Seat No. : _____

AC2-08

April - 2018

B.Sc., Sem.-VI

CC-309 : Electronics

Time : 3 Hours] **[Max. Marks : 70**

Instructions : (1) Symbols carry their usual meaning.

(2) Numbers on the right indicate marks.

1. (a) What is an optical fiber ? What are the advantages of using an optical fiber instead of a copper wire ? 7

OR

Explain total internal reflection with proper diagrams. What is Fresnel reflection and how can it be calculated ?

(b) What is the wavelength of visible light and the range of wavelength of light used for optical communication ? Also, explain absorption, luminescence, and scattering of light. 7

OR

Explain Snell's law. What is the critical angle for a ray passing from a medium with R.I. = 1.5 to a medium with R.I. = 1.46 ? Also, draw the propagation of a light ray in a fiber.

2. (a) Draw the block diagram of a super heterodyne receiver and explain its working. 7

OR

Explain the operation of a diode detector. Also, describe the principles of AGC.

(b) What are frequency tracking errors ? How can they be kept minimum ? 7

OR

In a broadcast super heterodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit (at the input to the mixer) is 100. If the intermediate frequency is 455 kHz, calculate (i) the image frequency and its rejection ratio at 1000 kHz, (ii) the image frequency and the rejection ratio at 25 MHz.

3. (a) Draw the block diagram of a basic monochrome TV system. Also, explain how the structural content, tonal content, kinematic content and sound can be reproduced faithfully in a television system. **10**

OR

With the help of the circuit diagram of a simple matrix, show how the I, Q and Y signals are generated in a colour TV transmitter.

(b) Explain how horizontal scanning takes place in a TV system. 4

OR

Explain how video bandwidth requirement is estimated.

4. (a) Explain the difference between analog and digital signals. 7

OR

Describe the cross-talk and give some ways of reducing its effect.

(b) How is the bandwidth of a data transmission system determined ? 7

OR

Write a note on parity-check codes.

5. Answer the following questions in a sentence or two : **14**

(1) Write an equation relating the energy of a photon and frequency.

(2) What is scattering of light ?

(3) What is critical angle ?

(4) What is image frequency ?

(5) What is the advantage of using an RF amplifier in a radio receiver ?

(6) Define : Sensitivity of a radio receiver.

(7) Define conversion transconductance.

(8) What is aspect ratio ?

(9) What is intercarrier frequency ?

(10) Which type of modulation is used in the sound system of a television ?

(11) What is the fullform of PAL ?

(12) Which is the code usually used in punched cards ?

(13) What is the fullform of ASCII ?

(14) Define transmission efficiency of a transmission system.