CBCS SCHEME

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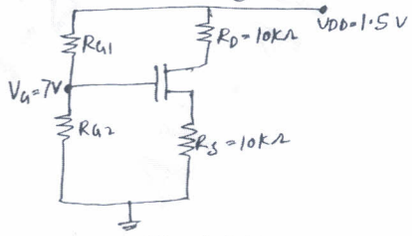
BEC303

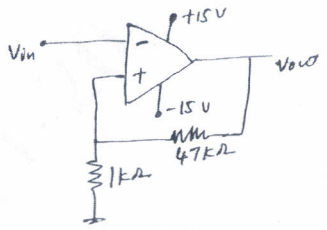
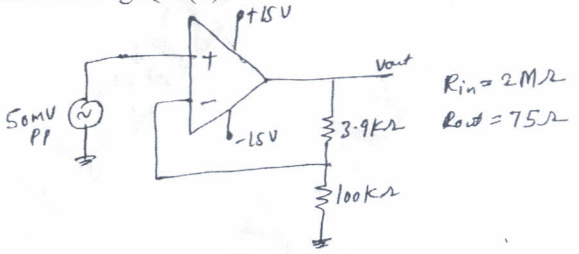
Third Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

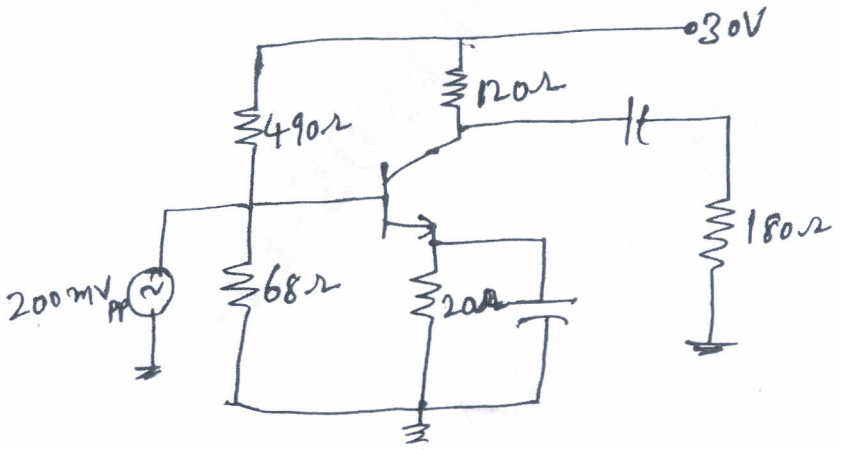
Electronic Principles and Circuits

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.	Analyze voltage divider bias circuit with equations.	8	L4	CO1
	b.	Explain two supply emitter bias circuit with equations.	8	L2	CO1
	c.	If $R_1 = 10\Omega$, $R_2 = 2.2K\Omega$, $R_C = 3.6K\Omega$, $R_E = 1K\Omega$, $V_{CC} = 10V$ calculate collector to emitter voltage for voltage divider bias.	4	L3	CO1
		OR			
Q.2	a.	Describe the small signal operation with diagram, write the 10 percent rule.	8	L2	CO1
	b.	Analyze common emitter amplifier with equations.	8	L4	CO2
	c.	Compute the output impedance for emitter follower with $R_1 = 10K\Omega$, $R_2 = 10K\Omega$, $R_E = 100\Omega$, $R_C = 100\Omega$, $V_{CC} = 30V$, $R_G = 600\Omega$, $V_{in} = 1V$.	4	L3	CO2
		Module – 2			
Q.3	a.	Explain following biasing MOS circuits: i) Fixing VGS ii) Drain to gate feedback resistor.	8	L2	CO2
	b.	Describe small signal equivalent circuit model of MOSFET.	6	L2	CO1
	c.	For the circuit shown in Fig.Q.3(c), determine value of VGS to establish dc bias current $I_D = 0.5mA$. Device parameters are $V_t = 1V$ K_n' $W/L = 1mA/V^2$ and $X = 0$. What is percentage change in I_D when transistor is replaced with another having $V_t = 1.5V$.  Fig.Q.3(c)	6	L3	CO1
		OR			
Q.4	a.	Analyze common source amplifier without source resistance and derive expression for voltage gain.	10	L4	CO2

	b.	Analyze common drain (source follower) amplifier and derive expression for voltage gain.	10	L4	CO2
		Module – 3			
Q.5	a.	Demonstrate how digital values are converted to analog values using R-2R DAC with example.	8	L3	CO4
	b.	Analyze comparator with non zero reference (positive voltage) with transfer characteristics.	8	L4	CO4
	c.	If V_{sat} = 13.5V computer trip points (UTP and LTP) and hysteresis for Fig.Q.5(c).  Fig.Q.5(c)	4	L3	CO4
		OR			
Q.6	a.	Demonstrate without any input how colpitts oscillator generates output. Determine frequency of oscillations with C_1 = 0.001μF, C_2 = 0.01μF, L = 15μH.	10	L3	CO2
	b.	Explain Monostable operation of 555 timer with diagram and necessary equations.	10	L2	CO4
		Module – 4			
Q.7	a.	Sketch four types of negative feedback topologies and explain in brief.	8	L3	CO3
	b.	Analyze current controlled current source (ICIS) amplifier with equations.	6	L4	CO3
	c.	Calculate feedback fraction, closed loop voltage gain input impedance and output impedance for Fig.Q.7(c).  Fig.Q.7(c)	6	L2	CO3
		OR			
Q.8	a.	Classify filters based on ideal responses.	8	L4	CO4
	b.	Explain VCVS unity gain second order low pass filter with equations.	6	L2	CO4
	c.	Explain Bandstop filter with diagram and equations.	6	L2	CO4

		Module – 5			
Q.9	**a.**	Classify power amplifiers based on classes.	**8**	**L4**	**CO2**
	b.	What is crossover distortion? Explain operation of class B transformer coupled push pull amplifier with diagram.	**8**	**L1**	**CO2**
	c.	If peak to peak output voltage is 18V input impedance of base is 100Ω what is power gain for Fig.Q.9(c).  Fig.Q.9(c)	**4**	**L1**	**CO2**
		OR			
Q.10	**a.**	Describe structure of SCR and explain gate triggering.	**6**	**L2**	**CO5**
	b.	Explain how RC circuit control SCR phase angle with circuit diagram and necessary equations.	**8**	**L2**	**CO5**
	c.	Describe UJT relation oscillator.	**6**	**L2**	**CO5**

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