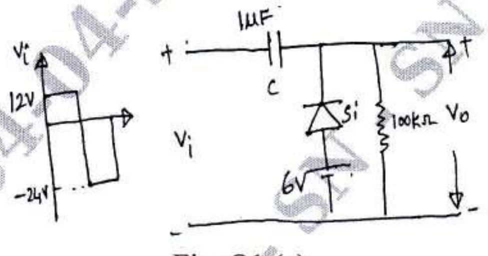
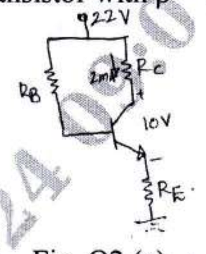
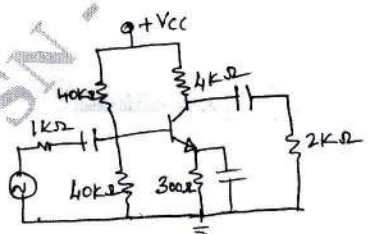
CBCS SCHEME

USN | | | | | | | | | | | **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 – 1	M	L	C
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.  Fig. Q1 (c)	7	L4	CO1
		OR			
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 $\beta = 100$.  Fig. Q2 (c)	8	L3	CO1
		Module – 2			
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.  Fig. Q3 (c)	8	L3	CO2

		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 $C_S = 0.1\ \mu F$, $R_S = 1\ K\Omega$, $R_1 = 12\ K\Omega$, $R_2 = 4\ K\Omega$, $R_E = 1.5\ K\Omega$, $C = 0.1\ \mu F$, $\beta = 100$, $V_{CC} = 15\ V$, $V_{BE} = 0.7\ V$, $r_0 = \infty$ and $h_{ie} = 1.04\ K\Omega$.	**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 $f_L = 50\,Hz$ and $f_H = 50\,kHz$, 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, $L = 50\ mH$, $C_1 = 0.02\ PF$, $R = 500\ \Omega$ and $C_2 = 12\ PF$. 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**

	b.	Design the fixed bias FET common source amplifier shown in Fig. Q10 (b) to meet the following requirements. $A_V = 12$, $Z_i = 10\ M\Omega$, $V_{DD} = 40$ V.	10	L3	CO3

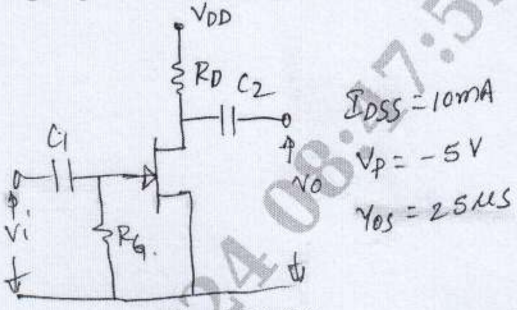


Fig. Q10 (b)

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