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53 (EC 201) BSEL

2012 C

2013

(May)

BASIC ELECTRONICS

Paper : EC 201

Full Marks : 100

Pass Marks : 30

Time : Three hours

*The figures in the margin indicate full marks
for the questions.*

Answer any five questions.

1. (a) What is semiconductor? 2
- (b) Why does an intrinsic semiconductor behave as an insulator at OK? 3
- (c) Describe avalanche break down mechanism. 5
- (d) Plot and explain the voltage ampere characteristics of diode. 7
- (e) What is depletion region? 2
- (f) What is valence electron? 1

Contd.

2. (a) What is rectification ? 2
- (b) Explain how a bridge rectifier works as full wave rectifier. 8
- (c) Explain how drift current is different from diffusion current. 4
- (d) Describe the operation of a diode clipper. 6
3. (a) What is clamping ? 2
- (b) Describe the operation of a clamping circuit. 6
- (c) Explain the action of a capacitor filter. 4
- (d) Show a two dimensional representation of a silicon crystal containing a donor atom impurity. 2
- (e) Draw the block diagram of regulated D.C. power supply. 2
- (f) Compare input resistance, output resistance, voltage gain in between CB and CE configuration of BJT. 4

4. (a) What is amplification? 2
- (b) Explain how amplification is different from rectification? 4
- (c) Plot and describe the output characteristics of BJT in CE configuration. 7
- (d) What is dc biasing? 2
- (e) What is the significance of the operating point? 3
- (f) What is stabilization of operating point? 2
5. (a) Draw the circuit diagram of a RC coupled amplifier. 5
- (b) What are the important advantages of negative feedback? 3
- (c) Describe the working principle of JFET. 6
- (d) Write down few advantages of JFET over BJT. 2
- (e) What is pinch of voltage? 2
- (f) How many different types of MOSFET are there? Write their names. 2

6. (a) What are the criteria for oscillation? 4
- (b) Write down few important characteristics of Op-Amp. 3
- (c) Oscillator is a _____ feedback circuit. 1
- (d) Bandwidth increases or decreases with positive feedback. 1
- (e) Convert the following numbers with the indicated bases to decimal 2
- (i) $(11011)_2$ (ii) $(F10)_{16}$
- (f) Prove that $a + ABC + a' = 1$ 1
- (g) What is truth table? 1
- (h) Distinguish between combinational and sequential circuit. 3
- (i) Convert the following numbers with the indicated base to binary 3
- (i) $(51)_{10}$ (ii) $(F1)_{16}$ (iii) $(102)_8$
- (j) Prove that $xy' + x'y + xy = x + y$ 1

7. (a) Draw the circuit diagram of a LC oscillator. 5
- (b) Explain how BJT can be used as an amplifier? 7
- (c) Explain the terms below 3×2=6
- (i) Bandwidth (ii) Gain
- (d) Sketch the crosssection of an nmos enhancement transistor. 2