

# CBCS SCHEME

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BEE303

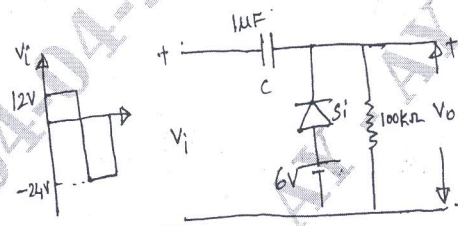
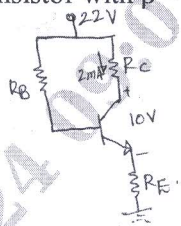
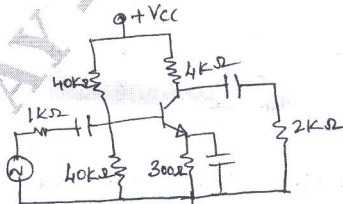
**Third Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024**

## Analog Electronic Circuits

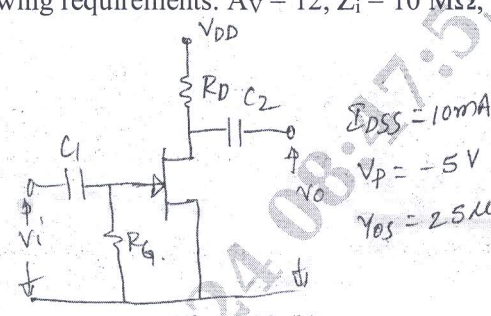
Time: 3 hrs.

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 – I					
Q.1	a.	With circuit diagram and waveform, explain Full Wave Bridge rectifier	6	L2	CO1
	b.	Explain the analysis of Double end clipper circuit which clips both the peaks of an sinusoidal AC signal.	7	L4	CO1
	c.	For the circuit shown in Fig. Q1 (c) analyze and plot the waveform for $V_0$ for the input indicated.	7	L4	CO1
		 <p style="text-align: center;">Fig. Q1 (c)</p>			
<b>OR</b>					
Q.2	a.	What are the factors affect the stability of operating point in a transistor?	5	L1	CO1
	b.	Discuss the exact analysis of voltage divider bias to find $I_B$ , $I_{CQ}$ , $V_{CEQ}$ and $I_{CSat}$ .	7	L4	CO1
	c.	Design the values of $R_B$ , $R_E$ and $R_C$ for the emitter bias circuit shown in Fig.Q2 (c). Assume silicon transistor with $\beta = 100$ .	8	L3	CO1
		 <p style="text-align: center;">Fig. Q2 (c)</p>			
<b>Module – 2</b>					
Q.3	a.	Mention the advantages of h-parameters for transistor analysis.	5	L1	CO2
	b.	Discuss the analysis of single stage amplifier, frequency response.	7	L4	CO2
	c.	A transistor with $h_{ie} = 1.1 K\Omega$ , $h_{fe} = 50$ , $h_{re} = 205 \times 10^{-4}$ , $h_{oe} = 25 \mu A/V$ is connected in CE configuration given in Fig. Q3 (c). Calculate $A_i$ , $A_{is}$ , $A_v$ , $A_{vs}$ , $R_i$ and $R_o$ .	8	L3	CO2
		 <p style="text-align: center;">Fig. Q3 (c)</p>			

OR					
Q.4	a.	Obtain the expression for Miller effect capacitance.	6	L2	CO2
	b.	Explain the high frequency analysis of BJT amplifier.	7	L2	CO2
	c.	Determine the lower cut-off frequency for the emitter follower using BJT amplifier with $C_S = 0.1 \mu\text{F}$ , $R_S = 1 \text{ K}\Omega$ , $R_1 = 12 \text{ K}\Omega$ , $R_2 = 4 \text{ K}\Omega$ , $R_E = 1.5 \text{ K}\Omega$ , $C = 0.1 \mu\text{F}$ , $\beta = 100$ , $V_{CC} = 15 \text{ V}$ , $V_{BE} = 0.7 \text{ V}$ , $r_0 = \infty$ and $h_{ie} = 1.04 \text{ K}\Omega$ .	7	L3	CO2
Module – 3					
Q.5	a.	With two stage cascaded amplifier, explain the need of cascading.	6	L2	CO3
	b.	Write a note on cascade connection.	6	L1	CO3
	c.	Explain the DC analysis of Darlington emitter follower.	8	L2	CO3
OR					
Q.6	a.	What are the characteristics of negative feedback amplifiers?	6	L1	CO3
	b.	An amplifier has mid-band voltage gain of 1000 with $f_L = 50 \text{ Hz}$ and $f_H = 50 \text{ kHz}$ , if 5% negative feedback is applied then calculate gain, $f_L$ and $f_H$ with feedback.	6	L3	CO3
	c.	Obtain expression for input and output resistance of voltage series amplifier.	8	L2	CO3
Module – 4					
Q.7	a.	With waveforms, explain classification of power amplifiers.	6	L2	CO3
	b.	Derive an expression for second harmonic distortion using 2 point method for power amplifier.	6	L3	CO3
	c.	With circuit diagram and waveform, explain working of class B push pull amplifier. Also show that conversion efficiency is 78.5%.	8	L2	CO3
OR					
Q.8	a.	With block diagram, explain the principle of working of an oscillator.	6	L2	CO3
	b.	Explain the principle of tuned oscillators. Also obtain expression for frequency of oscillations of Hartley oscillator.	6	L3	CO3
	c.	A quartz crystal has the following constants, $L = 50 \text{ mH}$ , $C_1 = 0.02 \text{ PF}$ , $R = 500 \Omega$ and $C_2 = 12 \text{ PF}$ . Determine the values of $f_s$ and $f_p$ . If the external capacitance across the crystal changes from 5 PF to 6 PF, find the change in frequency of oscillations.	8	L3	CO3
Module – 5					
Q.9	a.	Give the comparison between BJT and MOSFET.	6	L2	CO3
	b.	Explain the construction and working of n-channel JFET.	7	L2	CO3
	c.	Obtain the expression for $A_v$ , $Z_i$ and $Z_o$ for fixed bias common source amplifier using JFET.	7	L3	CO3
OR					
Q.10	a.	Explain the characteristics of n-channel E-MOSFET. Also describe its working.	10	L2	CO3

	<p>b. Design the fixed bias FET common source amplifier shown in Fig. Q10 (b) to meet the following requirements. <math>A_v = 12</math>, <math>Z_i = 10\text{ M}\Omega</math>, <math>V_{DD} = 40\text{ V}</math>.</p>  <p>Fig. Q10 (b)</p> <p>*****</p>	10	L3	CO3
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