete hybrid equivalent model.	10	L3	CO2
OR					
Q.4	a.	State and explain Millers Theorem and its dual.	8	L2	CO2
	b.	Consider a single stage CE amplifier with $R_s = 1K$ and $R_L = 1.2K\Omega$, Calculate A_{i_s} , R_{i_s} , A_v , A_{i_s} power gain and R_o if $h_{ie} = 1.1$, $h_{re} = 2.5 \times 10^{-4}$, $h_{fe} = 50$, $h_{oe} = 25 \mu A/V$.	6	L3	CO2
	c.	Explain hybrid – Pi model and multistage frequency effects.	6	L2	CO2
Module – 3					
Q.5	a.	Draw and explain the two stage RC coupled CE-CE cascaded amplifier.	6	L2	CO2
	b.	Derive an expression for R_{if} (input resist) for a feedback amplifier employing current series feedback.	10	L3	CO2
	c.	What are the advantages of negative feedback in amplifiers?	4	L2	CO2
OR					
Q.6	a.	Determine the voltage gain, input and output impedance with feedback for voltage series having $A = -100$, $R_i = 10 K\Omega$ and $R_o = 20 K\Omega$ for feedback $\beta = -0.1$.	4	L3	CO2
	b.	Derive the expression for input resistance for a voltage shunt feedback amplifier.	10	L2	CO2
	c.	With necessary equivalent diagram obtain the expression for Z_{in} , A_v , Z_o for a Darlington emitter follower.	6	L3	CO2

Module – 4

Q.7	a.	A, single ended Class A transformer coupled amplifier employs a transistor with $I_m = 1A$ $P_d = 10W$ $V_{CEO} = 40V$ feeds, a 2.5Ω load, calculate the maxim power that can be to a load. Determine that turns ratio of the output transformer.	6	L2	CO3
	b.	With the help of neat circuit diagram explain the operation of transistor Colpitt's oscillator and derive the expression for the frequency of oscillation.	10	L2	CO3
	c.	Explain Cross over distortion.	4	L2	CO3

OR

Q.8	a.	Explain the operation complementary symmetry Class B amplifier with a neat circuit diagram.	6	L2	CO3
	b.	A, single transistor amplifier with transformer coupled load produces harmonic amplitude in the output as, $B_0 = 1.5 \text{ mA}$, $B_1 = 120 \text{ mA}$, $B_2 = 10 \text{ mA}$ $B_3 = 4 \text{ mA}$ $B_4 = 2 \text{ mA}$ $B_5 = 1 \text{ mA}$.	4	L3	CO3
	c.	Derive the expression for the frequency of a wien bridge oscillator and explain its operation with a neat circuit diagram.	10	L2	CO3

Module – 5

Q.9	a.	A JFET has $g_m = 6mV$ at $V_{as} = -1V$, find I_{DSS} of if pinch – off voltage $V_P = -2.5V$.	4	L3	CO5
	b.	Draw and explain the construction n-channel D-MOSFET.	10	L2	CO5
	c.	Draw and explain a small signal low frequency model for JFET.	6	L2	CO5

OR

Q.10	a.	With necessary equivalent circuit obtain the expression for A_V Z_{in} , Z_o for a fixed biased JFET amplifier.	10	L2	CO5
	b.	List the difference between i) FET and BJT ii) JFET and MOSFET	10	L2	CO5
