

B.Sc. Part-II (Semester-III) Examination

3S : ELECTRONICS

(Electronics Devices and Circuits)

Time : Three Hours]

[Maximum Marks : 80

Note :— (1) Question No. 1 is compulsory.

(2) Draw neat diagrams wherever necessary.

1. (A) Fill in the blanks with correct word :

- (i) The parameter h_{ie} stands for _____ in CE mode.
- (ii) CMRR stands for _____.
- (iii) The frequency of Wein Bridge oscillator is _____.
- (iv) The voltage gain of an amplifier with negative feedback _____.

2

(B) Choose the correct alternative :

- (i) The maximum overall efficiency of a transformer coupled class A amplifier is _____ percent.
 - (a) 78.5
 - (b) 25
 - (c) 50
 - (d) 85
- (ii) A bistable multivibrator is a _____ oscillator.
 - (a) Triggered
 - (b) Free-running
 - (c) Sine wave
 - (d) Sawtooth
- (iii) R-2R ladder circuit is used to convert _____.
 - (a) Digital to analog
 - (b) Analog to digital
 - (c) Sine to square wave
 - (d) None
- (iv) OP-AMP 741 IC has total _____ pins.
 - (a) 2
 - (b) 6
 - (c) 14
 - (d) 8

2

(C) Answer the following questions each in **one** sentence :

- (i) What is D/A converter ?
- (ii) What is positive feedback ?
- (iii) What are basic elements of oscillator ?
- (iv) What is multistage amplifier ? 4

EITHER

- 2. (A) Draw the circuit diagram of two stage R-C coupled amplifier. 2
- (B) Explain the terms :
 - (i) Lower cut-off frequency
 - (ii) Upper cut-off frequency. 4
- (C) What is tuned amplifier ? Explain operation of single tuned amplifier with circuit diagram. 6

OR

- (P) Define h-parameter of Common Base Mode. 4
- (Q) Draw hybrid equivalent circuit for CE transistor amplifier. Derive the expression for :
 - (i) Current gain
 - (ii) Output impedance for a single stage CE transistor amplifier. 8

EITHER

- 3. (A) Explain class A, class B and class AB amplifiers. 6
- (B) Explain construction and operation of class B push pull amplifier. 6

OR

- (P) What is cross-over distortion ? Explain . 3
- (Q) Draw the circuit diagram of complementary symmetry amplifier. 3
- (R) Explain construction and operation of transformer coupled class A amplifier. 6

EITHER

- 4. (A) Distinguish between positive and negative feedback. 4
- (B) Derive the relation for the voltage gain of amplifier using negative feedback. 6
- (C) What are essential parts of oscillator ? 2

OR

- (P) What is oscillator ? Explain Barkhausen criterion of oscillations. 4
- (Q) Explain the construction and operation of RC-phase shift oscillator using transistor. State its advantages. 8

EITHER

5. (A) Explain the working of OP-AMP as non-inverting amplifier and derive the expression for gain. 6
- (B) How is OP-AMP used as summing amplifier ? Explain with suitable diagram. 6

OR

- (P) Explain the terms :
- (i) Differential mode gain
 - (ii) Common mode gain
 - (iii) CMRR. 6
- (Q) Explain construction and working of difference amplifier using transistor with suitable diagram. 6

EITHER

6. (A) Explain how OP-AMP is used as an astable multivibrator. 6
- (B) How OP-AMP is used to find solution of simultaneous equations :
 $5x + 2y = 3$ and $2x + 3y = 2$? Write the necessary steps. 6

OR

- (P) Explain working of OP-AMP as logarithmic amplifier. 6
- (Q) Explain how OP-AMP is used as damped harmonic oscillator. Write the necessary steps. 6

EITHER

7. (A) Describe the action of R-2R ladder type D/A converter with suitable diagram. 6
- (B) Explain the sample and hold circuits. 6

OR

- (P) Explain principle, construction and working of counter type A/D converter with suitable diagram. 6
- (Q) Explain the working of single slope A/D convertor. 6

