CBCS SCHEME

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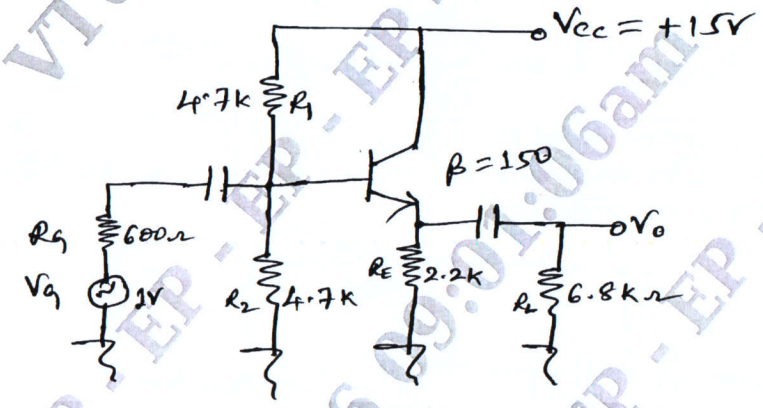
BEC303

Third Semester B.E./B.Tech. Degree Examination, June/July 2026
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 the CE-Amplifier with the help of DC circuit and AC equivalent circuit using π - model. Write the expressions for DC terminal voltages and transistor currents.	10	L2	CO1
	b.	Discuss about DC load line and Q-point for a VDB circuit.	05	L2	CO1
	c.	Discuss Two-Models of BJT.	05	L2	CO1
		OR			
Q.2	a.	Explain Two-Supply Emitter – Bias (TSEB) Amplifier with the help of circuit and waveforms.	10	L2	CO1
	b.	Calculate voltage gain, input impedance of the base and stage and ac input and ac output voltage for a given circuit of Fig.Q2(b).  Fig.Q2(b)	10	L3	CO1
		Module – 2			
Q.3	a.	Explain voltage divider biasing method in MOSFET by fixing V_G and connecting degeneration resistance in the source.	07	L2	CO2
	b.	Derive the equation for the ac drain current and the voltage gain for small-signal MOSFET Amplifier.	07	L2	CO2
	c.	Draw and explain the basic structure of MOS-Amplifier to implement the various configurations.	06	L2	CO1
		OR			
Q.4	a.	Derive an equation for the overall voltage gain and amplifier output resistance for CS-Amplifier with the help of necessary diagrams.	10	L2	CO2
	b.	Develop the necessary expressions for source-follower amplifier with the help of amplifier circuit and its small signal equivalent circuit model.	10	L2	CO2
		Module – 3			
Q.5	a.	Explain how the op-amp can be used as a summing amplifier? Justify with the help of circuit diagram and expressions.	10	L2	CO3
	b.	Design 4-bit R/2R ladder D/A converter with an example. Find the analog output voltage for a 4-bit binary input $D_3D_2D_1D_0 = (1011)_2$.	10	L3	CO3

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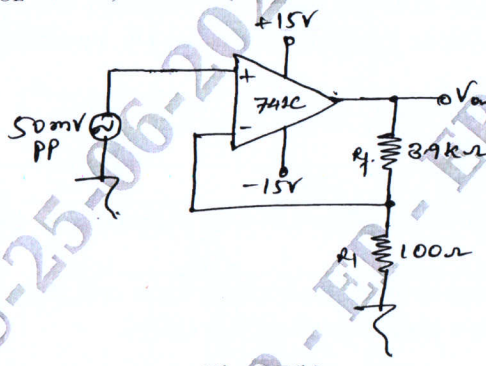
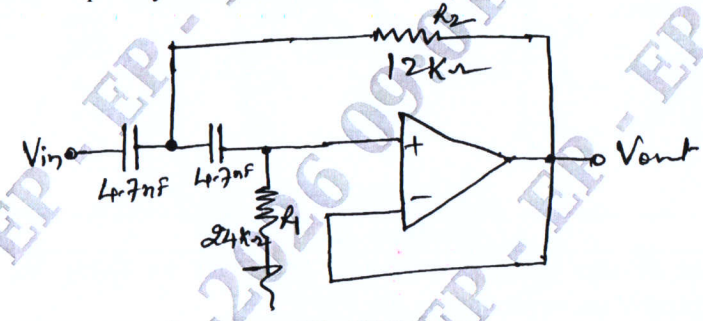
		OR			
Q.6	**a.**	Describe the working of Colpitt's crystal oscillator with the help of circuit diagram.	**06**	**L2**	**CO3**
	b.	Discuss the operation of Monostable and Astable using 555-timer.	**06**	**L2**	**CO3**
	c.	Plot the transfer characteristics of a comparator with positive and negative threshold voltages with the help of diagrams.	**08**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	Explain the VCIS – Amplifier. Obtain the expressions for exact output current, closed-loop input and output impedances.	**08**	**L2**	**CO4**
	b.	Calculate the feedback fraction, the ideal closed-loop voltage gain, the % error and the exact closed loop voltage gain for a given circuit of Fig.Q7(b). Use a typical A_{VOL} of 100,000 for the 741C.  Fig.Q7(b)	**08**	**L3**	**CO4**
	c.	Explain VCVS and ICIS Negative Feedback Amplifiers.	**04**	**L2**	**CO4**
		OR			
Q.8	**a.**	Explain the ideal response of LPF, HPF and BPF.	**06**	**L2**	**CO4**
	b.	What are the pole frequency and Q of the filter shown in Fig.Q8(b)? What is the cutoff frequency of the same?  Fig.Q8(b)	**06**	**L3**	**CO4**
	c.	Explain MFB Bandpass filters with the help of necessary diagrams and expressions.	**08**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain Class-A power amplifier operation with the help of circuit diagram. Derive the equations for power gain, output power and efficiency.	**08**	**L2**	**CO5**
	b.	Explain Class-B push-pull emitter follower with the help of circuit diagram.	**06**	**L2**	**CO5**
	c.	Explain Tuned Class-C Amplifier operation with the help of necessary diagrams.	**06**	**L2**	**CO5**
		OR			
Q.10	**a.**	Explain the SCR operation with the help of Basic SCR circuit.	**06**	**L2**	**CO5**
	b.	Explain the operation of Diac and Triac with the help of necessary diagrams.	**08**	**L2**	**CO5**
	c.	Draw the circuit diagram of UJT relaxation oscillator and explain its operation.	**06**	**L2**	**CO5**

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