



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 : (15x1=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

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- 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
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- 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 : (5×7=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.**(4x5=20)**

10. A transmission line has a characteristic impedance of 300Ω . Calculate the reflection coefficient and VSWR when the line is terminated by (a) 600Ω resistor and (b) 400Ω resistor.
 11. A Sinusoidal carrier frequency of 1.2 MHz is amplitude modulated by a sinusoidal voltage of frequency 20 KHz resulting in maximum and minimum modulated carrier amplitude of 110 V and 90 V respectively. Calculate :
 - i) Frequency of lower and upper side bands.
 - ii) Unmodulated carrier amplitude.
 - iii) Modulation index.
 - iv) Amplitude of each side band.
 12. The equation for an FM wave is given by
 $V_{FM} = 10 \sin [3.14 \times 10^8 t + 5 \sin (6.28 \times 10^3 t)]$ volts.
Calculate :
 - i) Carrier frequency
 - ii) Modulation frequency
 - iii) Modulation index
 - iv) 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 2Ω .
 15. In a colour TV system the signal voltages corresponding to the three primary colours are given as green = 3 mV, blue = 2 mV and red = 1mV. What are the voltages corresponding to Y, I and Q signals ?
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