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V Semester B.Sc. Degree Examination, March/April - 2023

ELECTRONICS

Communication - I

(CBCS Semester Scheme 2019, 2022-23 and Onwards)

Paper: V (EL-501T)



Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

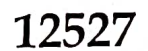
Answer **all** the questions from **Part-A**, any **FIVE** questions from **Part-B** and any **FOUR** questions from **Part-C**.

Note: It is required to answer all the questions of Part-A in any one page and to be answered only once. In this Part, answering the same question multiple times will not be considered for evaluation.

PART- A**Answer all the subdivisions.****(15×1=15)**

1. i) Low frequency noise is
 - a) Transit time noise
 - b) Flicker noise
 - c) Shot noise
 - d) None of the above
- ii) When the load is perfectly matched to the transmission-line characteristic impedance
 - a) Only forward waves are present
 - b) Only backward waves are present
 - c) Both forward and backward waves
 - d) None of these
- iii) In AM, the maximum frequency of audio signal _____
 - a) 5KHz
 - b) 10KHz
 - c) 15KHz
 - d) 20KHz

[P.T.O.]



- iv) In AM useful power is carrier by _____
 - a) Carrier
 - b) Sidebands
 - c) Both sidebands and carrier
 - d) None of these
- v) The number of sidebands present in the frequency spectrum of FM signal depends on
 - a) Modulation index
 - b) Carrier swing
 - c) Frequency deviation
 - d) Modulating frequency
- vi) The maximum frequency deviation allowed in FM system is
 - a) 100 KHz
 - b) 75 KHz
 - c) 25 KHz
 - d) 50 KHz
- vii) RF stage is essential in radio receivers to provide
 - a) High image frequency rejection
 - b) High rejection of adjacent unwanted signals
 - c) High signal to noise ratio
 - d) All of the above
- viii) Which network reduces the amplitude of high frequency audio signal?
 - a) Pre-emphasis
 - b) Discriminator
 - c) De-emphasis
 - d) Noiseless amplifier
- ix) In FM receivers, the amplitude limiter is used to
 - a) Remove amplitude variations due to noise
 - b) Filtration
 - c) Demodulation
 - d) Amplification
- x) In a SHD receiver, $f_i = 455$ kHz and the signal frequency $f_s = 1200$ kHz. The image frequency is
 - a) 910 kHz
 - b) 990 kHz
 - c) 2110 kHz
 - d) 1650 kHz



- xi) Antenna bandwidth is defined as
- antenna length divided by the number of elements
 - the angle between the half-power radiation points
 - the angle formed between two imaginary lines drawn through
 - the frequency range over which an antenna can be expected to operate satisfactorily
- xii) Helical antenna uses _____ polarization.
- Horizontal
 - Elliptical
 - Circular
 - Vertical
- xiii) The total length of a folded dipole antenna is _____
- Quarter wavelength
 - Half wavelength
 - Several wavelengths
 - None of these
- xiv) In Monochrome TV, interlaced scanning is used to
- Reduce flicker
 - Brighten the TV picture
 - Sharpen picture outline
 - Increase channel bandwidth
- xv) In colour TV system, the combination of green and blue yields in
- Cyan
 - Red
 - Magenta
 - Yellow

PART - B**Answer any FIVE questions.****(5 × 7 = 35)**

2.
 - Draw the equivalent circuit of a transmission line at radio frequencies.
 - Explain the propagation of electromagnetic waves as ground waves. **(2+5)**
3.
 - Define characteristic impedance and propagation constant of a transmission line.
 - Derive an expression for the instantaneous voltage of an AM wave. **(2+5)**
4.
 - Define carrier swing and frequency deviation of FM wave.
 - With a block diagram, explain FM transmitter. **(2+5)**



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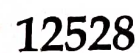
5. With a block diagram and relevant waveforms, explain AM SHD radio receiver.
6. a) Explain the working of balanced slope FM detector.
b) Define
 - i) Fidelity
 - ii) Selectivity with respect to radio receiver. (5+2)
7. a) Compare resonant and non-resonant antennas.
b) Draw the radiation pattern of resonant antenna for length $L = \lambda/2$, $L = \lambda$ and $L = 3\lambda/2$. (4+3)
8. a) Derive an expression for the total power radiated by an hertzian dipole antenna.
b) Mention the advantages of CC TV (5+2)
9. a) With a block diagram, explain monochrome TV transmitter.
b) Explain the basic principle of colour TV. (5 +2)

PART - C

Answer any FOUR questions

(4 × 5 =20)

10. RF amplifier is having an input resistor of $8K\Omega$ maintained at ambient temperature of 17°C and works in the frequency range of 12 to 15 MHz. Calculate the thermal noise voltage. What happens to the noise voltage, if the ambient temperature is changed to 27°C ?
11. The total power contents of an AM wave is 1500W for 100% modulation. Determine
 - i) power of the carrier
 - ii) power of lower side band.
12. In FM, when the amplitude and frequency of modulating signal are 5V and 10 kHz the frequency deviation is found to be 25 kHz. Calculate the modulation index. If the amplitude of the modulating signal is increased to 10V by halving its frequency, what happens to the frequency deviation? Calculate the modified values of deviation and the modulation index.
13. With a circuit diagram and relevant waveforms, explain linear diode AM detector.
14. A horizontal wire antenna of length 100cm has a current of 10A flowing through it. If the frequency of the signal is 100 MHz, calculate
 - a) radiation resistance
 - b) radiation efficiency and
 - c) total power radiated, if the loss resistance of the antenna is 10Ω .
15. Calculate the horizontal and vertical frequencies of interlaced scanning in the following systems.
 - a) 525 lines per frame and 60 fields per second
 - b) 625 lines per frame and 25 pictures second
 - c) 405 lines and 50 fields per second.



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Paper - VI EL - 502T

Maximum Marks : 70

[P.T.O.]



- iv) After the execution of RET instruction of a subroutine, the control retrieves main program address from the:
- a) Accumulator b) Stack
 - c) PC d) DE pair
- v) The Stack pointer is an
- a) 8 - bit register b) 16 -bit register
 - c) 4 - bit register d) 32 - bit register
- vi) Name the addressing mode for the instruction ADI 82h.
- a) Direct b) Register
 - c) Register Indirect d) Immediate
- vii) The operation performed by the microprocessor, if the status signals $S_0=S_1=1$,
- a) Read b) Write
 - c) Fetch d) Halt
- viii) Which interrupt has the lowest priority?
- a) INTR b) TRAP
 - c) RST 6.5 d) RST 7.5
- ix) Accuracy of an instrument is defined as
- a) Closeness of output to the true value
 - b) Change in output for every change in input
 - c) Degree of freedom from random errors
 - d) Both (a) and (b)



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- x) The temperature coefficient of Thermistor is _____
- a) Negative b) Positive
c) Zero d) Both a and b
- xi) Loud Speaker is used
- a) To convert electric energy into sound energy.
b) To convert mechanical energy into electrical energy
c) To convert sound energy into electric energy
d) None of the above
- xii) Bioelectric potentials are generated at
- a) Neurons b) Blood
c) Cellular level d) None of these
- xiii) When a cell is depolarized its potential will be approximately
- a) +90mV b) -90mV
c) -20mV d) +20mV
- xiv) The material used in limb electrode is
- a) German Silver b) Nickel Silver
c) Nickel Plated steel d) All
- xv) Electrodes to measure EEG are placed on
- a) Scalp b) Chest
c) Ears d) Cheek

[P.T.O.]



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PART - B

Answer any FIVE questions.

(5×7=35)

2. Draw and explain the functional pin diagram of 8085 microprocessors.
3. Explain with examples addressing modes of 8085 microprocessors.
4. Explain stack and subroutine operations in microprocessor.
5.
 - a) Define T-state and Instruction cycle.
 - b) Draw the timing diagram of memory read machine cycle of 8085 μ P.
6. Explain the various interrupts of 8085 microprocessors and mention their priority.
7.
 - a) What are the various modes of operation of 8255PPI.
 - b) Explain the construction and working of LVDT.
8.
 - a) Define the following terms with respect to measurement systems:
 - i) sensitivity
 - ii) resolution
 - iii) precision.
 - b) Explain active and passive transducer with an example for each.
9. Draw and explain the block diagram of EEG.

PART-C

Answer any FOUR questions.

(4×5=20)

10. Explain the following instructions (5)
 - i) LDAXD
 - ii) RAL
 - iii) DADD
 - iv) SPHL
 - v) CMP B
 11. Write an assembly language program to add ten 8-bit BCD numbers.
 12. Write an assembly language program to verify the truth tables of NAND and NOR gates.
 13. Calculate the time delay for the following program with 3MHz clock.

LABEL	INSTRUCTION	T-STATE
	LXI H,0123h	10
REPEAT:	DCX H	6
	MOVA, L	4
	ORAH	4
	JNZ REPEAT	10
 14. The expected value of the current to be measured is 500mA. However the measurement gives the value of 498mA. Calculate the relative accuracy, percentage accuracy and error.
 15. Draw and explain the labeled block diagram of ECG.
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