[Total No. of Questions - 9] [Total No. of Printed Pages - 3]

Dec-22-0134

EC-301 (Analog Electronics)
(ECE, EEE)

B.Tech-3rd (CBCS)

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note: Candidates are required to attempt five questions in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

SECTION A

1. (a) Calculate the break region over which the dynamic resistance of a diode is multiplied by a factor of 1000. (05)

   (b) Explain how to obtain the dynamic characteristic from the static volt-ampere curve of a diode. (05)

2. (a) Derive the relation between h_{FE} and h_{fe}. (05)

   (b) Discuss the two possible sources of breakdown in a transistor as the collector to emitter voltage is increased. (05)

SECTION-B

3. (a) A transformer coupling is used in the final stage of multi-stage amplifier. If the output impedance of transistor is $1k\Omega$ and the speaker has a resistance of 10Ω, find the turn ratio of the transformer so that maximum power is transferred to the load. (05)

   (b) Explain Darlington pair amplifiers. (05)

4. Explain in detail high frequency model for CE amplifiers. (10)

SECTION-C

5. (a) Distinguish between class A and class B operation. (05)

   (b) Derive the theoretical maximum conversion efficiency of class B power amplifier. (05)

6. A parallel resonant circuit has a capacitor of 100pF in one branch and inductance of $100\mu H$ plus a resistance of 10Ω in the parallel branch. Find (a) resonant frequency (b) impedance of the circuit at resonance (c) Q-factor of the circuit. (10)

SECTION-D

7. (a) The distortion in an amplifier is found to be 3%, when the feedback ratio of negative feedback amplifier is 0.04. When the feedback is removed, the distortion becomes 15%. Find the open and closed loop gain. (05)

   (b) Explain the effect of lower cut-off frequency with negative feedback? (05)

8. (a) Name some optoelectronic devices. List their strengths and weaknesses in comparison to competing products / technologies. (05)

   (b) Describe some measures necessary if you want to produce a high-efficiency LED. Use hand drawings to illustrate (at least) three major points. (05)

SECTION-E

9. (a) What is a crystal diode? (02)

   (b) Why is Peak Inverse Voltage important in rectifier services? (02)

[P.T.O.]

(c) In the Common-Emitter configuration, if the transistor is in the active region, then how the collector current must behave?

(d) What is utility of d.c. load line? (02)

(e) What is the advantage of RC coupling Scheme? (02)

(f) Why do the internal capacitances of transistor at low frequencies treated as open circuits by completely neglecting their effects in analysis? (02)

(g) What is meant by cross over distortion in class B power amplifier and how it is corrected? (02)

(h) What is the other name for tuned amplifier? (02)

(i) List the four basic feedback topologies. (02)

(j) Why silicon is not used for generation of light? (02)