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THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2004

EE 2K 304—ELECTRONICS—I

Time : Three Hours

Maximum : 100 Marks

*Answer **all** questions.*
Assume suitable data that are not given.

I. (a) What are drift and diffusion currents ? Explain.

   (b) Differentiate BJT from PN junction diode.

   (c) Write clamping circuit theorem state the applications of clampers.

   (d) Compare and contrast all types of filters.

   (e) State and explain the advantages of potential divider biasing technique.

   (f) Differentiate cascade from compound amplifiers.

   (g) Write a note on selection of coupling and by pass capacitors.

   (h) What is offset behaviour in differential amplifiers ? Explain.

   (8 × 5 = 40 marks)

II. (a) (i) With a help of Energy band diagrams explain the potential variation within graded semiconductors.

   (8 marks)

   (ii) Write a technical note on Breakdown diode.   (7 marks)

   Or

   (b) (i) Define voltage regulation. Draw a block diagram of a simple voltage regulator. Explain its functioning.

   (7 marks)

   (ii) Explain about the ratings, construction and characteristics of E-MOSFETS.   (8 marks)

III. (a) (i) Broadly compare the features of single-phase half-wave, full-wave centre tapped and Bridge rectifiers.

   (8 marks)

   (ii) Derive rectifier efficiency and ripple factor for a single-phase half-wave rectifier.

   (7 marks)

   Or

   (b) Draw the types of clipper and clamper circuits. Explain the principle of operation of them.

   (15 marks)

Turn over

IV. (a) (i) Write a technical note on thermal runaway.   (5 marks)

      (ii) Derive the design equations of self bias. Explain the features of this biasing technique.

                                                  (10 marks)

Or

(b) (i) Explain the various terms of multistate transistor amplifiers.   (5 marks)

      (ii) With a neat circuit diagram explain the principle of operation of class 'B' push-pull amplifiers. Derive an expression for its efficiency.

                                                  (10 marks)

V. (a) (i) Define and explain f_α, f_β and f_T. Derive expressions for them.   (6 marks)

      (ii) Explain why Emitter followings are called so ? Draw its equivalent circuit at high frequencies.

                                                  (9 marks)

Or

(b) (i) What are different amplifiers ? Explain the principle of operation of a differential amplifier with a neat circuit diagram.

                                                   (9 marks)

      (ii) Derive an expression for CMRR interms of differential and common mode gains.

                                                    (6 marks)

                                                [4 × 15 = 60 marks]