



SN – 394

V Semester B.Sc. Examination, November/December 2017
(Semester Scheme) (CBCS) (F + R)
(2016-17 and Onwards)
ELECTRONICS – V
EL-501 : Communication – I

Time : 3 Hours

Max. Marks : 70

Instructions : Answer all questions from Part – A, any five from Part – B and any four questions from Part – C.

Note : Answer all questions of Part – A in any one page, the same questions answered multiple times will not be considered for evaluation.

PART A

Answer all the sub-divisions :

(15×1=15)

1. i) Thermal noise is also known as
- | | |
|--------------------|----------------------|
| a) Johnson noise ✓ | b) Partition noise ✗ |
| c) Solar noise | d) Flicker noise ✓ |
- ii) Indicate the false statement. The SWR on a transmission line is infinity, the line is terminated in
- | | |
|----------------------|------------------------|
| a) a short circuit | b) a complex impedance |
| c) an open circuit ✓ | d) a pure reactance |
- iii) A transmission is distortion less in a T-line, if
- | | |
|--------------|--------------|
| a) $RL=1/GC$ | b) $RL=GC$ ✓ |
| c) $GL=RC$ ✗ | d) $RG=LC$ |
- iv) In a conventional AM broadcasting system, what is the maximum transmission efficiency of an AM signal ?
- | | |
|-------------|-----------|
| a) 64.44% | b) 56.66% |
| c) 33.33% ✓ | d) 75.55% |
- v) The modulation technique that uses the minimum channel bandwidth and lesser transmitted power is
- | | |
|-------------|-------------|
| a) FM | b) DSB-SC |
| c) DSB-FC ✗ | d) SSB-SC ✓ |

P.T.O.



- vi) Amplitude limiter in FM receivers are used to
- a) Remove amplitude variations due to noise ✓
 - b) Filtration
 - c) Demodulation
 - d) Amplification
- vii) The standard value for Intermediate Frequency (IF) in AM receivers is
- a) 455 KHz ✓
 - b) 580 KHz
 - c) 10.7 MHz
 - d) 50 MHz
- viii) Sensitivity is defined as
- a) Ability to receiver to amplify weak signals ✓
 - b) Ability to reject unwanted signals
 - c) Ability to convert incoming signal into Image frequency ✓
 - d) Ability to reject noise ✓
- ix) The image frequency of a superheterodyne receiver
- a) is created within the transmitter ✓
 - b) is due to insufficient adjacent channel rejection
 - c) is not rejected by the IF tuned circuits
 - d) is independent of the frequency to which the receiver is tuned ✓
- x) Which of the statement is not true for non-resonant antenna ?
- a) It is open-circuited at the far end ✓
 - b) It has no standing wave pattern
 - c) Antenna has maximum directive gain ✓
 - d) Its radiation pattern is unidirectional
- xi) Electrical length of an antenna is
- a) equal to its physical length
 - b) smaller than its physical length
 - c) greater than its physical length
 - d) any of the above ✓
- xii) Smaller the beam width angle
- a) smaller the directivity
 - b) higher the directivity ✓
 - c) higher the power gain
 - d) directivity is zero
- xiii) In European TV system, Field frequency is
- a) 50 fields/sec
 - b) 30 fields/sec ✓
 - c) 75 fields/sec
 - d) 90 fields/sec



- xiv) Identify the standard aspect ratio in PAL TV system
 - a) 5 : 2
 - b) 2 : 3
 - c) 4 : 3
 - d) 5 : 9
- xv) Interlaced scanning is used, in order to
 - a) increase the brightness of image
 - b) decrease the brightness of image
 - c) avoid flickering of image
 - d) increase the contrast in the image

PART - B

Answer any five questions :

(5x7=35)

- 2. a) Define :
 - i) Signal to Noise ratio.
 - ii) Noise Figure.b) Explain the propagation of electromagnetic waves as ground waves. (2+5)
- 3. a) Define frequency modulation. Draw relevant waveform.
b) Derive an expression for the instantaneous voltage of an AM signal. (2+5)
- 4. a) Mention the advantages of FM over AM.
b) Draw the block diagram of FM transmitter and explain the function of each block. (2+5)
- 5. Draw the circuit diagram of a slope detector and explain its working by drawing waveforms at each stage. 7
- 6. a) Draw the block diagram of AM superheterodyne receiver and explain the function of each block.
b) Define the terms 'Sensitivity and Fidelity' with respect to a radio receiver. (5+2)
- 7. a) Define :
 - i) Directive gain.
 - ii) Power gain with respect to an antenna.b) Derive an expression for the total power radiated by an antenna. (2+5)
- 8. a) Explain the effects of grounded antennas.
b) What are blanking and synchronizing pulses in TV system ? (3+4)
- 9. a) Draw the schematic diagram of a Videocon camera tube and explain its working.
b) Write a note on concept of CCTV. (5+2)



PART - C

Answer **any four** questions.

(4×5=20)

10. A transmission line has a characteristic impedance of $300\ \Omega$. Calculate the reflection coefficient and VSWR when the line is terminated by (a) $600\ \Omega$ resistor and (b) $400\ \Omega$ resistor.
11. A Sinusoidal carrier frequency of $1.2\ \text{MHz}$ is amplitude modulated by a sinusoidal voltage of frequency $20\ \text{KHz}$ resulting in maximum and minimum modulated carrier amplitude of $110\ \text{V}$ and $90\ \text{V}$ respectively. Calculate :
- Frequency of lower and upper side bands.
 - Unmodulated carrier amplitude.
 - Modulation index.
 - Amplitude of each side band.
12. The equation for an FM wave is given by
 $V_{\text{FM}} = 10 \sin [3.14 \times 10^8 t + 5 \sin (6.28 \times 10^3 t)]$ volts.
Calculate :
- Carrier frequency
 - Modulation frequency
 - Modulation index
 - Frequency deviation.
13. Draw the block diagram of FM superheterodyne receiver and explain the function of each block.
14. Find the radiation resistance of a dipole antenna $\lambda/6$ long, also find the antenna efficiency if the ohmic loss resistance of the dipole antenna is $2\ \Omega$.
15. In a colour TV system the signal voltages corresponding to the three primary colours are given as green = $3\ \text{mV}$, blue = $2\ \text{mV}$ and red = $1\ \text{mV}$. What are the voltages corresponding to Y, I and Q signals ?