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SB-0715

Second Year B. Sc. Examination

March / April – 2011

Electronics : Paper - III

(Electronics Circuit Design & Applications)

Time : Hours] [Total Marks :

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **S. Y. B. Sc.**

Name of the Subject :

☛ **Electronics : Paper - 3**

☛ Subject Code No. : **0 7 1 5** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) Question 1 is compulsory.
(3) Symbols have their usual meaning.
(4) Draw neat diagram to support your answer.
(5) Figures at extreme right indicate full marks.

1 Answer in brief : **14**

(i) Why is collector current in transistor, slightly less than emitter current ?

(ii) Why BJT is called current driven device where as JFET is called voltage driven device ?

(iii) In RC coupled amplifiers, why does the gain fall-off at low and high frequencies ?

(iv) State the merits and demerits of negative feedback in amplifiers.

(v) What is the main purpose of using transformer coupling in a class A amplifier ?

(vi) What do you mean by a tuned amplifier ? Where it is used ?

(vii) Can a negative feedback amplifier works as an oscillator ? If yes, how ? If not, why ?

2 (a) Using approximate hybrid model analyse a CE configuration with Re bypassed and unbypassed. 7

(b) Explain how the stabilization is obtained in potential divider bias circuit. 7

OR

2 (a) Draw the drain characteristics of N-channel FET. 7
Explain :
(1) Channel ohmic rigion
(2) Pinch-off voltage
(3) drain resistance
(4) trans conductance and
(5) I_{DSS}.

(b) Determine the bias resistor R_B for fixed bias and collector to base bias and compare the stability factor S for both of them. 7
Given :
V_{CC} = 12V, R_L= 330 ohms, I_B = 0.3 mA
β = 100, V_{CEQ} = 6V.

3 (a) Prove that in a negative feedback voltage gain reduces and in positive feedback it increases. 8

(b) The overall gain of a multistage amplifier is 100. When negative feedback is applied, the gain reduces to 10. Find the fraction of the output that is feedback to the input. 6

OR

3 (a) Derive expression for current gain, voltage gain, input resistance, output resistance and power gain of a transistor amplifier operating in the CE mode. Explain the significance of negative sign in the expression for the voltage gain. 8

(b) In a transistor amplifier, R_C = 10 KΩ, R_L = 30 KΩ and V_{CC} = 20V. The value of R_1 and R_2 are so as to fix the operating point at 10V, 1 mA. Draw the d.c. and a.c. load lines. Assume R_e is negligible. 6

4 (a) Explain the working principle of Hartley oscillator and derive its frequency of oscillator. 8

(b) Find the operating frequency of a transistor Hartley oscillator if $L_1 = 100\,\mu H$, $L_2 = 1mH$, mutual inductance between the coils $M = 20\ \mu H$ and $C = 20\ pF$. 6

OR

4 (a) Explain a single tuned inductively coupled transistor amplifier. 8

(b) Draw the circuit diagram for Bistable transisterised multivibrator. Explain its operation. What do you mean by symmetrical triggering ? 6

5 Write short notes on : (any **two**) 14

(1) Bootstrap ramp generator.

(2) Heatsink theory

(3) JFET as VVR.

(4) R.C phaseshift oscillator.