



V Semester B.Sc. Examination, November/December 2018
(Semester Scheme) (F + R) (CBCS)
(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-questions.

(15x1= 15)

1. i) Atmospheric noise is a form of

- a) Internal noise
c) Johnson noise

- b) External noise
d) Shot noise

ii) Noise figure is defined as

a) $\frac{\text{input } \frac{S}{N}}{\text{output } \frac{S}{N}}$

b) $\frac{\text{output } \frac{S}{N}}{\text{input } \frac{S}{N}}$

c) $\frac{\text{Signal voltage}}{\text{Noise voltage}}$

d) $\frac{\text{Noise voltage}}{\text{Signal voltage}}$

iii) An AM wave has _____ side bands.

a) 1

b) 3

c) 2

d) 0

P.T.O.



- iv) The modulation index of an AM wave is changed from 0 to 1. The transmitted power is
- a) Doubled
 - b) Unchanged
 - c) Halved
 - d) Increased by 50%
- v) The bandwidth of FM depends on
- a) Modulating frequency
 - b) Modulation index
 - c) Frequency deviation
 - d) All the above
- vi) In varactor diode modulator, varactor diode is
- a) Forward biased
 - b) No bias applied
 - c) Reverse biased
 - d) None of the above
- vii) The correct sequence of FM detection after converting it to AM is
- a) Rectification, eliminating the carrier, by passing dc voltage
 - b) Eliminating the carrier, rectification, by passing dc voltage
 - c) By passing dc voltage, rectification, eliminating the carrier
 - d) Rectification, by passing dc voltage, eliminating the carrier
- viii) In a radio receiver with simple AGC
- a) Local oscillator is controlled by AGC
 - b) The received signal strength is maintained constant
 - c) Detector gain is controlled by AGC
 - d) Will help in selecting the channel
- ix) The image frequency rejection depends on
- a) Selectivity
 - b) Sensitivity
 - c) Stability
 - d) Receiver
- x) In slope detector output amplitude depends on
- a) Amplitude of the input signal
 - b) Frequency deviation of the input signal
 - c) Frequency of the input signal
 - d) None of the above
- xi) Which network reduces the amplitude of high frequency audio signal ?
- a) Pre-emphasis
 - b) De-emphasis
 - c) Discriminator
 - d) Noise less amplifier
- xii) Non-resonating Antenna is
- a) Bidirectional
 - b) Isotropic
 - c) Will not work as antenna
 - d) Unidirectional
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- xiii) The main application of loop antenna is in
 - a) Transmitter of VHF
 - b) To receiving signal in the direction of the plane.
 - c) Receiver of SHF
 - d) Direction finding
- xiv) In vidicon camera tube photo layer has
 - a) Resistance change is not affected by light
 - b) Low resistance when no light falls on it
 - c) High resistance when no light falls on it
 - d) Constant resistance which is independent of light
- xv) In American system TV channel bandwidth is
 - a) 7 MHz
 - b) 6 MHz
 - c) 4.2 MHz
 - d) 5 MHz

PART - B

Answer **any five** questions.

(5×7=35)

- 2. What is transmission line ? Mention its primary and secondary constants and also draw its equivalent circuit at low and high frequencies.
- 3. a) Mention different layers in ionosphere with their existence period in a day.
b) Explain the block diagram of electronic communication system. (3+4)
- 4. a) Define frequency deviation and carrier swing relating to frequency modulation.
b) Draw and explain the block diagram of AM transmitter. (2+5)
- 5. a) Compare AM with FM
b) Define sensitivity, stability and fidelity of a radio receiver. (4+3)
- 6. a) What is image frequency ? Write its equation.
b) Explain the working of linear diode detector with circuit diagram and waveforms at different stages. (2+5)
- 7. Write the principle of superheterodyne receiver and explain the block diagram of FM superheterodyne receiver.



8. Define the following Antenna parameters antenna gain, directive gain, power gain, bandwidth, beam width, polarization and efficiency.
9. Explain the block diagram of Monochrome TV receiver.

PART – C

Answer any four questions.

(4×5=20)

10. Calculate the noise voltage at the input of a television RF amplifier using a device that has a 200Ω equivalent noise resistance and a 300Ω input resistor. The bandwidth of the amplifier is 6 MHz and temperature is 17°C . If the bandwidth is 7 MHz and temperature is 25°C , find new noise voltage for the same setup.
11. A FM wave is represented by $V_{\text{FM}} = 20 \sin [5.5264 \times 10^8 t + 9 \sin 94.2 \times 10^3 t]$. Calculate
 - i) Carrier frequency.
 - ii) Modulating frequency.
 - iii) Frequency deviation.
 - iv) Carrier swing.
12. Draw the radiation pattern and current distribution for an Antenna of length.
 - i) $\lambda/2$
 - ii) λ and
 - iii) $3\lambda/2$
13. An Antenna of length 181 mm has an rms current of 5A flowing through it. If the frequency of the signal is 500 MHz, calculate
 - i) Radiation resistance
 - ii) Total power radiated
 - iii) Efficiency of the Antenna if the loss resistance is 12Ω .
14. Calculate the horizontal and vertical scanning frequencies of interlaced scanning in the following TV standards
 - i) 625 lines per frame and 25 frames per second
 - ii) 525 lines per frame and 30 frames per second.
15. In a colour TV system the signal voltages corresponding to the three primary RGB colours are given as 3mV, 2mV and 1mV respectively. Calculate voltage corresponding to Y, I and Q signals.