

**DIPLOMA - IN - COMPUTER SCIENCE AND
ENGINEERING**

Term-End Examination

June, 2012

**BICS-034 : PRINCIPLES OF COMMUNICATION
ENGINEERING**

Time : 2 hours

Maximum Marks : 70

Note : (i) Use of scientific calculator is permitted.

*(ii) Attempt **any five** Question No. 1. is compulsory.*

1. (a) The modulation index of AM wave is changed from 0 to 1. The transmitted power is : **7x2=14**
- (i) Unchanged
 - (ii) Halved
 - (iii) Doubled
 - (iv) Increased by 50%
- (b) The transmission bandwidth is doubled in FM. The SNR is :
- (i) also doubled
 - (ii) improved four fold
 - (iii) decreased by $\frac{1}{4}$
 - (iv) un affected

(c) An FM signal with a modulation index m_f is passed through a frequency tripler the wave in the output of the tripler will have a modulation index of :

- (i) $m_f/3$ (ii) m_f
(iii) $3 m_f$ (iv) $9 m_f$

(d) Velocity of em wave in free space is defined as :

- (i) $\sqrt{\frac{\epsilon_0}{\mu_0}}$ (ii) $\sqrt{\frac{\mu_0}{\epsilon_0}}$
(iii) $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$ (iv) $\frac{\mu_0}{\epsilon_0}$

(e) For free space :

- (i) $\sigma = \infty$ (ii) $\sigma = 0$
(iii) $J \neq 0$ (iv) none of these

(f) The highest modulating frequency used in AM broadcast system is :

- (i) 10 KHz (ii) 15 KHz
(iii) 5 KHz (iv) 2 MHz

(g) Poynting vector gives :

- (i) rate of energy flow
(ii) direction of polarization
(iii) electric field
(iv) magnetic field

2. (a) Mention the different types of AM and also explain the advantage of FM over AM. $7+7=14$
- (b) Determine the percentage of power saving when the carrier wave and one of the side bands are suppressed in an AM wave modulated to a depth of : (i) 100% (ii) 50%
3. (a) Draw the block diagram of superheterodyne receiver and explain the function of each block. $10+4=14$
- (b) Distinguish between simple AGC and delayed AGC.
4. (a) What do you mean by impedance matching in transmission line ? Explain the quarter wave impedance inverting transformer. $7+7=14$
- (b) A lossless transmission line of 200 ohms characteristic impedance is connected to a load of 300 ohms determine the voltage reflection coefficient and standing wave ratio .
5. (a) Explain the block diagram and operation of PLL with vector diagram. $10+4=14$
- (b) The resonant frequency of RF amplifier of a receiver is 1 MHz and its bandwidth is 10 KHz. What will be the quality factor Q ?

6. (a) What are the ground wave propagation ? Explain the term skip distance, MUF. $8+3+3=14$
- (b) What is the critical frequency for reflection at vertical incidence, if the maximum value of electron density is $2.58 \times 10^6 \text{ cm}^{-3}$?
7. What is the half wave dipole ? How is it formed ? What are the voltage and current pattern of half wavelength dipole ? Explain with the help of mathematical expressions. $5+2+7=14$
8. Write short notes on *any four* : $3\frac{1}{2} \times 4 = 14$
- (a) Deviation ratio
 - (b) Power density
 - (c) VSWR
 - (d) Polarization
 - (e) Beam width
 - (f) Selectivity
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