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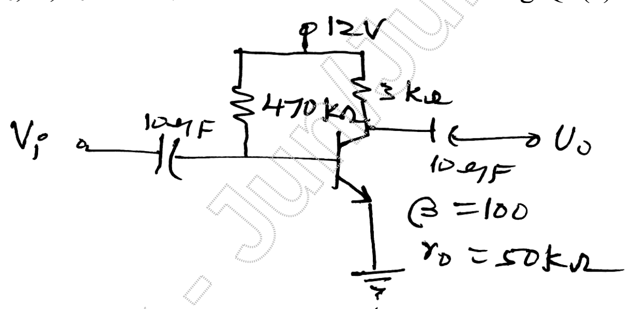
BBM/BEI302

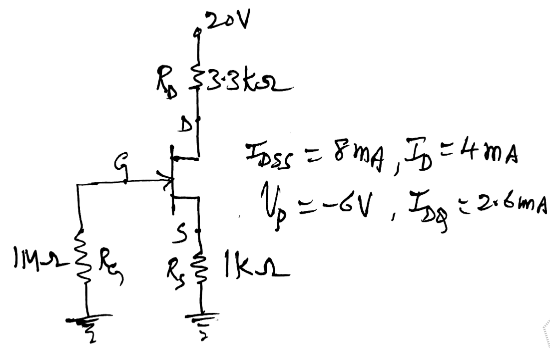
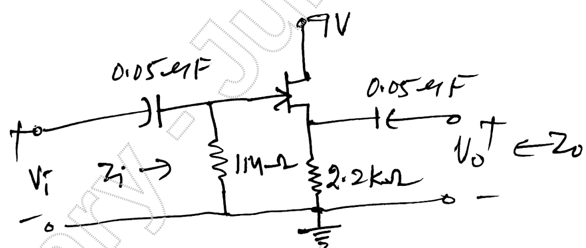
Third Semester B.E./B.Tech. Degree Examination, June/July 2024

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.**	Draw the BJT r_e model for common emitter configuration and, explain parameters in the model.	**4**	**L1**	**CO1**
	b.	Obtain expression for z_i, z_0 and A_v for emitter bias configuration using BJT r_e model with unbypassed emitter.	**8**	**L2**	**CO1**
	c.	Determine r_e, z_i, z_0 and A_v for the network shown in Fig Q1(c).  Fig Q1(c)	**8**	**L3**	**CO1**
		OR			
Q.2	**a.**	List out the features of emitter follower configuration.	**4**	**L1**	**CO1**
	b.	Obtain expression for z_i, z_0 and A_v for voltage divider bias configuration using BJT hybrid model.	**8**	**L2**	**CO1**
	c.	Compare BJT r_e model and hybrid model.	**8**	**L1**	**CO1**
		Module – 2			
Q.3	**a.**	Explain the drain characteristics and transfer characteristics of n-channel JFET.	**8**	**L1**	**CO2**
	b.	Explain the construction and operation of n-channel depletion type MOSFET.	**8**	**L2**	**CO2**
	c.	Compare JFET and MOSFET.	**4**	**L1**	**CO2**
		OR			
Q.4	**a.**	Explain the FET fixed bias configuration with circuit, equations and suitable graph.	**10**	**L2**	**CO2**

	b.	Determine V_{GSQ}, V_{DS}, V_G and V_D for circuit shown is Fig Q4(b).  Fig Q4(b)	**10**	**L2**	**CO2**
		Module – 3			
Q.5	**a.**	Obtain expression for trans-conductance from Shockley's equation.	**4**	**L2**	**CO3**
	b.	Derive expression for input impendence output impedance and voltage gain for common source voltage divider bias using JFET ac equivalent circuit.	**8**	**L2**	**CO3**
	c.	Determine g_m, r_d, z_i, z_0 and A_v for the source follower circuit shown in Fig Q5(c). Given V_{GSQ} = -2.86V, I_{DQ} = 4.56μA, I_{DSS} = 16μA, U_p = -4V, Y_{OS} = 25μs.  Fig Q5(c)	**8**	**L3**	**CO3**
		OR			
Q.6	**a.**	Explain the impact of capacitors C_s, C_c and C_E on the low frequency response of BJT amplifier with R_2 load.	**10**	**L2**	**CO3**
	b.	What is Miller effect? Derive expression for Miller effect input capacitance and output capacitance.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Explain the power amplifier types based on input-output cycles and Q-point of operation.	**10**	**L2**	**CO4**
	b.	Explain the circuit and operation of transformer coupled class A power amplifier with input-output waveform.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	Show that the efficiency of class B amplifier is 78.5%.	**6**	**L2**	**CO4**
	b.	A class B amplifier provides a 20V peak signal to a 16Ω load using a dc power supply of 30V. Determine the input power, output power and efficiency.	**6**	**L3**	**CO4**

	c.	Explain the working of complementary symmetry class B power amplifier with a circuit diagram. Mention its merits and demerits.	**8**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain the circuits of V to I and I to V converters using op-amp.	**8**	**L2**	**CO5**
	b.	Explain the effects of negative feedback on gain and bandwidth of an amplifier.	**6**	**L2**	**CO5**
	c.	A crystal has L = 0.4H, C = 0.085pF, C_m = 1pF and R = 5kΩ. Calculate the series resonant frequency, parallel resonant frequency and Q-factor of crystal.	**6**	**L3**	**CO5**
		OR			
Q.10	**a.**	Explain the working of op-amp as comparator.	**6**	**L1**	**CO5**
	b.	Explain the working of a transistor crystal oscillator.	**6**	**L2**	**CO5**
	c	Explain the types of feedback connections in amplifiers.	**8**	**L1**	**CO5**

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