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HirasugarInstitute of Technology, Nidasoshi.

Inculcating Values, Promoting Prosperity

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ECE Dept.
Exam.
Internal Assessment
Odd Sem(2018-19)

SECOND INTERNAL ASSESSMENT

Sem: III Sub: Analog Electronics **Sub. Code:17EC33**

Date: 16/10/2018 Time: 11am -12 noon **Max. Marks:30**

Note: Answer two full questions, draw sketches wherever necessary.

Q. No		Discription of Question	Marks	CO	RBT Level
1	a	Explain transistor series voltage regulator with neat sketches.	7	C203.4	L2
	b	For a harmonic distortion reading of $D2 = 0.1$, $D3 = 0.02$ and $D4 = 0.01$, with $I_1 = 4A$ and $R_C = 8\Omega$ calculate the total harmonic distortion, fundamental power component and total power	8	C203.4	L3
		OR			
2	a	Explain Class D power amplifier with neat block diagream and waveforms	7	C203.4	L2
	b	Determine the regulated voltage and circuit currents for the shunt regulator shown in figure 2(b)	8	C203.4	L3

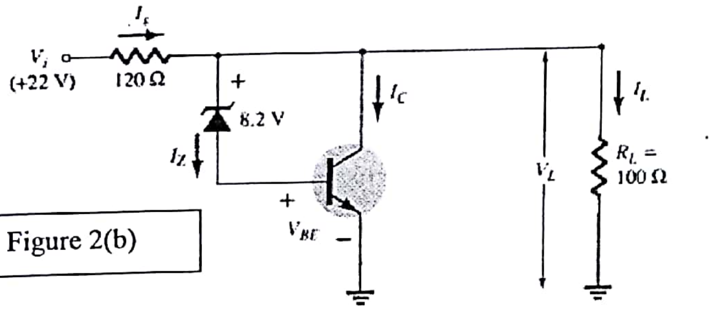

Figure 2(b)

Q. No		Discription of Question	Marks	CO	RBT Level
3	a	Derive an expression for Z0,Zi and Av for CE fixed bias configuration using re model	7	C203.1	L2
	b	For the emitter-follower network of Fig.3(b) determine: i) r_e ii) Z_i iii) Z_o iv) A_v .	8	C203.1	L3

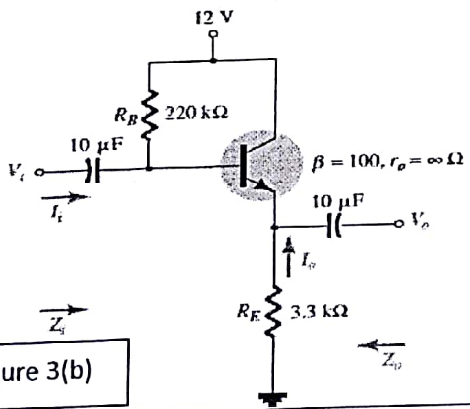

Figure 3(b)

Q. No		Discription of Question	Marks	CO	RBT Level
		OR			
4	a	Define h parameters and draw the h- parameter model equivalent circuits for CE and CB transistor	8	C203.1	L2
	b	Given I_E = 2.5 mA, hfe = 140, hoe = 20 mS (milli mho), and hob = 0.5 mS, determine: i) The CE hybrid equivalent circuit.ii)The CB r_e model.	7	C203.1	L3

Prof. S B Akkole Prof. S B Akkole Dr. V G.Kasabegoudar

Course Coordinator Module Coordinator HOD

Nidasoshi-591 236, Taq: Hukkeri, Dist: Belagavi, Karnataka, India.
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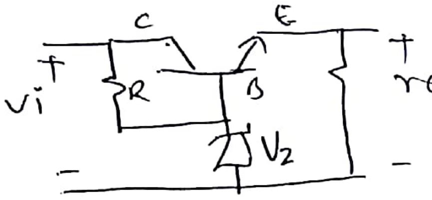
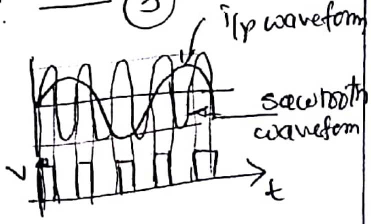
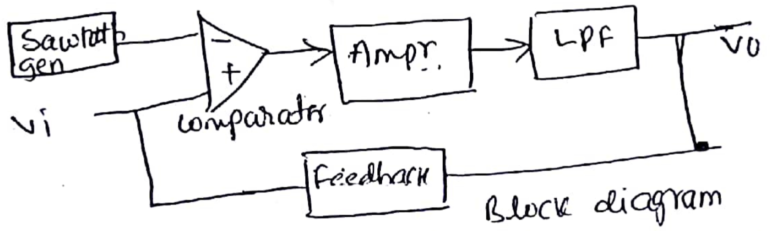
IA - 2 SCHEME OF EVALUATION

Sem : III	Subject : Analog Electronics	Sub Code : 17EC33	Date : 16/10/2018		
Q. No.	**Bit**	**Description**	**Marks**	**CO's**	**RBT LEVEL**
1	a	Drawing series voltage regulator ckt – (3M) Explanation : $V_O = V_Z - V_{BE}$. If o/p voltage decreases VBE increases ∴ Vo increases converse is also true – (4) ckt diagram 	7	C203.5	L2
	(b)	$THD = \sqrt{D_2^2 + D_3^2 + D_4^2} = \sqrt{.1^2 + 0.02^2 + .01^2}$ – (3) = 0.1 Fundamental power $P_1 = I_1^2 R_c = \frac{4^2 \times 8}{2} = 64W$ – (2) Total power $P = (1 + THD^2) P_1 = (1 + 0.1^2) 64$ = 64.64W – (3)	8	C203.5	L3
2	(a)	Block diagram – 3M waveform – 1M Explanation – 3M   Block diagram – i/p waveform converted to pulse type at comparator – pulses are amplified & fed to LPF to get original signal – more than 90 η.	(7)	C203.5	L2

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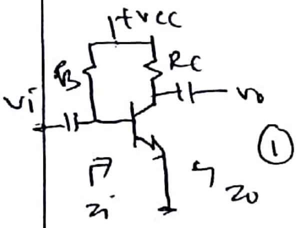
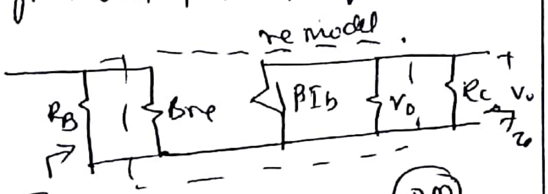
IA - SCHEME OF EVALUATION

Sem : III	Subject : AE	Sub Code : 17EC33	Date : 16/10/2018		
Q. No.	**Bit**	**Description**	**Marks**	**CO's**	**RBT LEVEL**
2	(b)	$V_L = 8.2+0.7 = 8.9V$ — (2M) $I_L = \frac{V_L}{R_L} = \frac{8.9}{100} = 89mA$ — (2M) $I_S = \frac{V_i - V_L}{R_s} = \frac{22-8.9}{120} = 109mA$ — (2M) $\therefore I_C = I_S - I_L = 109-89 = 20mA$ — (2M)	8M.	C203.5	L3
3	(a)	re model ckt diagram 2M + 1M for fixed bias  (1)  (2M) $Z_i = \beta r_e \parallel R_B$ — (1) $Z_o = R_C \parallel r_o$ — (1) $A_v = -\frac{R_C \parallel r_o}{r_e}$ — (2)	7	C203.1	L2
	(b)	$I_B = \frac{V_{CC}-V_{BE}}{R_B+(1+\beta)R_E} = 20.42\mu A$ — (1) $r_e = \frac{26\times10^{-3}}{I_E} = \frac{26\times10^{-3}}{2.062\times10^{-3}} = 12.61\Omega$ — (1) $Z_b = \beta r_e + (\beta+1)R_E = (100)(12.61) + 101\times3.3\times10^3 = 334.56k\Omega$ — (1) $\therefore Z_i = Z_b \parallel R_B = \frac{334.56\times220\times10^3\times10^3}{334.56\times10^3+220\times10^3} = 132.72k\Omega$ — (1) $Z_o = R_E \parallel r_e = 3.3k\Omega \parallel 12.61\Omega = 12.56\Omega$ — (2) $A_v = \frac{v_o}{v_i} = \frac{R_E}{R_E+r_e} = \frac{3.3\times10^3}{3.3\times10^3+12.61} \simeq 1$ — (2)	8	C203.1	L3

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IA -2 SCHEME OF EVALUATION

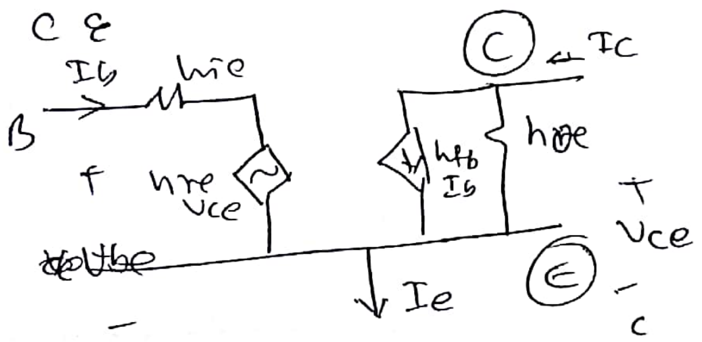
Sem : III	Subject : AE	Sub Code : 17EC33	Date : 16/10

Q. No.	Bit	Description	Marks	CO's
4	(a)	$h_{11} = \frac{V_i}{I_i}\Big|_{V_0=0}$; $h_{12} = \frac{V_i}{V_0}\Big|_{I_i=0}$	8	C203.1

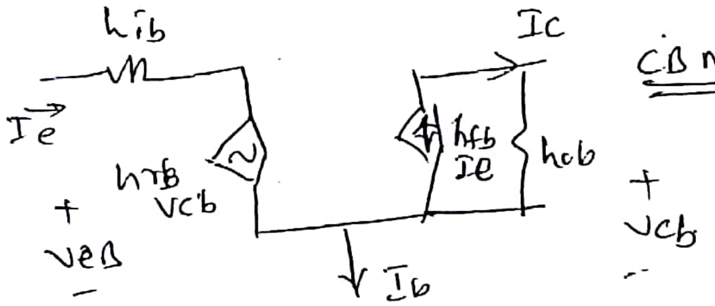
$h_{21} = \frac{I_0}{I_i}\Big|_{V_0=0}$ $\quad h_{22} = \frac{I_0}{V_0}\Big|_{I_i=0}$

Defining above h-parameters — (2m)

Drawing with figs 3 + 3m for CE & CB Model



CE model — (3m)



CB Model (3m)

Q. No.	Bit	Description	Marks	CO's
	(b)	(i) $I_E = 2.5mA$ $\therefore$ $r_e = \frac{26\times10^{-3}}{2.5mA} = 10.4\Omega$ — (1)	7	C203.1

$h_{ie} = \beta r_e = (140)(10.4) = 1.456\Omega$

$r_o = \frac{1}{h_{oe}} = \frac{1}{20\mu S} = 50 k\Omega$ — (1)

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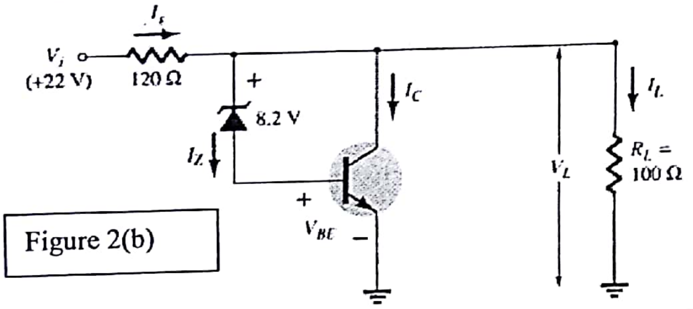
	b	Determine the regulated voltage and circuit currents for the shunt regulator shown in figure 2(b)  Figure 2(b)	8	C203.4	L3
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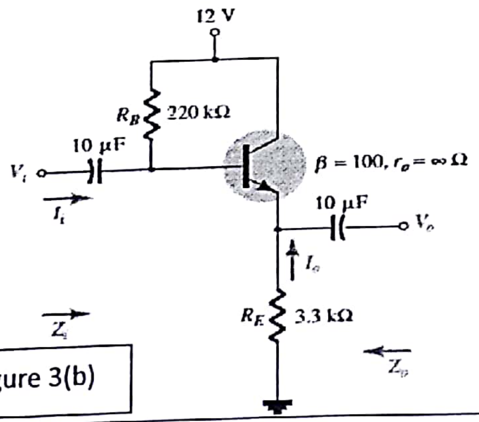
	b	For the emitter-follower network of Fig.3(b) determine: i) re ii) Zi iii) Zo iv) Av.  Figure 3(b)	8	C203.1	L3
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