S J P N Trust's
Hirasugar Institute of Technology, Nidasoshi.
Inculcating Values, Promoting Prosperity
Approved by AICTE, Recognized by Govt. of Karnataka and Affiliated to VTU Belagavi.

ECE Dept.
Exam.
Internal Assessm
Odd Sem(2018

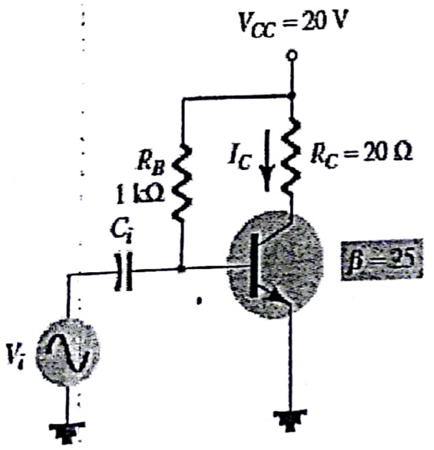
FIRST INTERNAL ASSESSMENT

Sem: III
Date: 11/09/2018

Sub: Analog Electronics
Time: 11am -12 noon

Sub. Code:17EC33
Max. Marks:30

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

Q. No		Discription of Question	Marks	CO	RBT LEVEL
1	a	Explain FET phase shift oscillator with neat figure and necessary equations.	7	C203.4	L2
	b	With neat sketch explain unijunction transistor relaxation oscillator.	8	C203.4	L2
		OR			
2	a	Mention the advantages of negative feedback and derive an expression for input impedance for voltage series feedback circuit.	7	C203.4	L2
	b	A crystal L=0.4H, C=0.085pF and Cm=1pF with R= 5KΩ. Find i)Series resonate frequency ii) Parallel resonate frequency iii) Q factor	8	C203.4	L3
3	a	In a Transistor Hartley oscillator L1=2mH and L2=20μH while the frequency is to be varied from 950KHz to 2050 KHz. Calculate the range over which the capacitor is to be varied.	7	C203.4	L3
	b	Explain with neat sketches how power amplifiers are classified.	8	C203.5	L2
		OR			
4	a	With neat circuit diagram explain the operation of the transformer coupled Class A power amplifier and show that maximum efficiency is 50%.	7	C203.5	L2
	b	Calculate the input power, output power, and efficiency of the amplifier circuit in Fig 4(b) for an input voltage that results in a base current of 10 mA peak.  Fig 4(b)	8	C203.5	L3

Course Coordinator
(Prof. S B Akkole)

Module Coordinator
(Prof. S B Akkole)

HOD
Dr. V G Kasabegoudar

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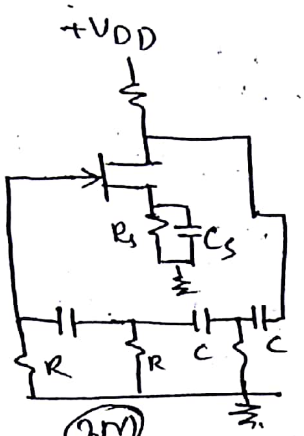
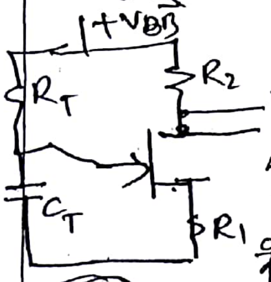
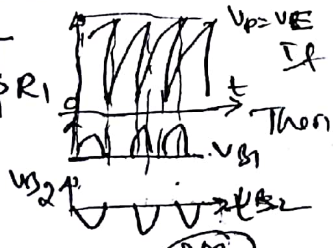
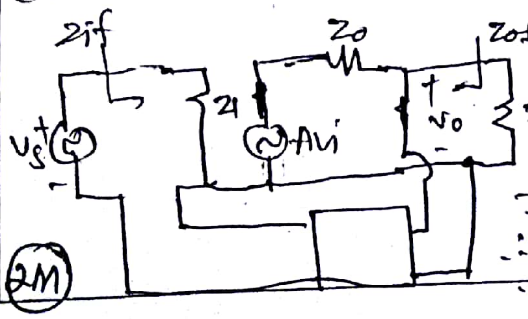
ECE Dept.
Exam.
Scheme of Evaluation
Odd Sem(2018-19)

IA - I SCHEME OF EVALUATION

Sem : III | Subject : Analog Electronics | Sub Code : 17EC32 | Date : 11/9/2018

Q. No.	Bit	Description	Marks	CO's	RBT LEVEL
1	a	Fig 3M + Explanation 4 marks with eqns.  $\lvert A\rvert = g_m R_L$ $R_L = \frac{R_D r_d}{R_D + r_d}$ $f = \frac{1}{2\pi\sqrt{6}RC}$ — (4M) (3M)	7	203-4	L2
	(b)	fig 2M + 2M for waveforms + 3M Explanation  (2M) $f = \frac{1}{R_T C_T \ln\left[\frac{1}{1-\eta}\right]}$ If $\eta = 0.5$ Then $f = \frac{1.5}{R_T C_T}$ (3M)  (2M)	8	203-4	L2
2	(a)	2M advantages + 2.0 I/p fig + 3 Expression any four (i) Higher i/p impedance (ii) Better stabilized voltage gain (iii) Improved freq response (iv) Lower o/p imp (v) Reduced Noise (vi) More linear operation — (2M)  (2M) $I_i = \frac{V_i}{Z_i} = \frac{V_s - V_f}{Z_i}$ $= \frac{V_s - \beta V_o}{Z_i} = \frac{V_s - \beta A V_i}{Z_i}$ $I_i Z_i = V_s - \beta A V_i$ $\therefore V_s = I_i Z_i + \beta A I_i Z_i$ $\therefore Z_{if} = Z_i(1+A\beta)$ (3M)	7	203-4	L2

Staff-In-Charge | Module Coordinator | HOD

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IA - I SCHEME OF EVALUATION

Sem : III | Subject : Analog Electronics | Sub Code : 17EC32 | Date : 11/9/2018

Q. No.	Bit	Description	Marks	CO's	RBT LEVEL
2	(b)	Finding f_s 3M, f_p = 3M, Q = 2M. $f_s = \frac{1}{2\pi\sqrt{LC}} = \frac{1}{2\pi\sqrt{0.4\times0.085\times10^{-12}}} = 863.14 KHz$ (3M) $f_p = \frac{1}{2\pi\sqrt{LC_p}}$ $C_p = \frac{C \cdot C_M}{C + C_M} = \frac{0.085\times10^{-12}\times1\times10^{-12}}{0.085\times10^{-12}+1\times10^{-12}}$ = 0.078 pF — (3M) $= \frac{1}{2\pi\sqrt{0.4\times0.078\times10^{-12}}}$ = 901.03 KHz // or = 900 KHz // $Q = \frac{WL}{R} = \frac{2\pi f_s \cdot L}{R} = \frac{2\pi\times863.14\times10^3\times0.4}{5\times10^3}$ = 433.86 // — (2M)	8	203-4	L3
3	(a)	finding capacitance value for each freq. 3.0 + 3.0 M + 1M L_{eq}. $L_{eq} = L_1 + L_2 = 2\times10^{-3} + 20\times10^{-6}$ = 2.02 mH. — (1M) for f_o = 950 KHz $f_o = \frac{1}{2\pi\sqrt{L_{eq}C}}$ $\therefore C = \frac{1}{(2\pi)^2 f^2 \times L_{eq}}$ $C = \frac{1}{(2\pi)^2} \frac{1}{(950)^2} \frac{1}{2.02\times10^{-3}}$ = 13.89 PF (— 3M) for f_o = 2050 KHz $C = \frac{1}{(2\pi)^2} \frac{1}{(2050)^2} \frac{1}{2.02\times10^{-3}}$ = 2.98 PF (— 3M)	7M.		

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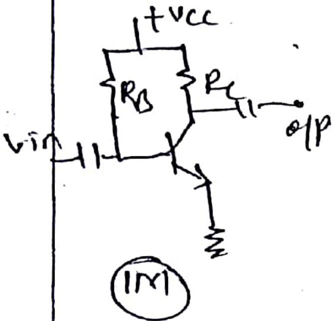
IA - 2 SCHEME OF EVALUATION

Page. No. 3 / 4

Sem : III **Subject :** Analog Electronics **Sub Code** 17EC33 **Date :** 11/4/2018

Q. No.	Bit	Description	Marks	CO's	RBT LEVEL
3	(b)	classification of PA 2M (i) class A, (ii) class B (iii) class C (iv) class AB (v) class D. Sketches & definitions 1+1=2M for explaining any 3.	8M.	C203.5	L2
4	(a)	ckt diagram 1M + Explanation AC&DC operation & η 3M + 3M for η_{max}	7	C203.5	L2



DC power: $V_{CC} \cdot I_{CQ}$

AC power $= \frac{V_{CE(P)} I_{C(P)}}{2}$

$\eta = \frac{AC\ power}{DC\ power}$ (3M)

$\eta_{max} = \frac{P_{o\,ac\,max}}{P_{i\,dc}}$

$P_{o\,ac\,max} = \frac{(V_{CE\,max} - V_{CE\,min})(I_{C\,max} - I_{C\,min})}{8}$

$V_{CE\,max} = 2V_{CC}$ $V_{CE\,min} = 0$

$I_{C\,max} = 2I_{CQ}$ $I_{C\,min} = 0$

$= \frac{2V_{CC} \cdot 2I_{CQ}}{8 V_{CC} \cdot I_{CQ}} \times 100$

$= 50\%$ — (3M)

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IA - SCHEME OF EVALUATION

Sem : IV		Subject : Analog electronics	Sub Code : 17EC33 Date : 11/9/2018		
Q. No.	Bit	Description	Marks	CO's	RBT LEVEL
4	(b)	$I_{BQ} = \frac{V_{CC} - V_{BE}}{R_B} = \frac{20 - 0.7}{1 \times 10^3} = 19.3\,mA$ – (1M) $I_{CQ} = \beta I_{BQ} = 25 \times 19.3 \times 10^{-3} = 0.48A$ – (1M) $I_{C(P)} = \beta I_{B(P)} = 25 \times 10mA = 250mA\,peak$ – (1M) $P_{o(ac)} = I_{C rms}^2 \cdot R_C = \frac{I_{C(P)}^2}{2} R_C = \frac{(250 \times 10^{-3})^2 \cdot 20}{2}$ – (2M) $= 0.625W$ $P_{i\,dc} = V_{CC} \cdot I_{CQ} = 20 \times 0.48 = 9.6W$ – (2M) $\therefore \eta = \frac{P_{o\,ac}}{P_{i\,dc}} \times 100 = \frac{0.625}{9.6W} \times 100 = 6.5\%$ – (1)	8	~~CO~~ C203.5	L3

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