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RA-0715

Second Year B. Sc. Examination

March / April – 2010

Electronics : Paper - III

(Electronics Circuit Design & Application)

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) Figures on the **right** indicate full marks.
(3) All symbols and abbreviations have their usual meaning.
(4) Non-programmable calculator is allowed.
(5) Draw neat diagram/figures to support your answer.
(6) Assume data if necessary.

1 Answer in brief : **14**

(a) What do you understand by stabilization of operating point? Why it is necessary in amplifier circuit?
(b) Why is the voltage gain of an amplifier with negative feedback smaller than no feedback?
(c) What is the basic condition for oscillation?
(d) Distinguish between an amplifier and an oscillator.
(e) Define h-parameters of a transistor in CE configuration.
(f) Why is it that the total voltage gain of a cascaded amplifier is the product of the stage gains, but the total current gain is not the product of the stage current gains.
(g) What is cross-over distortion? How is it overcome?

2 (a) How we can get operating point stability with the help of bias compensation method? Explain any one compensation method in detail. **10**
(b) What do you mean by "Thermal resistance"?

OR

2 (a) Explain why the gain drops at low and high frequency in a frequency response curve of an amplifier. Derive the expression for mid frequency gain in the case of RC coupled amplifier. 8

(b) Design a voltage divider bias circuit for the following data : 6

I_{cq} = 12 mA, β = 100, V_{ccq} = 9V, V_{cc} = 22V

3 (a) Using a neat diagram of a transistorised Bistable multivibrator explain its working principle. Derive necessary equations. 8

(b) Calculate the component values of a monostable multivibrator developing an output pulse of 140 μS duration. Assume h_{femin} = 20, I_{sat} = 6 mA, V_{cc} = 6V, V_{BB} = –1.5V. 6

OR

3 (a) Draw the circuit of a class-B push-pull amplifier and explain its operation. Derive an expression for its maxiumum conversion efficiency. 9

(b) An amplifier has mid band gain of 125 and a bandwitdh of 250 kHz. If 4% negative feedback is introduced. Find the new bandwidth and gain. 5

4 (a) Draw the circuit diagram of phase shift oscillator and explain its operation by deriving expression for frequency of oscillation. 8

(b) The frequency of oscillation of a three section RC phase shift oscillator with R=5 kΩ is 5 kHz. Find the value of capacitors to be used in it. What range of resistors could be used to obtain a frequency range of 1 kHz to 20 kHz, for this oscillator? Use the same value of capacitor. 6

OR

4 (a) Discuss the effect of bypass and coupling capacitor on the low frequency response of a CE amplifier. 7

(b) Explain "Heat Sink Theory." 7

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

(a) R-C Ramp generator

(b) Monostable Multivibrator

(c) FET as a V.V.R.

(d) Transformer coupled amplifier

(e) Negative resistance oscillators

(f) Hartley Oscillator

(g) Single tuned amplifier.