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Question Paper Code : 21446

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Third Semester

Electronics and Communication Engineering

EC 2205/EC 36/080290011 — ELECTRONIC CIRCUITS — I

(Common to Medical Electronics Engineering)

(Regulations 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is biasing?

2. Define stability factor.

3. Draw the *h* parameter model of CE transistor at low frequencies.

4. Define CMRR.

5. List the distortions present in the power amplifier.

6. Give the applications of class-C amplifier.

7. A half wave signal with a peak of 20V is the input to a choke input filter. If $X_L = 5k\Omega$ and $X_C = 25$ ohms, what is the approximate peak to peak across the capacitor?

8. A power has no-load voltage of 12V. What will be its full load voltage if its voltage regulation is

   (a) 10%

   (b) 50%

9. Two stage of a multistage amplifier have a gain of 50 and 20. And what is the effective voltage gain in dB?

10. Draw the frequency response of a RC coupled amplifier.

PART B — (5 × 16 = 80 marks)

11. (a) (i) List the three sources of instability of collector and how does the designer minimize the percentage variation in IC due to the above sources? (6)

(ii) Draw a self-bias circuit and explain qualitatively why such a circuit is an improvement on the fixed-bias circuit as far as stability is concerned. (10)

Or

(b) (i) What is the condition for thermal stability? Explain (8)

(ii) In a self-bias circuit find Rc, R1, R2 for the following specifications

$R_C = 4\,k\Omega$ $VCC = 20V$ $I_C = 2mA$ and $\beta = 50$. (8)

12. (a) (i) Write the Ebers and Moll equations and explain. (6)

(ii) Draw a family of CS drain characteristics of an *n* channel JFET and explain how does the FET behave for small values of |VDS| and large |VDS|? (10)

Or

(b) (i) Define the following regions in a transistor

(1) active

(2) saturation and

(3) cutoff. (6)

(ii) Draw the static input and output characteristics of a CE transistor and explain the salient features of the characteristics. (10)

13. (a) (i) Draw the high frequency Pi model of an amplifier and describe how the internal behavior of the transistor affects its high frequency performance. (10)

(ii) With a neat circuit diagram describe the operation of RC coupled amplifier. What are the advantages and disadvantages of it? (6)

Or

(b) (i) Derive expressions for voltage gain, input impedance and output impedance of a RC coupled amplifier. (10)

(ii) Derive the expressions of upper and lower cut off frequencies of multistage amplifiers. (6)

14. (a) (i) Describe the classification power amplifier. (6)

(ii) Discuss the complementary symmetry class C amplifier and derive its efficiency. (10)

Or

(b) With a neat diagram explain the class B Push pull amplifier. Derive the expression for its efficiency. (16)

15. (a) (i) With a neat diagram describe the operation of full wave bridge rectifier. (4)

(ii) Derive the expression for ripple factor, efficiency and TUF of a bridge rectifier. (4)

(iii) Derive the expressions for ripple factor and DC output voltage for a capacitor filler at the output of full wave rectifier. (8)

Or

(b) (i) Derive the operation of a transistor series voltage regulator. (10)

(ii) With a block diagram describe a switching mode power supply. (6)