RAMAIAH
Institute of Technology

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(Approved by AICTE, New Delhi & Govt. of Karnataka)

(Autonomous Institute, Affiliated to VTU)
Accredited by NBA & NAAC with 'A' Grade

SEMESTER END EXAMINATIONS – JANUARY 2020

Program	:	**B.E : Electronics and Communication Engineering**	**Semester**	:	**III**
Course Name	:	**Analog Circuits**	**Max. Marks**	:	**100**
Course Code	:	**EC32**	**Duration**	:	**3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT- I

1. a) Convert the given circuit into a current source in parallel with a resistor across A – B shown in Fig.1(a). CO1 (10)

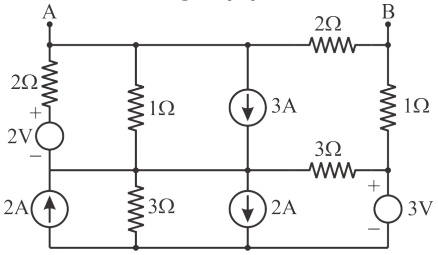

Fig.1(a)

b) Obtain the equivalent resistance R_{ad} from the network shown in Fig.1(b) by star to delta transformation. CO1 (10)

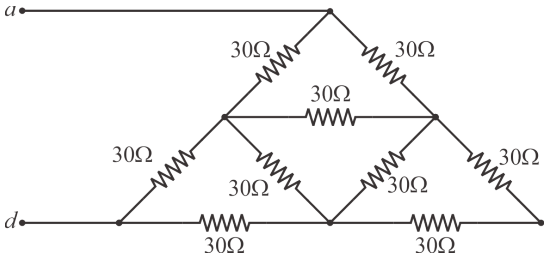

Fig.1(b)

2. a) Using nodal analysis find the node voltages for the circuit shown in Fig.2(a) CO1 (10)

Fig.2(a)

b) For the circuit shown in Fig.2(b), find the mesh currents. CO1 (10)

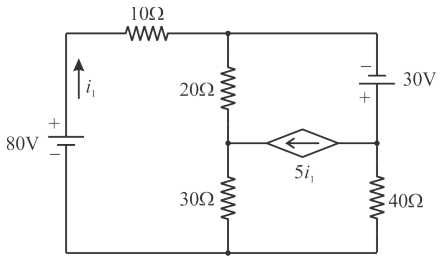

Fig.2(b)

UNIT– II

3. a) Obtain the Norton's equivalent across the terminals A – B, in the circuit shown in Fig. 3(a) CO2 (10)

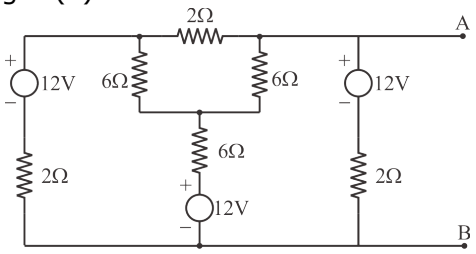

Fig.3(a)

b) Using superposition theorem, find V_x, in the circuit shown in Fig. 3(b) CO2 (10)

Fig.3(b)

4. a) State and explain Thevenin's theorem. CO2 (10)
   b) Find the value of R in the circuit shown in Fig.4(b), so that maximum power is delivered to the load. Also find the maximum power delivered to the load. CO2 (10)

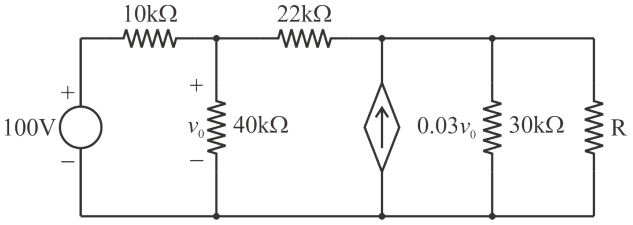

Fig.4(b)

UNIT- III

5. a) Starting from fundamentals, define h-parameters and obtain h-parameter equivalent circuit of common emitter configuration. CO3 (07)
   b) Discuss the effect of negative feedback on input and output impedance in voltage series feedback. CO3 (06)
   c) A transistor amplifier is connected in CE configuration and the h-parameters are given by h_{ie}=1K, h_{fe}=50, $h_{re}=2\times10^{-4}$ and $h_{oe}=25\times10^{-6}\Omega$. Compute A_i,A_v,Z_i and Zo, if $R_L=R_s$=2.2kΩ. CO3 (07)

6. a) State and prove Millers Theorem. CO3 (06)
   b) Give the list of feedback amplifier topologies. Explain each type of feedback amplifier with block diagram. CO3 (10)
   c) Explain the effect of negative feedback on amplifier bandwidth. CO3 (04)

UNIT- IV

7.	a)	A single ended class A transformer coupled amplifier employs a transistor with I_{Cmax}=1A, P_{dmax}=10W and V_{CEOmax}=40V, Calculate the maximum output power that can be delivered to the load. Determine the turns ratio of the output of the transformer.	CO4	(08)
	b)	With a neat block diagram explain class D amplifier.	CO4	(06)
	c)	Compare the various classes of operation of power amplifiers based on operating cycle and efficiency.	CO4	(06)
8.	a)	How are power amplifier classified? Explain. Show that the transformer coupled class A amplifier has maximum efficiency of 50%.	CO4	(08)
	b)	Explain with neat circuit diagram the working of Complementary symmetry of class B power amplifier. Also mention the advantages of it.	CO4	(08)
	c)	Draw and explain the block diagram of class D amplifier.	CO4	(04)

UNIT- V

9.	a)	With neat sketches, explain the low frequency response using small signal model of a CS amplifier and derive an expression for f_L (Lower cut-off frequency).	CO5	(10)
	b)	Consider the drain to gate feedback biasing circuit of the N-channel E-MOSFET used has parameters and If determine the quiescent point. Assume .	CO5	(10)
10.	a)	Using the small signal model of a CS amplifier derive:	CO5	(05)
		i) $A_v = \frac{V_0}{V_i}$		
		ii) Z_i		
		iii)		
		iv)		
	b)	Explain the voltage divider biasing technique in MOSFET and show that it is better than other bias techniques.	CO5	(10)
	c)	Draw the T-model of a CS Amplifier and derive an expression for Av.	CO5	(05)

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