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M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2017
Electronic Science
SEMICONDUCTOR DEVICES

Day & Date: Thursday, 16-11-2017
 Time: 10.30 AM to 01.00 PM

Max. Marks: 70

- Instructions:** 1) Q. (1) and (2) are compulsory.
 2) Answer any three questions from Q.3 to Q.7.
 3) All questions carry equal marks.
 4) Use of nonprogrammable calculator is allowed.

Q.1 A) Choose the alternatives given below.

06

- 1) _____ lattice structure is called zinc blende structure.
 - a) Simple cubic
 - b) Body centered cubic
 - c) Face centered cubic
 - d) Diamond
- 2) Which is the compound or element not used in LEDs?
 - a) CaO
 - b) GaP
 - c) GaAs
 - d) All of the above
- 3) Band gap of silicon is _____ at room temperature ($T=300K$).
 - a) 0.67eV
 - b) 1.1eV
 - c) 2.42eV
 - d) 5eV
- 4) Density-of-states effective mass of an electron in GaAs is _____.
 - a) $1.1m_0$
 - b) $0.067m_0$
 - c) $0.45m_0$
 - d) $0.98m_0$
- 5) _____ is voltage-variable capacitance of a reverse biased p-n junction.
 - a) Varactor diode
 - b) Tunnel diode
 - c) Zener diode
 - d) None of the above
- 6) Miller overlap capacitance is the capacitance between _____.
 - a) Gate and drain
 - b) Gate and shield
 - c) Gate and source
 - d) Source and shield

B) State True or false.

08

- 1) In an electronic grade Si, the levels of impurities are reduced to parts per billion or ppb.
- 2) The hot carrier effect implies that the carrier drift velocity is comparable to the thermal velocity.
- 3) An Ebers-Moll model is more accurate and can handle some second-order effects better than the Gummel-Poon charge control model.
- 4) The absorption of light by semiconductors gives rise to useful electron-hole pairs.
- 5) The electrical conductivity of semiconductor is not as high as metal but also not as poor as electrical insulator.
- 6) MOSFET is a current-controlled device.
- 7) Bipolar junction transistor (BJT) consists of an emitter-base (EB) diode connected back to back to a collector-base (CB) diode.
- 8) Total energy of a particle is the product of kinetic and potential energy.

- Q.2** a) Describe a Czochralski method for single crystal Si growth. **05**
b) Explain what is Heteroepitaxy and misfit dislocations? **05**
c) Distinguish between photo detectors and light emitting diodes. **04**
- Q.3** a) Discuss a Kronig-Penney model for one dimensional periodic potential. **10**
b) Discuss the inferences drawn from the E-k relationship. **04**
- Q.4** a) With a schematic band diagram, explain the carrier concentration at equilibrium for intrinsic, n-type and p-type semiconductors with the help of density of states and Fermi-Dirac distribution function. **10**
b) Distinguish between n-type and p-type semiconductors. **04**
- Q.5** a) An abrupt Si p-n junction has $N_a = 10^{18} \text{ cm}^{-3}$ on one side and $N_d = 5 \times 10^{15} \text{ cm}^{-3}$ on the other; i) Calculate the Fermi level position at 300K in the p and n regions. ii) Draw an equilibrium band diagram for the junction and determine the contact potential, V_0 . **08**
b) Discuss etching process in fabrication of p-n junctions. **06**
- Q.6** a) Explain in brief the GaAs MESFET and a high electron mobility transistor. **10**
b) Explain switching operation of BJT using neat diagram. **04**
- Q.7** a) Explain the quantum mechanical tunneling of electrons through a potential barrier in a tunnel diode. **10**
b) Write a note on solar cell. **04**

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M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2017
Electronic Science
NETWORK ANALYSIS AND SYNTHESIS

Day & Date: Saturday, 18-11-2017
 Time: 10.30 AM to 01.00 PM

Max. Marks: 70

- Instructions:** 1) Q. (1) and (2) are compulsory.
 2) Answer any three questions from Q.3 to Q.7.
 3) All questions carry equal marks.
 4) Use of nonprogrammable calculator is allowed.

Q.1 A) Choose the alternatives given below.

06

- 1) Superposition theorem is valid only for _____.
 a) Linear circuits
 b) Both linear and nonlinear
 c) Nonlinear circuits
 d) Complex circuits
- 2) KCL works on the principle of which of the following.
 a) Law of conservation of charge
 b) Law of conservation of energy
 c) Both a and b
 d) Law of conservation of voltage
- 3) A network has 4 nodes and 3 independent loops what is the number of branches in the network?
 a) 5
 b) 6
 c) 7
 d) 8
- 4) What is the total reactance of a series RLC circuit at resonance?
 a) Equal to X_L
 b) Equal to X_C
 c) Equal to R
 d) Zero
- 5) Laplace transform of the unit impulse function $\delta(t - a)$ is:
 a) e^{-as}
 b) e^{as}
 c) e^{-t}
 d) None of the above
- 6) If a two port network is passive, then we have with usual notations, the following relationship for symmetrical network is _____.
 a) $h_{12} = h_{21}$
 b) $h_{12} = -h_{21}$
 c) $h_{11} = h_{21}$
 d) $h_{11}h_{22} - h_{12}h_{21} = 1$

B) State True or false.

08

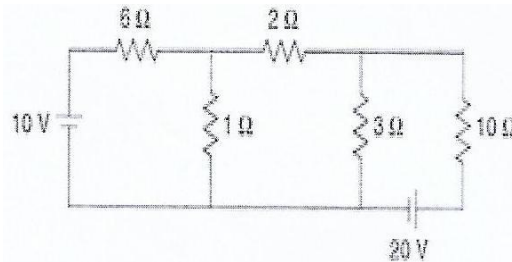
- 1) A polynomial is said to be Hurwitz if the roots of polynomials have real parts which are zero or negative.
- 2) In series circuit, the current flowing through all the resistances will be the same and equal to the total current.
- 3) The Laplace transform of unit step signal is one.
- 4) A node of a network is an equi-potential surface at which two or more circuit elements are joined.
- 5) The equity factor is defined as the ratio of the energy dissipated in one period to maximum energy stored.
- 6) For the maximum power transfer, the relation between Z_s and $Z_1 = Z_s^*$

- 7) Initial condition for a capacitor with voltage is short circuit. – T
- 8) For an RC driving –point impedance function, the poles and zeros should alternate on the real axis – F.

Q.2 Attempt the following.

- a) Explain time – shifting theorem in terms of laplace transform. **05**
- b) Explain initial conditions of network in a capacitor. **05**
- c) Compare: Series resonance and Parallel resonance. **04**

- Q.3 a) Explain the mesh analysis. Find the current through the 2Ω resistor of the network shown below. **10****

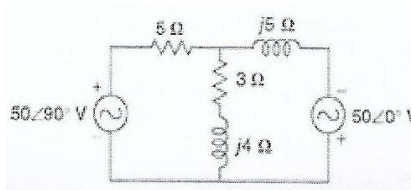


- b) Explain series combination of resistors and obtain an expression for voltage division and power in it. **04**

- Q.4 a) Derive an expression for resonant frequency of a tank circuit in parallel resonant circuit. **08****

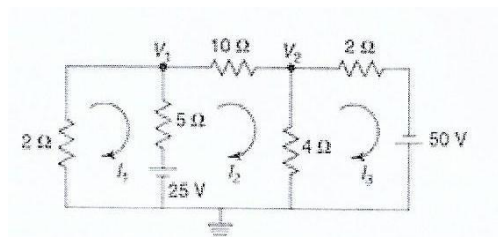
- b) Explain unit step and shifted unit step functions in brief. **06**

- Q.5 a) Find the current through $3 + j4$ impedance for the network below using superposition theorem. **10****

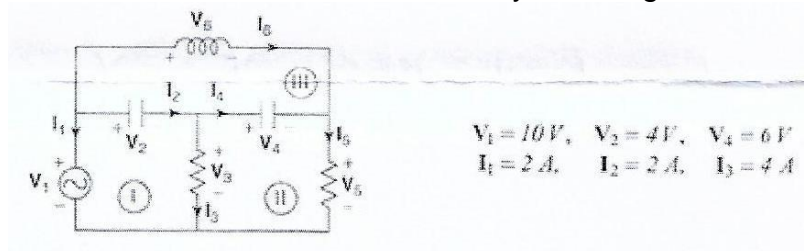


- b) Find the laplace transform of $e^{t-a}, t > a$ **04**

- Q.6 a) Using node voltage analysis, find the currents I_1, I_2, I_3 for the network shown below: **08****



- b) In the network shown below, check the validity of Tellegan’s theorem. **06**



$$V_1 = 10V, \quad V_2 = 4V, \quad V_4 = 6V$$

$$I_1 = 2A, \quad I_2 = 2A, \quad I_3 = 4A$$

- Q.7 a) Explain the properties of Hurwitz polynomial. Test whether the polynomial $P(s) = s^4 + 7s^3 + 6s^2 + 21s + 8$ Hurwitz using Routh-array method. **10****

- b) Mention the properties of positive real functions. **04**

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M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2017
Electronic Science
COMMUNICATION SYSTEM

Day & Date: Tuesday, 21-11-2017
 Time: 10.30 AM to 01.00 PM

Max. Marks: 70

- Instructions:** 1) Q.1 and Q.2 are compulsory.
 2) Attempt any three questions from Q. 3 to Q.7.
 3) All questions carry equal marks.
 4) Use of nonprogrammable calculator is allowed.

Q.1 A) Select the correct alternatives:-

08

- 1) When modulation index of an AM wave is increased from 0.5 to 1, the transmitted power _____.
 - a) Remains the same
 - b) Increases by 25%
 - c) Increases by 33.3%
 - d) Increases by 50%
- 2) Quantizing error occurs in _____.
 - a) TDM
 - b) FDM
 - c) PCM
 - d) PWD
- 3) A mobile telephone has a range of about _____.
 - a) 50 km
 - b) 10 km
 - c) 1 km
 - d) 0.1 km
- 4) In single tone AM modulation, the transmission efficiency for $m = 1$ is _____.
 - a) 33.3%
 - b) 50%
 - c) 100%
 - d) 16.65%
- 5) PAM stands for _____.
 - a) Phase Angle Modulation
 - b) Phase Amplitude Modulation
 - c) Pulse Amplitude Modulation
 - d) Pulse Angle Modulation
- 6) A signal is sampled at 8 kHz and is quantized using 8 bit uniform quantizer. Assuming SNR_q for a sinusoidal signal, the correct statement for PCM signal with a bit rate of R is _____.
 - a) $R = 32$ Kbps, $SNR_q = 25.8$ dB
 - b) $R = 64$ Kbps, $SNR_q = 49.8$ dB
 - c) $R = 64$ Kbps, $SNR_q = 58.8$ dB
 - d) $R = 32$ Kbps, $SNR_q = 49.8$ dB
- 7) Generally a VCR has _____.
 - a) Four stationary video heads
 - b) Two stationary video heads
 - c) Four rotating video heads
 - d) Two rotating video heads
- 8) An RF carrier of 12 kV at 1 MHz is amplitude modulated by 1 kHz signal having peak value of 6 kV. The modulation pattern is seen on CRO screen. The voltage indicated will be _____.
 - a) 18 kV
 - b) 1.001 kV
 - c) 6 kV
 - d) 36 kV

Q.1	B)	State true and false :	06
		1) A video monitor is exactly similar to TV receiver.	
		2) A modem can be used to translate data from digital to analog only.	
		3) De-multiplexing is the process of allowing two or more signals to share the same medium or channel.	
		4) The range of electromagnetic signals encompassing all frequencies is referred to as the electromagnetic spectrum.	
		5) Modulation makes the information signal more compatible with the medium.	
		6) Simplex communication refers to a one-way transmission type system.	
Q.2		Attempt the following:-	
		1) Explain the operation of Dual Slope detector.	05
		2) Differentiate between Delta modulation and Pulse modulation.	05
		3) Explain the terms:- i) Half duplex ii) Full Duplex	04
Q.3	A)	Explain the operation of an A.M. receiver with a neat block diagram.	10
	B)	Explain PLL as FM detector.	04
Q.4	A)	Differentiate between FSK and ASK and PSK.	08
	B)	Explain the basic principle of DPSK with a block diagram.	06
Q.5	A)	What is frequency hopping? Explain in detail.	08
	B)	Explain the process of tracking of DS signal.	06
Q.6	A)	Explain the working principle of frequency doubler and tripler.	08
	B)	Discuss the construction and working of VCO.	06
Q.7	A)	Discuss Direct Sequence Spread Spectrum.	08
	B)	Explain the acquisition of DS signal.	06

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M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2017
Electronic Science
MICROCONTROLLERS AND INTERFACING

Day & Date: Thursday, 23-11-2017
 Time: 10.30 AM to 01.00 PM

Max. Marks: 70

- Instructions:** 1) Answer any five questions.
 2) Questions 1 and 2 are compulsory.
 3) Answer any three questions from Q.3 to Q.7.
 4) Use of scientific calculator is allowed.

Q.1 A) Choose the alternatives given below.

08

- 1) In 8051 _____ pins have no dual function.
 - a) PORT 0
 - b) PORT 1
 - c) PORT 2
 - d) PROT 3
- 2) The internal RAM location 01H of 8051 can also be accessed as _____.
 - a) Register R1 of bank 0
 - b) Direct memory address 01H
 - c) Indirect memory address 01H using @RO
 - d) All of the above
- 3) The stack pointer of 8051 _____ storing data on the stack.
 - a) Increments before
 - b) Increments after
 - c) Decrements before
 - d) Decrements after
- 4) The 8051 has bit-addressable area of _____ bits.
 - a) 8
 - b) 16
 - c) 128
 - d) 256
- 5) The 8051 can access maximum _____ bytes of external ROM and external RAM respectively.
 - a) 4K, 128
 - b) 8K, 256
 - c) 64K, 128
 - d) 64K, 64K
- 6) _____ I/O pins are required to connect matrix keypad of 16 keys.
 - a) 4
 - b) 8
 - c) 12
 - d) 16
- 7) _____ sensor has the output scale factor of 10.0 mV/°c.
 - a) LM 35
 - b) Thermocouple
 - c) Thermistor
 - d) LDR
- 8) The first line of characters is addressed at _____ locations in 16*2 LCD.
 - a) 00H-0FH
 - b) 20H-2FH
 - c) 80H-8FH
 - d) C0H-CFH

B) State true or false.

06

- 1) The serial port of 8051 is full duplex.
- 2) The DJNZ instruction of 8051 tests 'Zero flag' to make decision.
- 3) DPTR is an 8-bit pointer.
- 4) External Access pin of 8051 is active low.
- 5) 8051 I/O ports can directly drive DC motor.
- 6) The GSM module is used to build applications involving satellite – based navigation system.

- Q.2** a) Explain LCALL, ACALL, RET and RETI instructions of 8051. **04**
b) With a neat diagram explain LED interfacing with 8051. **05**
c) Give specifications of HY – HS 220 module. **05**
- Q.3** a) List features of 8051 microcontroller. **05**
b) Explain internal RAM organization of 8051. **05**
c) Write a short note on PORT 3 of 8051. **04**
- Q.4** a) What is an Interrupt? What is the need of Interrupts? Explain the interrupt mechanism of 8051. **08**
b) Write a program to generate square wave on PORT 1 pin 1 (single pin) when an external interrupt 0 (level sensitive) occurs. **06**
- Q.5** a) With a neat diagram explain interfacing of 8-channel ADC with 8051 microcontroller. **04**
b) Write a program to read input voltages in the range of 0-5V of ADC input channels and display these inputs in 'channel number: voltage' format. **10**
- Q.6** a) Design a 8051 microcontroller based system to measure and display the temperature in degree Celsius and humidity on %RH. **10**
b) How to measure current using microcontroller? **04**
- Q.7** a) What is GSM? Explain why and how to interface GSM module with the microcontroller. **10**
b) Explain any four AT commands supported by GSM module. **04**

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M.Sc. (Semester - III) (New) (CBCS) Examination Oct/Nov-2017
Electronic Science
DIGITAL SIGNAL PROCESSING

Day & Date: Thursday, 16-11-2017
 Time: 02.30 PM to 05.00 PM

Max. Marks: 70

- Instructions:** 1) Q.1 and Q.2 are compulsory.
 2) Attempt any three questions from Q. 3 to Q.7.
 3) All questions carry equal marks.
 4) Use of nonprogrammable calculator is allowed.

Q.1 A) Select the correct alternatives:-**08**

- 1) $S1=A \sin \omega t$ is a _____.
 a) Single variable signal b) Real valued signal
 c) Complex valued signal d) Multichannel signal
- 2) Output of causal system depends upon only _____.
 a) Present inputs b) Past inputs
 c) Present and past input d) Future inputs
- 3) Z-transform may be viewed as _____.
 a) Discrete Laplace transform b) Discrete Fourier transform
 c) Discrete Time Fourier transform d) Discrete Threshold transform
- 4) DFT provides a convenient way to evaluate _____.
 a) Convolution b) Convolution sum
 c) Convolution product d) Deconvolution
- 5) In DIT-FFT _____.
 a) Multiplication is done after addition
 b) Multiplication is done before addition
 c) Multiplication is done after linear filtering
 d) Multiplication is done before linear filtering
- 6) Canonical realization is _____.
 a) Direct form-I realization b) Direct form-II realization
 c) Cascade form d) Parallel form
- 7) Selection of digital filter depends on _____.
 a) Time domain b) Phase domain
 c) Frequency domain d) Quantized domain
- 8) Digital parameters are obtained in _____.
 a) $H(z)$ plane b) $H(s)$ plane
 c) X-Y plane d) X-Y-Z plane

Q.1 B) State true and false :**06**

- 1) A linear system satisfies superposition principle.
- 2) Discrete time system is linear and time invariant.
- 3) Z-transform of $d(n)$ sequence is equal to 1.
- 4) All zero system has a Finite Impulse Response.
- 5) The system function remains unchanged even after interchange of input and output in SFG.
- 6) A comb filter can be viewed as a notch filter.

Q.2	Give a brief account on:-	14
	1) Advantages of DSP over ASP.	
	2) Properties of DFT	
	3) Notch Filter	
Q.3	A) How will you manipulate a discrete time signal by various transformation operations? Explain with suitable examples.	10
	B) If $x(n) = \{1, -2, 3, 0, -1, 4, 3\}$ draw a eat diagram of discrete time for i) $x(n-1)$, ii) $x(-n)$, iii) $x(n+2)$.	04
Q.4	A) The impulse response of LTI system is $h(n)=\{1, -2, 0, 1, -1\}$. Determine the convolution response of a system to the input signal $x(n)) \{1, -1, 2, 1, 0, -2\}$.	08
	B) With the help of basic building blocks, draw a discrete time system for the following I-O relations.	06
	1) $y(n) = \frac{1}{4}x(n) + \frac{1}{2}x(n+1) - \frac{1}{4}x(n-1)$	
	2) $y(n) = \frac{1}{2}x(n+1) + x(n-a) + \frac{1}{3}x(n+1)$	
Q.5	A) Consider the causal linear shift invariant filter with system function:- $H(z) = (1 + 0.875z^{-1})/(1 + 0.2z^{-1} + 0.9z^{-2})(1 - 0.7z^{-1})$. Draw a Signal Flow Graph for the system using:-	10
	i) Direct form-I,	
	ii) Direct form-II, and	
	iii) a cascade of 1 st and 2 nd order systems realized in direct form-II.	
	B) What is casuality and stability of a system?	04
Q.6	A) Obtain an expression for N/2-point DFT using decimation in Time-FFT algorithm. How computation is involved in an eight point sequence. Explain with figure.	10
	B) Write note on windowing method of design of a digital filter.	04
Q.7	A) What are the specifications for filter design? Mention requirements for FIR filter design.	10
	B) Mention the applications of Notch and Comb filter.	04

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M.Sc. (Semester - III) (New) (CBCS) Examination Oct/Nov-2017
Electronic Science
MICROWAVE ELECTRONICS AND APPLICATIONS

Day & Date: Saturday, 18-11-2017
 Time: 02.30 PM to 05.00 PM

Max. Marks: 70

- Instructions:** 1) Q.1 and Q.2 are compulsory.
 2) Attempt any three questions from Q. 3 to Q.7.
 3) All questions carry equal marks.
 4) Use of non-programmable calculator is allowed.

Q.1 A) Select the correct alternative:**06**

- 1) The cyclotron angular frequency ω of the circular motion of the electron is _____ rad/s.
 - a) eB/m
 - b) R/v
 - c) evB
 - d) mv/eB .
- 2) TE_{mn} modes in rectangular waveguide are characterized by _____.
 - a) $H_x = 0$
 - b) $H_z = 0$
 - c) $E_x = 0$
 - d) $E_z = 0$
- 3) Which of the following is avalanche transit-time device?
 - a) BARITT
 - b) IMPATT
 - c) TRAPATT
 - d) All of the above
- 4) E-plane tee is also called as a _____.
 - a) Series tee
 - b) H-plane tee
 - c) Hybrid tee
 - d) Directional coupler
- 5) Standing wave ratio of transmission line is the ratio of _____.
 - a) Minimum voltage to maximum voltage
 - b) Maximum voltage to minimum voltage
 - c) Maximum current to minimum current
 - d) Both b and c
- 6) Sinusoidal FM-CW radar is used when, _____ is required.
 - a) Range
 - b) Both range and velocity
 - c) Velocity
 - d) None of above

Q.1 B) State true and false :-**08**

- 1) The lower half of the smith chart represents $+jx$.
- 2) The hybrid ring has characteristics similar to those of hybrid tee.
- 3) The device is stable in the gunn oscillation mode of Gunn diode.
- 4) Two-cavity klystron is operated by the principles of velocity and current modulation.
- 5) In the over-coupling of resonator loaded Q_c factor is equal to half of the external Q_{ext} .
- 6) Carriers injected into the drift region are called an IMPATT diode.
- 7) Quality factor of micro-strip lines is a ratio of transmitted and incident power of strip lines.
- 8) MODFET is also called a high electron mobility transistor.

- Q.2 Answer the following:-** **14**
- 1) Give a brief account of Gauss law. **05**
 - 2) Explain Two-Hole directional coupler. **05**
 - 3) Write a note on klystron. **04**
- Q.3 a)** What is transmission coefficient? Obtain and explain with mathematical expressions. **10**
- b)** A transmission line has the following parameters: $R=2\Omega/m$, $L=8\text{ nH/m}$, $G=0.5\text{ mmho/m}$, $C=0.23\text{ pF}$, $f=1\text{ GHz}$. Calculate (a) the characteristic impedance (b) the propagation constant. **04**
- Q.4 a)** Discuss TM modes of rectangular waveguides with cutoff wave number, cutoff frequency and characteristic wave impedance of TM_{mn} in guide. **07**
- b)** Explain operation principles of coupled-cavity TWT with suitable diagram. **07**
- Q.5 a)** Explain TRAPATT diode. What is the Principle of operation in TRAPATT diode? **10**
- b)** What is coplanar strip line? **04**
- Q.6 a)** Distinguish between modulated and un-modulated CW radar. **07**
- b)** Give a brief account of explanation of linear magnetron. **07**
- Q.7 a)** Explain electronic motion in an electrical field. **10**
- b)** An air-filled rectangular waveguide of inside dimensions $7\text{ X }3.5\text{ cm}$ operates in the dominant TE_{10} mode. **04**
- Find
- 1) cutoff frequency ,
 - 2) phase velocity of the wave in the guide at a frequency of 3.5 GHz
 - 3) and guided wavelength

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M.Sc. (Semester - III) (New) (CBCS) Examination Oct/Nov-2017
Electronics Science
DATA COMMUNICATION & NETWORKING

Day & Date: Tuesday, 21-11-2017
 Time: 02.30 PM to 05.00 PM

Max. Marks: 70

- Instructions:** 1) Q.1 and Q.2 are compulsory.
 2) Attempt any three questions from Q. 3 to Q.7.
 3) Figures to the right indicate full marks.
 4) Use of non-programmable calculator is allowed.

Q.1 A) Select the correct alternative: **06**

- 1) Which data unit is used in transport layer?
 a) Bit b) Frame
 c) Packet d) Segment
- 2) Logical address to physical address translation performs at which layer of the OSI model?
 a) Physical b) Network
 c) Data link d) Session
- 3) _____ Protocol is useful for error control as well as flow control.
 a) Stop and Wait b) Selective Reject
 c) Simplex d) Selective Repeat
- 4) Which of the following protocol provides file sharing?
 a) Telnet b) SMTP
 c) UDP d) FTP
- 5) The _____ is a country specific domain name.
 a) .com b) .org
 c) .us d) .pro
- 6) _____ acts as a point of connection which connects segments of transmission medium.
 a) Hub b) NIC
 c) Modem d) Ethernet

Q.1 B) State true and false :- **08**

- 1) Point to point line configuration provides dedicated link between two devices.
- 2) A bridge operates at the data link layer of the OSI model.
- 3) ALOHA protocol does not try to detect whether the channel is free before transmitting.
- 4) IGMP is used on IEEE-802.3 networks in order to obtain Ethernet address from IP address.
- 5) Subnet is made up of telecommunication lines (i.e. circuits, channels, trunks) and switching elements.
- 6) A computer communication technology that provides a way to interconnect multiple computer across long distance is LAN.
- 7) Coaxial cable provides better shielding than Twisted pair cable.
- 8) HDLC is very similar to the SDLC synchronous data link protocol.

Q.2	Attempt the following:-	14
	a) Explain the static channel allocation problem in LAN and MAN.	05
	b) Explain flow control in data link layer.	05
	c) State and explain the features of CSMA.	04
Q.3	a) With a neat sketch, explain operation of cable modem. State its advantages and disadvantages.	08
	b) Explain pure ALOHA multiple access protocol in detail.	06
Q.4	a) Describe OSI model in computer communication network.	10
	b) State features of coaxial cable.	04
Q.5	a) What is framing? Explain the following framing techniques:-	10
	1) Character count	
	2) Bits stuffing	
	b) Define the following terms:-	04
	1) Router	
	2) Switch	
	3) Hub	
	4) Repeater	
Q.6	a) Discuss about following categories of network detail.	08
	1) LAN	
	2) WAN	
	b) What are the types of frames available in high level data link protocol (HDLC)?	06
Q.7	a) What is TCP? Explain TCP protocol with its header format.	10
	b) Write a short note on token bucket algorithm.	04

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M.Sc. (Semester - IV) (New) (CBCS) Examination Oct/Nov-2017
Electronics Science
MOBILE COMMUNICATION

Day & Date: Monday, 20-11-2017
 Time: 02.30 PM to 05.00 PM

Max. Marks: 70

- Instructions:** 1) Q. (1) and (2) are compulsory.
 2) Answer any three questions from Q.3 to Q.7.
 3) All questions carry equal marks.
 4) Use of nonprogrammable calculator is allowed.

Q.1 A) Choose the alternatives given below.**08**

- 1) A _____ can only display short text message and cannot send any message.
 - a) Mobile phones
 - b) Pocket computer
 - c) Laptop
 - d) Pager
- 2) If the corresponding value of (i, j) are (3, 0) then frequency reuse factor N is _____.
 - a) 0
 - b) 3
 - c) 9
 - d) 7
- 3) A _____ establishes a virtual pipe for data packets between an inner entry and an inner exit points.
 - a) Tunnel
 - b) Header
 - c) Data
 - d) Original IP
- 4) _____ protocol is used between the access point and the switch.
 - a) APC
 - b) IP
 - c) TCP
 - d) B-ISDN
- 5) The behavior TCP shows after the detection of congestion is called _____.
 - a) Fast retransmit
 - b) Slow start
 - c) Fast recovery
 - d) Implications of mobility
- 6) Medium access control belongs to _____.
 - a) Physical layer
 - b) Network layer
 - c) Data link layer
 - d) Transport layer
- 7) The type of access used in GSM technology is _____.
 - a) OFDMA
 - b) CDMA
 - c) FDMA/TDMA
 - d) TDMA
- 8) The antenna which attempts to direct all its energy in a particular direction is called as _____.
 - a) Directional antenna
 - b) Dish antenna
 - c) Horn antenna
 - d) Parabolic antenna

- B) State True or false.** **06**
- 1) The FDMA multiple access is achieved by allocating different time slots for the different users.
 - 2) A piconet network can have upto 9 stations.
 - 3) The remote and rarely populated areas will be covered by macro cells.
 - 4) WATM is a third generation mobile communication technology.
 - 5) Infrared technology uses diffused light reflected at walls, furniture, etc.
 - 6) In mobile IP, the problem of changing the IP address while still having a TCP connection open means connection will breaks.

Q.2 Attempt the following.

- a) Explain the advantages and disadvantages of Infrared technology in wireless transmission. **05**
- b) Explain in brief mobile and wireless devices. **05**
- c) Write a note on WATM mobile quality of services. **04**

OR

What is your idea of Snooping TCP? **04**

- Q.3**
- a) Draw and explain the system architecture of IEEE 802.11 standard. **08**
 - b) Draw and explain the format of an IEEE 802.11 physical frame using FHSS. **06**
- Q.4**
- a) Explain the function architecture of GSM system with a suitable sketch. **08**
 - b) Write a note on Bluetooth. **06**
- Q.5**
- a) Explain the several terms needed to understand the mobile IP? Explain its registration mechanism. **10**
 - b) Differentiate TDMA from that of the CDMA. **04**
- Q.6**
- a) Explain the following referred to the cellular communication. **08**
 - 1) Frequency reuse
 - 2) Hand off
 - b) What is GSM? List the services of GSM. **06**
- Q.7**
- a) Explain in brief packet switched data services on cellular networks. **08**
 - b) Explain about Hiper – LAN with reference model. **06**

Seat No.	
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Set **P**

M.Sc. (Semester - IV) (New) (CBCS) Examination Oct/Nov-2017
Electronics Science
FIBER OPTIC COMMUNICATION

Day & Date: Wednesday, 22-11-2017
 Time: 02.30 PM to 05.00 PM

Max. Marks: 70

- Instructions:** 1) Q. (1) and (2) are compulsory.
 2) Answer any three questions from Q.3 to Q.7.
 3) All questions carry equal marks.
 4) Use of nonprogrammable calculator is allowed.

Q.1 A) Choose the alternatives given below. 06

- 1) The laser source provides the light signal that is _____.
 a) Coherent with light source b) Possible to modulate at frequency
 c) Low divergence beam d) All the above
- 2) The first step for preparation of fiber is _____.
 a) Ultra pure material powder
 b) Conventional glass refining technique
 c) Impure fiber preparation
 d) All the above
- 3) The optical carrier frequency is in the range of _____.
 a) 10^{13} to 10^{16} Hz b) 10^{14} to 10^{16} Hz
 c) 10^{13} to 10^{17} Hz d) 10^{11} to 10^{16} Hz
- 4) Semiconductor photodiode without internal gain generate _____ per absorbed photons.
 a) Two electron – hole pair b) Three electron hole pair
 c) One electron hole pair d) None of these
- 5) Microscopic meandering of the fiber core axis, known as _____.
 a) Micro Bending b) Linear Bending
 c) Nonlinear Bending d) Circular Bending.
- 6) In optical fibers the Cut-Back technique is used to measure _____.
 a) Spectral loss b) Dispersion loss
 c) Absorption loss d) None of these

B) State True or false. 08

- 1) Material absorption is a loss mechanism related to the material composition and the fabrication process for the fiber.
- 2) Meridional ray which passes through the cross section of fiber.
- 3) Photon energy is inversely proportional to wavelength.
- 4) Insertion loss is to measure the diameter of optical fiber.
- 5) A permanent joint formed between two individual optical fibers in the field or factory is known as a Fiber Splice.
- 6) The typical best bandwidth length product for single mode step index fiber is 100MHZ KM.
- 7) The most common on-line measurement technique uses fiber image projection (Shadow method) for the measurement of outer diameter of fiber.
- 8) Laser is non-coherent source of light.

- Q.2 Write short notes.**
- a) Explain optical fiber communication system in brief. **05**
 - b) Explain the principle of PIN photodiode. **05**
 - c) Explain the various advantages of optical fiber. **04**
- Q.3**
- a) Using the simple ray theory of light, describe the mechanism for the transmission of light within an optical fiber. **08**
 - b) An optical fiber has a numerical aperture of 0.20 and a cladding refractive index of 1.59. Determine the acceptance angle for the fiber in water which has a refractive index of 1.33. **06**
- Q.4**
- a) Briefly write about how fluoride glass fibers are prepared? **08**
 - b) Explain material absorption losses in brief. **06**
- Q.5**
- a) Explain the concept of double heterojunction LED with a neat sketch. **08**
 - b) A P-N Photodiode has a quantum efficiency of 60% at a wavelength of 0.9 μm . Calculate **06**
 - 1) Its responsibility at 0.9 μm .
 - 2) Received optical power if mean photocurrent is 10^{-6} A.
- Q.6**
- a) The radiative and nonradiative recombination lifetime of the minority carriers in the active region of a double heterojunction LED are 60ns and 100ns, respectively. Determine the total carrier recombination lifetime and power internally generated within the device when peak emission wavelength is 0.87 μm at a drive current of 40mA. **08**
 - b) Explain the different advantages and disadvantages of LED compared to Laser. **06**
- Q.7**
- a) Briefly explain how numerical aperture is measured in optical fiber? **08**
 - b) Explain what do you mean by FDDI? **06**