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Total number of printed pages – 2

B. Tech
CPEC 5308

Sixth Semester (Special) Examination – 2013
COMMUNICATION ENGINEERING

BRANCH : CSE, IT

QUESTION CODE : E 366

Full Marks – 70

Time : 3 Hours

*Answer Question No. 1 which is compulsory and any **five** from the rest.*

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10
- (a) Find the fundamental frequency of the mixed signal given below :
 $18 \sin(300 \pi t) + 9 \cos(60 \pi t) - 12 \cos(100 \pi t)$
- (b) How FM signal can be generated from PM signal ?
- (c) How many AM broadcast station can be accommodated in 100 KHz bandwidth if the highest frequency component in the baseband signal is 5KHz ?
- (d) State sampling theorem used to obtain digital signal from analog signal.
- (e) What do you mean by companding ? Define compander.
- (f) What do you mean by noise bandwidth ? What is noise bandwidth of a low pass RC filter ?
- (g) Draw the NRZ and RZ code for the digital data 10110111.
- (h) A satellite channel has 30 MHz bandwidth. How many voice channels can be accommodated in the carrier if FM modulation is used and bandwidth used is five times the baseband bandwidth ?
- (i) How diversity is helpful in cellular communication system ?
- (j) At what distance from the dipole is the induction field equal to the radiation field ? Justify.
2. (a) What is the need of modulation in a Communication System ? 5
- (b) In an AM system, the modulating signal is a sinusoid with frequency f_m Hz. If 80% modulation is used, then find the ratio of total sideband power in the modulation signal to the total power. Derive the necessary formulae you have used. 5

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3. (a) Derive the expression for power radiated and find the radiation resistance of a half wave dipole. 5
- (b) Compare between LED and LASER optical source. 5
4. (a) Discuss different handoff strategies used in modern cellular communication system. 6
- (b) What is frequency division multiplexing (FDM) ? Write few application of using FDM. 4
5. (a) What is meant by geostationary orbit ? How do geostationary and geosynchronous orbit differ ? State how many number of above orbits are possible. 5
- (b) Explain Pre-emphasis and De-emphasis circuits in communication system. Explain its importance. 5
6. (a) What are the sources of error in PCM system ? Derive an expression of SNR in PCM system. What is its significance ? 5
- (b) By drawing block diagram, show how a narrow band FM signal may be generated ? 5
7. (a) What is noise ? Explain different sources of noises present in communication system. 5
- (b) Explain the functional description of electrical communication system in detail. 5
8. Write short Notes on any **two** of the following : 5×2
 - (a) Time Division Multiplexing (TDM)
 - (b) Line of Sight Propagation of Microwave Signal
 - (c) FM Discriminator
 - (d) Noise Figure.

