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BICS-034

DIPLOMA – VIEP – COMPUTER SCIENCE AND ENGINEERING (DCSVI)

Term-End Examination

00781

June, 2014

BICS-034 : PRINCIPLES OF COMMUNICATION ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any* ***five*** *questions. Question no.* ***1*** *is* ***compulsory****. All questions carry equal marks.*

1. Choose the correct answer :

(a) The ratio of the total power in AM wave to the unmodulated carrier is given by 2

(i) $\frac{P_t}{P_c} = 1 + M^2$

(ii) $\frac{P_t}{P_c} = 1 + \frac{M^2}{4}$

(iii) $\frac{P_t}{P_c} = 1 + \frac{M^2}{2}$

(iv) None of the above

(b) De-emphasis circuit is used 2

(i) prior to modulation.

(ii) after modulation.

(iii) prior to detection.

(iv) after detection.

(c) The type of modulation used for sound in TV transmission is 2

(i) AM

(ii) FM

(iii) PCM

(iv) PWM

(d) Fidelity of a radio receiver depends on 2

(i) RF amplifier

(ii) IF amplifier

(iii) Audio amplifier

(iv) Detector

(e) Characteristic impedance of free space is given by 2

(i) $Z_0 = \sqrt{\frac{\mu_0}{\varepsilon_0}}$

(ii) $Z_0 = \sqrt{\mu_0 \varepsilon_0}$

(iii) $Z_0 = \sqrt{\frac{1}{\mu_0 \varepsilon_0}}$

(iv) $Z_0 = \sqrt{\frac{\varepsilon_0}{\mu_0}}$

(f) The complex Poynting vector is *2*

(i) $\vec{E} \times \vec{H}$

(ii) $(\vec{E} \times \vec{H}) / 2$

(iii) $\text{Re}\,(\vec{E} \times \vec{H}) / 2$

(iv) None of the above

(g) The VSWR of an infinite line is *2*

(i) zero

(ii) maximum

(iii) infinity

(iv) one

2. (a) What is the wavelength of the sinusoidal signal of frequency 5 kHz ? *4*

(b) Explain how impedance matching can be done by single stub matching. *6*

(c) What is the characteristic impedance of the transmission line of inductance 1·119 μH/m and capacitance 12·3 PF/m ? *4*

3. (a) With the help of a block diagram explain the superheterodyne receiver and its working with waveforms. *10*

(b) Explain the need of AGC. *4*

4. (a) Discuss the concept of pre-emphasis and de-emphasis. *8*

(b) Define modulation index of both AM and FM. *6*

5. (a) What do you mean by modulation ? Explain briefly the need for modulation. *7*

(b) In an FM system, when the frequency is 1 kHz and AF voltage is 2 V, the deviation is 4 kHz. If the AF voltage is now increased to 6 V, what is the new deviation ? *7*

6. (a) Define polarization, bandwidth, beamwidth and antenna gain. *8*

(b) Draw the radiation pattern of telescopic antenna and mention its application. *6*

7. (a) Explain the ground wave propagation. Explain the term maximum usable frequency and critical frequency. *8*

(b) A long distance microwave line consists of a chain of repeaters at 40 km intervals. What must be the minimum height of transmitting and receiving antennas above ground level (given that they are identical) to ensure line of sight conditions ? *6*

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Dish antenna

(b) Duct Propagation

(c) The Electromagnetic spectrum

(d) Slope detection

(e) Quarter wave transformer

(f) FM transmitter