Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐

L 1233

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Second Semester

Mechanical Engineering

EC 152 — ELECTRONICS ENGINEERING

(Common to Metallurgical Engineering/Textile Technology/
Chemical Engineering/Industrial Bio-Technology/Leather Technology/
Polymer Technology/Textile Chemistry/Fashion Technology)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is an extrinsic semiconductor?

2. What is the maximum efficiency of full wave rectifier?

3. What is the significance of Q-point?

4. List the classification of amplifiers.

5. Compare JFET and BJT.

6. Distinguish between the firing angle and the conduction angle of an SCR.

7. State Barkhausen criterion for oscillation.

8. What is a differentiator?

9. Draw the truth table for EX-OR gate.

10. What is a JK flip-flop? Write the excitation table of JK flip-flop.

PART B — (5 × 16 = 80 marks)

11. (a) Derive the continuity equation from the first principle.

Or

(b) Explain the operation of a full wave rectifier and give the waveforms of input and output voltages.

12. (a) Draw the ac equivalent circuit of a CE amplifier with voltage divider bias using h-parameter model and derive the equations for input impedance, output impedance, voltage gain and current gain.

Or

(b) Derive the equation for power output and conversion efficiency of a class A series fed amplifier.

13. (a) Explain the working of different types of MOSFET with suitable diagrams.

Or

(b) Draw the equivalent circuit of UJT and explain its operation with the help of emitter characteristics.

14. (a) Draw the circuit of Hartley oscillator and explain its working. Derive the expressions for frequency of oscillation and condition for starting of oscillations.

Or

(b) With a neat sketch, explain the working of an astable multivibrator.

15. (a) Using Boolean algebra simplify each of the following Boolean expressions.

   (i) $Y = A + AB + ABC + ABCD$

   (ii) $Z = A(A + AB)(A + ABC)(A + ABCD)$

   (iii) $A = X + Y + \overline{\overline{XY}Z}$

   (iv) $B = \overline{\overline{XY}\ \overline{YZ}}$.

Or

(b) Draw a three FF shift register capable of performing the following operations :

(i) Serial entry of data

(ii) Complement operation

(iii) Count up

(iv) Count down