MCC-4   Seat No. _____

M. Sc. (Sem. II) (CBCS) Examination
April / May - 2018

Electronics, Computer & Instrumentation : Paper - VIII
(Amplifier & Oscillators)

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Instructions : (1) All questions carry equal marks.

(2) Figures on right hand side indicate marks.

(3) Each question carries 14 marks.

1   Attempt any seven questions out of ten from the following :   **14**

(1)   What is thermal runaway in transistor amplifier circuit ?

(2)   What is an oscillator ?

(3)   Why are L-C resonant circuit impractical at audio-frequenices ?

(4)   The tuned-collector oscillator makes use of an L-C tuned circuit with L = 29.3 μH and C = 450 *pf*. Determine the frequency of oscillation.

(5)   What is difference between voltage and power amplifiers ?

(6)   What is distortion in an amplifier ?

(7)   Which power amplifier designed for digital or pulse type signals, what are their efficiency ?

(8)   Why Audio power amplifier is called the small signal power amplifier ?

(9)   What is meant by power amplifier ?

(10) What is a tuned amplifier ?

2 Write any two from the following :

    (1)   Colpitt's oscillator   **7**

    (2)   Crystal oscillator.   **7**

   (3)   Wien bridge oscillator.   **7**

3 Answer the following :

    (1)   Calculate the input power, output power delivered   **7**
to the transistor, power lost in transistor, collector efficiency and overall efficiency of the amplifier shown in following circuit for an input voltage Resulting in base current of 10 mA peak.
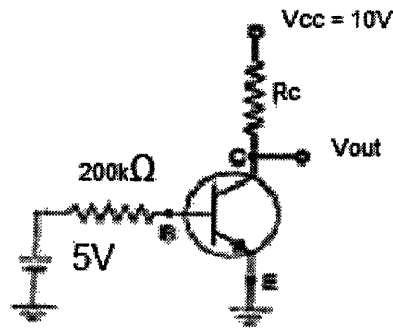
        Take β = 25 and V_{BE} = 0.7V.
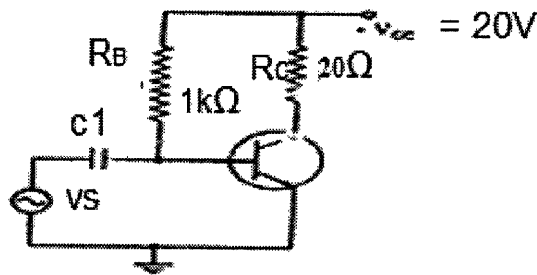
    (2)   The BJT amplifier, shown in following circuit has   **7**
hfe = 100 V_{BE} = 0.7, I_{CO} = 0. Calculate the value of R_1 and R_c such that its I_C = 1mA and V_{CE} = 2.5 V
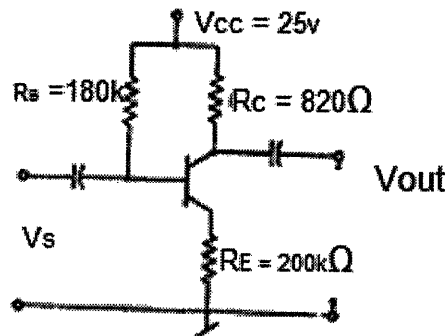
        Assuming $I_E = I_C$

OR
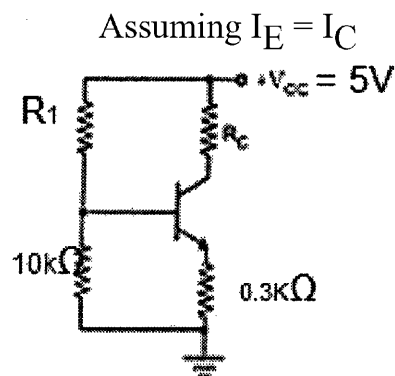
3   Answer the following :

(1)   A silicon transistor with $V_{BE\ Sat} = 0.8$ v $\beta = hfe = 100$,   **5** $V_{CE\ sat} = 0.2$ V is used in circuit shown in Fig. Find the maximum value of R_c for which the transistor remains in saturation.

(2)   Find I_c and V_{CE} for the following circuit of $\beta = 80$ **5** for BJT.

(3)   A tune collector oscillator has a fixed inductance of   **4** 10 μH and has to be tunable over the frequency Band of 500 Khz to 1.5 Mhz find the range of variable capacitor to be used.

4   Answer the following :

(1)   Draw the circuit diagram of a Class A transformer   **5** Coupled power Amplifier and explain it.

(2)   Draw the circuit diagram of a Darlington Amplifier   **5** and explain it.

(3)   Draw the self bias or potential divider bias circuit   **4** and derive the equation of V_{CE} and I_C.

5 Answer the following : (any **two**)

    (1) In a transistor amplifier, change of 0.025 v in signal   **7** voltage causes base current to change by 15 μA and collector current by 1.2 mA. If collector and load resistances are of 6 $k\Omega$ and 12 $k\Omega$ determine

        (i) Input resistnace

        (ii) Current gain

        (iii) AC Load

        (iv) Voltage gain

        (v) Power gain

    (2) What is miller theorem explain and prove it.   **7**

    (3) What is decibel ? Give the merits of dB notations.   **7**

    (4) Write a short note on large signal tuned amplifier.   **7**

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