Model Question Paper
Semiconductor devices and their applications - Part V
12th Standard

Physics

Reg.No. : [ ][ ][ ][ ][ ][ ]

I.Answer all questions.

II.Use blue pen only.

Time : 01:00:00 Hrs

Total Marks : 85

Part-A

5 x 1 = 5

1) Ratio of the collector current to the emitter current is denoted by

   (a) α (b) β (c) A   (d) βA

2) The value of α in any transistor lies between

   (a) 50-300   (b) upto 1000   (c) 0-9   (d) 0.95-0.99

3) In CE amplifiers, the phase reversal between reversal between input and output voltages is

   (a) $0\degree$ (b) $90\degree$ (c) $180\degree$ (d) $270\degree$

4) _____ is the most widely used method of providing bias and stabilization to a transistor

   (a) base bias   (b) base bias with the emitter feedback   (c) base bias with collector feedback   (d) voltage divider bias

5) At lower and upper cut-off frequencies, the gain of the amplifier is _____ times of mid frequency gain

   (a) 2   (b) $\frac{1}{2}$ (c) $\sqrt{2}$ (d) $\frac{1}{\sqrt{2}}$

Part-B

1 x 3 = 3

6) State the important characteristics of OP-AMP?

2 x 3 = 6

7) Prove the following logic expression $(\bar{A} + B) (A + B) = B$.

8) The gain of the amplifier, without feedback is 100. If 5% of the output voltage is feedback into the input through a nagative feedback network,Find out the voltage gain after feedback.

Part-C

2 x 5 = 10

9) Construct a logic using NAND gates only for Y= $\bar{A} + \bar{BC}$.

10) Construct a logic circuit using NAND gates only for $Y = \bar{A} + \overline{BC}$

9 x 5 = 45

11) Describe the action of an operational amplifier as difference amplifier.

12) Explain the functions of an operational as a summing amplifier

13) Explain the circuit symbol and pin-out the configuration of an operational amplifier.

14) Explain the voltage divide bias with a circuit.

15) Explain N-type semiconductor.

Generic 10

2X10=20

16) a)   Simplify the following logic expression using the laws and theorems o Boolean algebra.

   $Y = A\bar{B} + AB + BC + CA$

   b)   Explain with neat circuit diagram the working of Bridge rectifier. What are its advantages?

17) a)   With a negative feedback, an amplifier gives an output of 10V, for an input of 0.5V. When feedback is removed, it requires 0.25V input for the same output. Calculate (i) Gain without feedback (ii) Feedback fraction.

   b)   When a negative feedback is applied to an amplifier of gain 100, the over all gain falls to 50.

   (i) Calculate the fraction of output voltage feedback.

   (ii) If this fraction is maintained, calculate the value of the amplifier gain required if the overall stage gain is to be 75.

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