

Time: 3 Hours

DECEMBER 2012

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 Minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. Indicate which of the following systems is digital:

- | | |
|-------------------------------|--------------------------------|
| (A) Pulse Position modulation | (B) Pulse Code modulation |
| (C) Pulse Width modulation | (D) Pulse Frequency modulation |

b. Ideal value of VSWR is

- | | |
|--------------|---------------------|
| (A) 0 | (B) 1 |
| (C) infinite | (D) Between 0 and 1 |

c. Space noise frequency range is

- | | |
|--------------------------|----------------------|
| (A) 8 MHz to 1.43 GHz | (B) 2 MHz to 8 MHz |
| (C) 0.43 MHz to 1.43 GHz | (D) 1 GHz to 2.2 GHz |

d. It is required to match a 200Ω load to a 300Ω transmission line, to reduce the SWR along the line to 1. _____ Characteristic impedance of quarter wave Transformer used for this purpose.

- | | |
|--------------------------------|--------------------------------|
| (A) 245Ω | (B) 0Ω |
| (C) $\sqrt{\frac{3}{2}}\Omega$ | (D) $\sqrt{\frac{2}{3}}\Omega$ |

e. Submarine Cables use the principle very much like those of

- | | |
|---------|--------------------|
| (A) PCM | (B) TDM |
| (C) FDM | (D) Coaxial Cables |

f. A carrier of 100W is modulated for the depth of 50%. The total transmitted Power is:

- | | |
|------------|----------|
| (A) 112.5W | (B) 125W |
| (C) 150W | (D) 100W |

Code: AE65

Subject: ANALOG COMMUNICATIONS

- g. For separate channel in an FDM receiver it is necessary to use:
- (A) Band Pass Filter (B) Low Pass Filter
(C) Up-Converter (D) Band Stop Filter
- h. The SSB-SC is used for the following application
- (A) Radio Broadcasting (B) Point to point communication
(C) Telegraphy and Telephony (D) TV transmitter
- i. The output of an Ideal balance modulator is :
- (A) DSB Signal (B) SSB Signal
(C) SSB-SC Signal (D) FM Signal
- j. The generation of FM using phase modulator is called
- (A) Indirect Frequency modulation (B) Directed FM
(C) AM (D) PAM

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

- Q.2** a. An amplifier operating over the frequency range from 18 to 20 MHz has a 10 K ohm ($10k\Omega$) input resistor. What is the rms noise voltage at the input to the amplifier. If the ambient temperature is 27°C . (6)
- b. Define Signal to noise ratio and noise figure of a receiver. (4)
- c. Draw and explain the block diagram of Communication System. (6)
- Q.3** a. Calculate the percentage Power saving when the Carrier and one of the sidebands are suppressed in an AM Wave modulated to a depth of
(i) 100 percent
(ii) 50 percent (6)
- b. Explain the phase shift method of generation of SSB modulated wave. (4)
- c. Draw the circuit diagram of Grid-modulated class C amplifier used in AM generation. (6)
- Q.4** a. In an FM system, when the Audio Frequency (AF) is 500 Hz and the AF voltage is 2.4V, the maximum frequency deviation is 4.8KHz. If the AF voltage is now increased to 7.2V, what is the new frequency deviation? If the AF voltage is raised to 10V while the AF is dropped to 200 Hz. What is the frequency deviation? Find the modulation index in each case. (8)
- b. What is Pre-emphasis? Why is it used? Sketch a typical pre-emphasis circuit and explain why de-emphasis must be used in FM. (8)

- Q.5** a. Explain the following with respect to Radio Receiver. (8)
(i) Mixer
(ii) Sensitivity
(iii) Selectivity
(iv) AGC
- b. Explain in brief, the factors must be considered while selecting the Intermediate frequency in radio receiver. What is the value of IF chosen in India for radio broadcasting? (8)
- Q.6** a. A coaxial cable, having an inner diameter of 0.025mm and using an insulator with a dielectric constant of 2.56, is to have a characteristic impedance of 2000Ω . What must be the outer conductor diameter? (8)
- b. Write short notes on:
(i) Losses in transmission line
(ii) Standing Wave Ratio (8)
- Q.7** a. With the aid of diagram, explain the operation of Isolators and Circulators. (8)
- b. A waveguide has an internal width a of 3 cm and carries the dominant mode of a signal of unknown frequency. If the characteristic wave impedance is 500Ω , what is this frequency? (8)
- Q.8** a. What are the advantages and applications of Pulse Code Modulation? (4)
- b. Define and describe Pulse Position Modulation and explain with Waveform how it is derived from PWM. (6)
- c. Calculate the capacity of a Standard 4 KHz telephone channel with a 32-dB signal to noise ratio. (6)
- Q.9** a. What is multiplexing? Why is it needed? What are its two basic forms? (4)
- b. Draw the block diagram of a microwave link repeater, indicating the function of each block. (8)
- c. Describe the method of laying a submarine cable. (4)