

BTS 131 (H)

B.TECH. DEGREE IV SEMESTER (SUPPLEMENTARY) EXAMINATION  
IN MECHANICAL ENGINEERING  
JUNE 2001

ME 404 INDUSTRIAL ELECTRONICS  
(1998 Admissions)

Time: 3 Hours

Maximum Marks: 100

(Answer five questions choosing one from each module)

**MODULE - I**

- I. (a) Explain what is meant by h-parameters. Give equivalent h - parameter models for a PNP transistor in CE and CB configuration respectively at low frequencies. Give the expressions for voltage gain, current gain input and output impedances for single stage transistor CE amplifier circuit in h-parameters. (12)
- (b) Draw the frequency response of RC coupled amplifier and explain the factors affecting it. (8)

OR

- II. (a) Derive an expression for the output power of an idealised class B push pull power amplifier. Also find the maximum conversion efficiency. (12)
- (b) Explain the effect of negative feedback on -
- (i) input impedance
  - (ii) output impedance
  - (iii) gain stability
  - (iv) Distorsion and noise (8)

(Turn over)

- III. (a) What is a differentiator circuit? Justify that RC differential circuit is a high pass circuit. Determine the 3 dB cutoff frequency for this network. (6)
- (b) Briefly describe the important OP AMP parameters. (10)
- (c) Draw the frequency response curve of an op - amp. What is common mode rejection ratio and what is its significance? (4)

OR

- IV. (a) Explain the features of common mode and differential mode operations. (10)
- (b) Explain the significance of slew rate as applied to operational amplifiers. (4)
- (c) Show how an op-amp may be used to build a subtractor. Derive an expression to show that  $e_0 = (e_1 - e_2)$ . (6)

MODULE - III

- V. (a) What is the basic principle of operation of an oscillator? What is Barkhausen criteria for sinusoidal oscillators? (10)
- (b) Draw the circuit of RC phase shift oscillator and derive the frequency of oscillations. (10)

OR

- VI. (a) Draw the circuit diagrams of (i) Monostable multivibrator (ii) Bistable multivibrator (6)
- (b) Draw the circuit of Hartley oscillator and explain its working. Derive the expression for frequency of oscillation and condition for sustained oscillations. (14)

Contd.....3.

MODULE - IV

- VII. (a) What are the ratings and specifications of SCRs. (10)
- (b) Explain with necessary waveforms the working of a single phase half controlled rectifier circuit. (10)

OR

- VIII. (a) Explain the turn off characteristics of an SCR. (10)
- (b) For a single phase full wave fully controlled bridge converter, supplying purely resistive load, derive an expression for the average load voltage. (10)

MODULE - V

- IX. (a) Draw the circuit diagram and explain the working of a transistorised series voltage regulator. (8)
- (b) Draw the block diagram and explain the working principle of a SMPS. (8)
- (c) Give two applications of dielectric heating. (4)

OR

- X. (a) Explain in detail the principle of induction heating. What are the merits and demerits of the same? (10)
- (b) What are the applications of power electronics in welding? (10)

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