

B.TECH. BIO MEDICAL 2014 COURSE (CBCS) : WINTER - 2017

SUBJECT: ELECTRONICS CIRCUITS & APPLICATIONS

Day: **Tuesday**
Date: **21/11/2017**

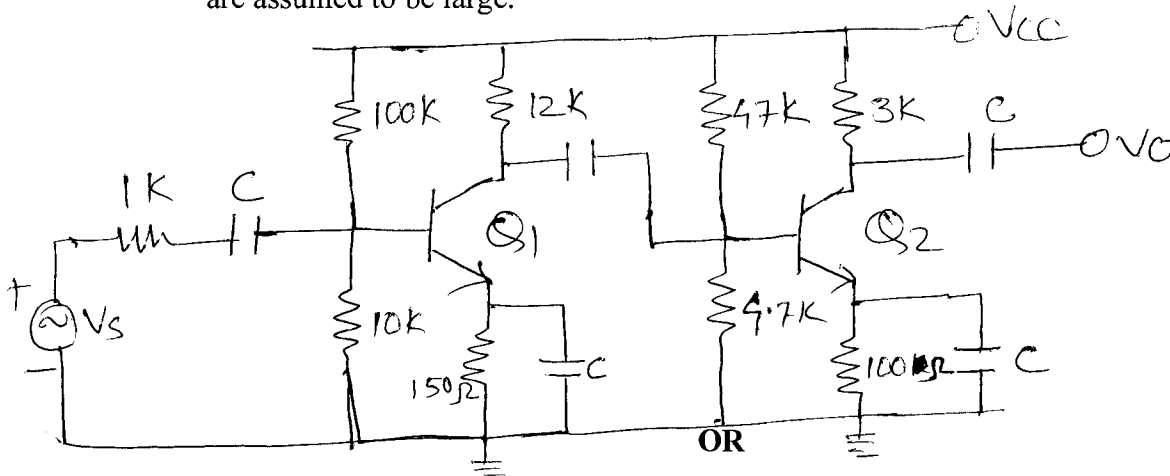
W-2017-2103

Time: **02.30 PM TO 05.30 PM**
max. Marks: 60

N.B.:

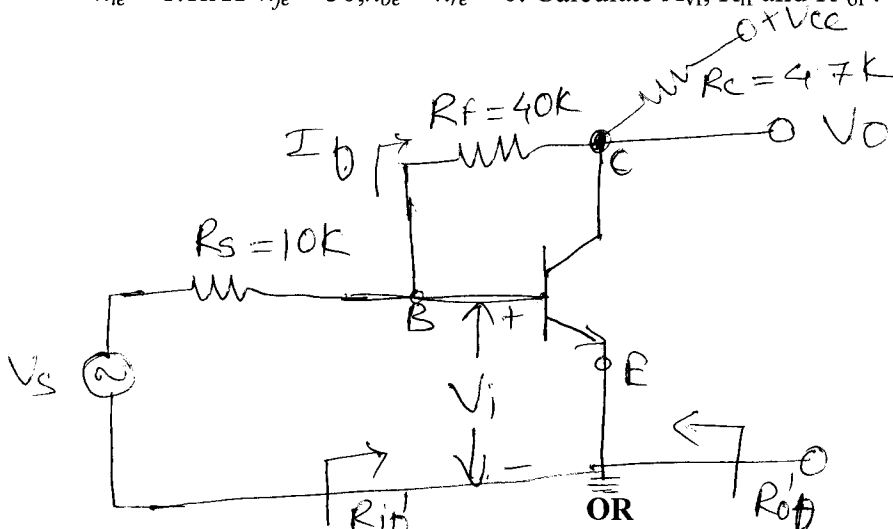
- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat diagrams **WHEREVER** necessary.

Q.1 For two stage amplifier circuit shown below calculate R_i , R_o , A_v . If both the (10)
transistors are identical, with $h_{ie} = 1k\Omega$, $h_{fe} = 50$, $h_{oe} = h_{re} = 0$. All capacitors
are assumed to be large.



- Q.1 a)** What is bootstrapping? How it is used in Darlington amplifier to increase the (05)
input resistance.
- b)** Explain Cascade amplifier with diagram. (05)

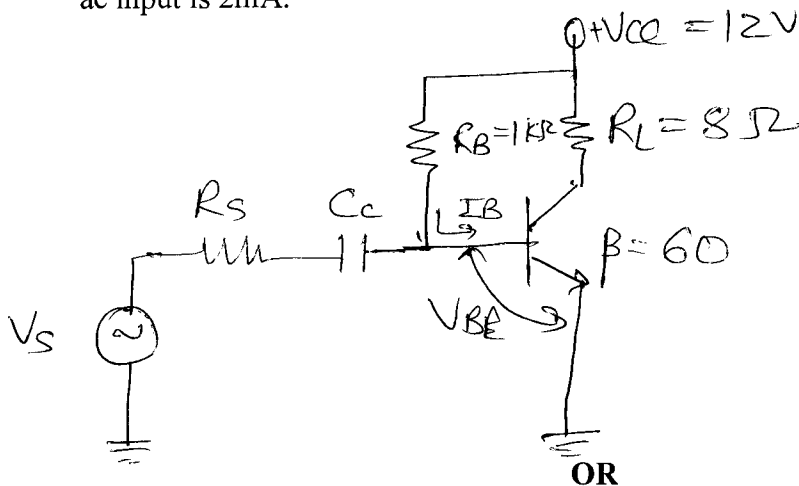
Q.2 The transistor shown in the below figure has the following h- parameters: (10)
 $h_{ie} = 1.1k\Omega$, $h_{fe} = 50$, $h_{oe} = h_{re} = 0$. Calculate A_{vf} , R_{if} and R'_{of} .



Q.2 Describe how the performance of an amplifier improves with negative (10)
feedback. Derive expression for input impedance and output impedance in case
of voltage series feedback and current shunt feedback.

P. T O.

- Q.3** For the class A directly coupled class A power amplifier shown below, calculate V_{CEQ} , I_{CQ} , P_{dc} and P_{ac} and efficiency, if $\beta = 60$ and the RMS base current due to ac input is 2mA. (10)



- Q.3** A complementary symmetry power amplifier is operated using $V_{cc} = \pm 10V$ and delivers power to load $R_L = 5\Omega$. Calculate: (10)
- Maximum output power
 - Power ratings of transistors
 - DC input power

- Q.4** a) Explain Barkhausen criterion for feedback oscillator. (05)
 b) Compare LC and RC Oscillator. (05)

OR

- Q.4** A Quartz crystal has the following constants, $L = 50mH$, $C_1 = 0.02pF$, $R = 500\Omega$ and $C_2 = 12 pF$. Find the values of f_s and f_p . If the external capacitance across the crystal changes from 5pF to 6pF. Find the change in frequency of oscillators. (10)

- Q.5** a) Discuss various performance parameters of regulators. (05)
 b) Write a short notes on : Protection circuits for regulated power supplied. (05)

OR

- Q.5** Draw the circuit schematic of a transistorized series voltage regulator and explain its working. Define parameters used to compare such regulators. (10)

- Q.6** Draw the hybrid π common emitter BJT model and explain it. (10)

OR

- Q.6** A single stage CE amplifier is having gain bandwidth of 5MHz with $R_L = 500\Omega$. Assume $h_{fe} = 80$, $g_m = 90mA/V$, $r_{bb'} = 10\Omega$, $C_{b'e} = 1pF$. and $f_T = 400 MHz$. (10)
- Find the value of source resistance that will give the required bandwidth
 - Find the midband voltage gain V_o/V_s with the value of R_s found in (i).

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