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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (S,FE) / S1 (PT) (S,FE) Examination June 2024 (2015 Scheme)

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Course Code: EC205

Course Name: ELECTRONIC CIRCUITS (EC,AE)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks. Marks

1 a) Draw the circuit and find the transfer function of an RC high pass network. Find the expression for cut off frequency and draw the frequency response. (7)

b) In figure 1, determine the value of R_C needed if $V_C = 2V$. Use $\beta = 50$ for the transistor. (6)

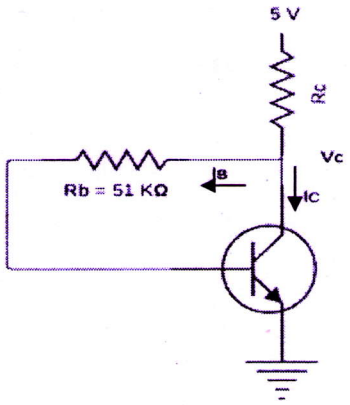

Figure 1

c) Define stability factor. (2)

2 a) Determine the input resistance, ouput resistance and voltage gain of the transistor ciruit shown in figure 2. (7)

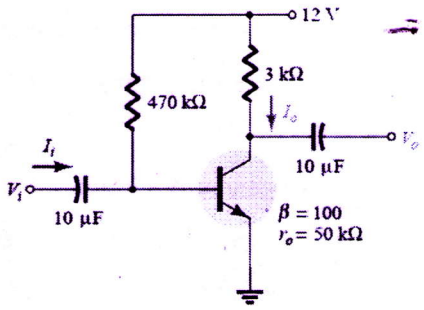

Figure 2

	b)	Draw the circuit diagram of a cascade amplifier using common emitter configuration. Determine the equivalent circuit and find the expression for input resistance, voltage gain and output resistance.	(8)
3	a)	Derive the condition for an RC circuit to function as a i) Differentiator ii) Integrator	(8)
	b)	Using small signal hybrid π model, find the input impedance, output impedance and voltage gain of a common base amplifier circuit.	(7)

PART B

Answer any two full questions, each carries 15 marks.

4	a)	Using high frequency equivalent circuit, find the expression for beta cut off frequency of a BJT. Sketch the frequency response of short circuit current gain.	(8)
	b)	Explain any two broad banding techniques used in an amplifier.	(7)
5	a)	Explain shunt-series feedback topology. Determine its impedance at input and output side.	(8)
	b)	Draw the circuit diagram of a crystal oscillator. Explain its working.	(7)
6	a)	Calculate the beta cut off frequency f_β and the capacitance C_π of a transistor with the following parameter. $f_T = 400$ MHz, $I_c = 1$ mA, $\beta = 100$, $C\mu = 0.2$ pf.	(5)
	b)	Draw the circuit diagram of RC phase shift oscillator and explain its working. Derive the expression for the frequency of oscillation.	(10)

PART C

Answer any two full questions, each carries20 marks.

7	a)	What is cross over distortion. How can you eliminate it?	(5)
	b)	Draw the circuit diagram of a monostable multivibrator. Explain its working using suitable waveforms. Derive the expression for the period of the output pulse.	(10)
	c)	Explain the working of a simple sweep generator circuit.	(5)
8	a)	Using necessary equations and diagrams, show that a transistor series voltage regulator output is stabilized over a specified range of input.	(10)

b) The following parameters are given for the MOSFET amplifier shown in figure 3. (10)

$g_m = 1.63$ mS, $r_d = 50$ kΩ.

Find

i) Voltage gain

ii) Input impedance

iii) Output impedance

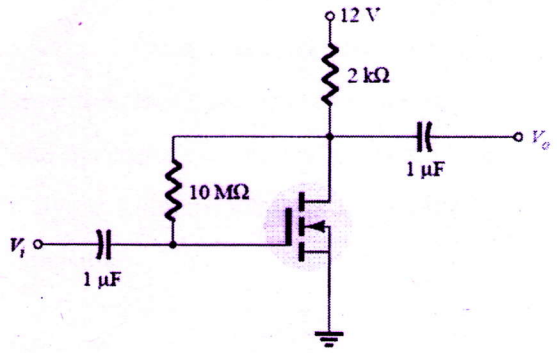

Figure 3

9 a) Explain one method used to protect series voltage regulator from short circuit. (5)

b) Design an astable multivibrator to generate a square wave of frequency 1 KHz and duty cycle 50%. Assume a value for β of the transistor. (10)

c) What is the significance of hysteresis in Schmitt trigger? (5)

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