



SLR-JP – 206

Seat No.	
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**M.Sc. (Part – I) (Semester – I) Examination, 2015
ELECTRONICS (Communication Science)
PAPER – III : Communication Systems (New)**

Day and Date : Monday, 20-4-2015

Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

- 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.

1. A) Select correct alternatives.

8

- 1) A 400-watt carrier is modulated to a depth of 80%. Calculate the total power in the modulated wave.
a) 656 watt b) 528 watt c) 324 watt d) 264 watt
- 2) An unmodulated carrier is 10 W measured at 12 W when modulated, and then m is
a) 63% b) 82% c) 25% d) 50%
- 3) The modulation index of FM system is
a) > 1 b) < 1 c) $= 1$ d) none of the above
- 4) In FM frequency deviation is ± 50 kHz and message signal frequency is 10 kHz then modulation index is
a) 5 degree b) 6 radian c) 6 degree d) 5 radian
- 5) Indicate which of the following system is analog.
a) PCM b) Differential PCM
c) PWM d) Delta

P.T.O.



- 6) Time Division multiplexing is
- Interleaving pulses belonging to different transmission
 - Can be used with PCM only
 - Combines five groups into adjacent frequency slot
 - Stacks 24 channels in adjacent frequency slot
- 7) State, which characteristics of a PWM change with modulation
- Frequency
 - Amplitude
 - Phase
 - Duty cycle
- 8) With increase in the sampling frequency
- The adjacent spectrums will overlap
 - A guard band is created between the adjacent spectrums
 - The adjacent spectrums will touch each other
 - None of the above

B) State **true** of **false**.

6

- PPM is obtained from PAM.
- Selectivity of a receiver is to spread one signal from other on closely adjacent frequency.
- In RZ, encoding process is based on the data bits.
- PLL is negative feedback system.
- FM broadcast stations are assigned adjacent channels to operate in the same region.
- In A.M. if modulation index is <1 , the baseband signal is recovered with distortion.

2. Attempt the following.

- Explain the need of pre-emphasis and de-emphasis in FM. 5
- What are the advantages of single side band transmission ? 4
- State and explain the sampling theorem. 5

- For A.M. transmitter, using the crystal controlled price oscillator, temperature oven and buffer amplifier explain the exciter section. 8
 - Explain the design of class C amplifier. 6



- 4. a) Explain in detail VCO master oscillator for F.M. transmitter for generation of carrier. 10
 - b) Explain PLL as F.M. detector. 4
 - 5. a) Explain the generation direct sequence spread spectrum. 8
 - b) Explain PN sequence generation. 6
 - 6. a) Explain differential PSK system in detail. 8
 - b) Explain the frequency doubler concept in FM. 6
 - 7. a) Explain the generation of PWM and PPM with suitable circuit diagram. 8
 - b) 10111000 express the binary signal in following data format. 6
 - i) Unipolar RZ
 - ii) Bipolar RZ
 - iii) Unipolar NRZ
 - iv) Bipolar NRZ.
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Seat No.	
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M.Sc. – I (Semester – I) Examination, 2015
ELECTRONICS (Communication Science)
Paper – IV : Introduction to MATLAB and LABVIEW (New)

Day and Date : Wednesday, 22-4-2015

Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

- Instructions :** 1) *Q. 1 and Q. 2 are compulsory.*
2) *Answer any three questions from Q. 3 to Q. 7.*
3) *All questions carry equal marks.*

1. a) Select correct option :

8

1) A MATLAB variable name may have maximum of _____ characters.

- a) 10 b) 220 c) 68 d) 131

2) All elements of column vector in MATLAB are separated by _____.

- a) Blank space b) Commas
c) Bank space or commas d) Semicolon

3) If $a \begin{pmatrix} 2 \\ 3 \end{pmatrix} = 4$, then

- a) $\begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 4 \\ 2 & 3 & 4 \end{pmatrix}$ b) $\begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 4 \end{pmatrix}$

- c) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 4 \end{pmatrix}$ d) $\begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$



- 4) _____ is a sequence of displayable or non-displayable ASCII characters in LabVIEW.
- a) numeric b) string c) cluster d) script node
- 5) Terminal blocks of DAQ device have _____ terminals.
- a) 100 b) 68
c) 50 d) any one of the above
- 6) Logical operator '~' is _____.
- a) logical OR b) logical exclusive-OR
c) logical compliment d) logical AND
- 7) Highlight option is present on _____.
- a) Front panel toolbar b) Front panel function
c) Block diagram toolbar d) Block diagram control
- 8) I stands for _____ in while loop and for loop of LabVIEW.
- a) iteration number b) indexing number
c) integration number d) none of the above

b) State **True** or **False** :

6

- 1) In the MATLAB % is used for backspace.
- 2) Virtual instrumentation has synchronizing platform.
- 3) If-else control structure has two group of statement true and false.
- 4) MATLAB workspace is a collection of all the variables that have been generated so far in the current MATLAB session and shows their data type and size.
- 5) A group of homogeneous elements of a specific data types is known as cluster.
- 6) LabVIEW installs MAX which establishes all devices and channel configuration parameter ?



- 2. Attempt the following :
 - 1) Explain Matrix subscript of MATLAB. 5
 - 2) Explain Transducers for DAQ. 5
 - 3) Explain in brief Numeric constants of MATLAB. 4
 - 3. a) Draw and explain graphical system design model. 10
b) List out four types of LabVIEW clusters and explain it. 4
 - 4. a) Explain briefly MATLAB environment with its help features. 10
b) Define switch statement of MATLAB using general syntax. 4
 - 5. a) Define sub VI in LabVIEW. How to create an icon in LabVIEW ? 10
b) Write a note on DAQ-card. 4
 - 6. a) Explain briefly the types of MATLAB functions. 10
b) Write a program to obtain the sum of all even numbers from 0 to 20, using 'for' statement. 4
 - 7. a) Draw G-code for calculator and half adder in LabVIEW. 10
b) Explain MATLAB 'while' loop. 4
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SLR-JP – 209

Seat No.	
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M.Sc. I (Semester – I) Examination, 2015
ELECTRONICS (Communication Science)
Paper – II (Old) Instrumentation

Day and Date : Friday, 17-4-2015

Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

- 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.

1. Objective questions. 14
- a) Choose correct alternatives. 8
- 1) A thermistor operates on the principle,
- a) variable inductance b) variable capacitance
c) variable resistance d) all of the above
- 2) Piezo-electric crystal is used to measure
- a) sound b) light
c) pressure d) none of the above
- 3) In microphone, which of the following varies with the input audio signal,
- a) resistance b) capacitance
c) inductance d) none of the above
- 4) UPS converts
- a) ac into dc b) dc into ac
c) both (a) and (b) d) none of the above

P.T.O.



- 5) Spectrum analyser is used to study
- a) static characteristics
 - b) dynamic characteristics
 - c) energy distribution of signal
 - d) none of the above
- 6) A pH of less than 7, indicates the solution is,
- a) acidic
 - b) alkaline
 - c) neutral
 - d) all of the above
- 7) A multiplexer has
- a) one input, many outputs
 - b) many inputs, one output
 - c) one input, one output
 - d) many inputs, many outputs
- 8) A data acquisition systems must have
- a) ADC and DAC
 - b) Multiplexer and demultiplexer
 - c) Sample and hold circuit
 - d) All of the above

b) Fill in the blanks.

6

- 1) Thermocouples are used to measure _____.
- 2) In solar cells, light is converted into _____
- 3) In S/H circuits, _____ are used as switch.
- 4) _____ amplifiers are used to prevent high voltage signals to a system.
- 5) UPS requires _____ for its operation.
- 6) Human hair can be used to measure _____.

2. Attempt **any three**.

14

- a) What is Hall effect ? Explain.
- b) Discuss piezoelectric sensors.
- c) Explain the working of an inverse transducer.
- d) Write a note on proximity detector.



- 3. a) Explain the construction and working of various types of temperature transducers. **10**
 - b) Write the advantages and disadvantages of each of the above transducers. **4**
 - 4. a) With neat diagram, describe the functioning of a temperature balance system. **10**
 - b) Explain the operation of a RMS converter. **4**
 - 5. a) With necessary diagram, discuss in detail, the working of a SMPS. **10**
 - b) Write a note on frequency to voltage converter. **4**
 - 6. a) Draw the diagram of a lock-in amplifier and explain its operation. **10**
 - b) Write a note on power measurement. **4**
 - 7. a) Discuss the working of a standard interface system in detail. **10**
 - b) Write a note on signal conditioning. **4**
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Seat No.	
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M.Sc. (Part – I) (Semester – II) Examination, 2015
ELECTRONICS (Communication Science) (New)
Paper – V : Modern Antenna Design

Day and Date : Thursday, 16-4-2015
Time : 11.00 a.m. to 2.00 p.m.

Total Marks : 70

Instructions : 1) Q. (1) and (2) are **compulsory**.
2) Attempt **any three** questions from Q. 3 to Q. 7.
3) **All** questions carry **equal** marks.

1. A) 1) Power level of side lobes of an antenna is _____ 8
a) –20 dB b) 20 dB c) –30 dB d) 30 dB
- 2) For deep-dish reflectors, f/D ratio is _____
a) large b) 1 c) small d) greater than 1
- 3) A horn antenna is _____ type of antenna.
a) wire b) aperture c) microstrip d) lens
- 4) A graph of special variation of the electric (or magnetic) field along constant radius is
a) Field pattern b) Power pattern
c) Electric pattern d) Magnetic pattern
- 5) Antenna efficiency is the ratio of _____ to _____
a) Radiation intensity, average radiated power
b) Received power, pointing vector of incident wave
c) Radiated power, total input power
d) Radiation intensity, radiation power
- 6) Patch has _____
a) High gain wide band antenna b) High gain narrow band antenna
c) Low gain narrow band antenna d) Low gain wide band antenna
- 7) The Beam widths for corner reflectors are approximately equal in both principal planes, provided $\theta =$
a) 120° b) 60° c) 90° d) 45°
- 8) Radiation pattern of Yagi uda antenna is _____
a) Directional b) Omni-directional
c) Bidirectional d) None of the above



- B) 1) Half wave dipole is very useful as a multi-band HF receiving antenna. **6**
- 2) The radiation pattern of paraboloidal reflector antenna with a horn antenna and the radiation pattern of paraboloidal reflector antenna with feed are same.
- 3) The region of Radiative near-field region is in between the reactive region and the far field region.
- 4) Half power beam width is half of the first null beam width.
- 5) The end fire array is the broadside array.
- 6) Intrinsic impedance of free space is 65Ω .
2. Attempt the following :
- 1) Explain briefly radian and steradian. **5**
- 2) List the application of an antenna. **4**
- 3) Write a note on radiation intensity. **5**
3. A) Derive an expression for retarded potential of an antenna. **10**
- B) Explain the field regions of an antenna. **4**
4. A) Describe non-metallic dielectric lens antenna with its suitable diagram. **10**
- B) Define the term of directivity of an antenna. **4**
5. A) Obtain an expression for the pattern in the gain over a $\lambda/2$ dipole antenna in free space with an arbitrary power input. **10**
- B) Explain the various types of radiation pattern. **4**
6. A) Draw and formulate the radiation mechanism of a single wire. **10**
- B) Write a note on Cassegrain feed. **4**
7. A) Explain in detail with suitable diagram the various types of corner reflector antenna. **10**
- B) Explain briefly the lobe and the various types of lobes. **4**
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SLR-JP – 213

Seat No.	
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**M.Sc. (Part – I) (Semester – II) Examination, 2015
ELECTRONICS (Communication Science) (New) (Paper – VI)
Microwave Engineering**

Day and Date : Saturday, 18-4-2015
Time : 11.00 a.m. to 2.00 p.m.

Total 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.

1. Objective Questions : 14
- a) Select correct alternatives : 6
- 1) When transmission line is provided with shorting plate the load reflection coefficient is _____
- a) 0 b) 1
c) -1 d) None of the above
- 2) X-band microwave frequency lies in the range of _____
- a) 8 – 12 GHz b) 2 – 4 GHz
c) 4 – 8 GHz d) 12 – 16 GHz
- 3) TE₁₀ is dominant mode of propagation in _____
- a) Circular wave guide
b) Rectangular wave guide
c) Coaxial line
d) Square wave guide
- 4) Transverse electric wave has _____
- a) $E_z = H_z = 0$ b) $H_z = 0$
c) $E_z = 1$ d) $E_z = 0$

P.T.O.



- 5) Reflex Klystron is _____
- Microwave amplifier
 - Microwave oscillator
 - Microwave passive device
 - Microwave phase shifter
- 6) In the case of lossless transmission line one of the following conditions are valid,
- $R = 0$
 - $G = 0$
 - $R = G = 0$
 - $L = C = 0$

b) State **true** or **false** :

8

- There is no phase difference between E and H fields of the EM wave propagating in a perfect insulator.
- Gunn diode can be used as a microwave oscillator.
- At 5 GHz frequency transmission of E.M. wave using tapered load can be done.
- Tangential component of electric and magnetic field are continuous across the boundary.
- SWR is always equal to or greater than unity.
- In a coaxial line if $R_L = Z_0$, then load reflection coefficient T_L is infinite.
- TE_{00} Mode exists in the rectangular waveguide.
- A circularly polarized wave is resultant difference of two equal amplitudes fields vectors in phase quadrant.

2. a) Explain electric fields in conducting material.

5

b) Explain Maxwell's equation in integral form.

5

c) Explain the concept of lossy dielectric.

4

3. a) Explain in detail the working principle and concept of velocity modulation with the help of suitable diagram.

8

b) Explain dielectric phase shifter in the rectangular waveguide.

6



4. a) Explain the theory of rectangular waveguide transmission for TE mode. **10**
- b) A transmission line has characteristic impedance of $50 + j0.01'\Omega$ and terminated in a load impedance of $73 - j42.5'\Omega$. Calculate :
- a) The reflection coefficient
- b) The standing wave ratio. **4**
5. a) A coaxial line has the following characteristics at 1000 MHz :
 $R' = 4$ ohms/m, $L' = 450$ nH/m, $G' = 7 \times 10^{-4}$ mho/m, $C' = 50$ pF/m. **10**
- i) Calculate Z_0 , α , β and λ at 1000 MHz.
- ii) With $V_0^+ = 10 \angle 0$ V and $V_0^- = 0$, Calculate V, I and P at $z = 4$ m.
- b) Short note on low loss lines. **4**
6. a) Explain in brief rotary phase shifters with suitable vector diagrams. **8**
- b) Explain the Gunn effect principle in detail. **6**
7. a) Sketch and explain Type-N connector. **8**
- b) Sketch and explain resistive card waveguide attenuator. **6**
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Seat No.	
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**M.Sc. (Part – I) (Semester – II) Examination, 2015
ELECTRONICS (Communication Science) (New)
Paper – VII : Advanced Microcontrollers**

Day and Date : Tuesday, 21-4-2015

Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

- 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 .

1. Objective questions : 14
- a) Select correct alternatives : 8
- 1) ARM is a _____ architecture.
a) RISK b) CISK c) RISC d) CISC
 - 2) ARM thumb mode has a _____ bit instruction set.
a) 8 b) 16 c) 32 d) 64
 - 3) Accessing external SRAM takes _____ additional clock cycle per byte compared to access of the internal SRAM.
a) 0 b) 1 c) 2 d) 3
 - 4) _____ is a conditional branch instruction of AVR.
a) BRNE b) BREQ c) SBRC d) All of these
 - 5) _____ instruction forces program execution to continue at address contained by the Z-register.
a) RJMP b) RCALL c) IJMP d) All of these
 - 6) When addressing I/O registers of AVR as SRAM, _____ must be added to I/O address.
a) \$ 10 b) \$ 16 c) \$ 20 d) \$ 64



Seat No.	
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**M.Sc. (Part – I) (Semester – II) Examination, 2015
ELECTRONICS (Communication Science) (New)
Paper – VIII : Digital Design and VHDL Programming**

Day and Date : Thursday, 23-4-2015
Time : 11.00 a.m. to 2.00 p.m.

Total 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.

1. a) Select correct alternatives.

6

- 1) In VHDL, the mode of a port does not define
 - a) an input
 - b) an output
 - c) both an input and an output
 - d) the type of the bit
- 2) How are the statements between BEGIN and END not evaluated in VHDL ?
 - a) Constantly
 - b) Simultaneously
 - c) Concurrently
 - d) Sequentially
- 3) The content of a simple Programmable Logic Device (PLD) consists of
 - a) fuse-link arrays
 - b) thousands of basic logic gates
 - c) advanced sequential logic functions
 - d) thousands of basic logic gates and advanced sequential logic functions
- 4) SPLDs, CPLDs and FPGAs are all which type of device ?
 - a) PAL
 - b) PLD
 - c) EPROM
 - d) SRAM



- 5) The VHDL editor is
- a) a graphics editor
 - b) a C program editor
 - c) a text editor
 - d) an I/O editor
- 6) The following VHDL ENTITY declaration code is incorrect because :

```
ENTITY booly 2 IS
```

```
    PORT (A, B, C, D, E : IN bit
```

```
          X : OUT bit)
```

```
END booly2;
```

- a) missing semicolon
 - b) missing “PORT END”
 - c) mismatch in ENTITY name
 - d) incorrect ENTITY name
- b) State **true** or **false** :
- 1) 10 bit ring counter has output frequency 10 Hz if input frequency is 100 Hz.
 - 2) 22V10 PAL has 22 input and output pins.
 - 3) MAX 7032 CPLD has 64 macro cells.
 - 4) PAL has programmable AND plane and programmable OR plane.
 - 5) Behavioural description in VHDL program includes process statement.
 - 6) 4 bit binary adder is faster than carry look ahead adder.
 - 7) Even parity checker are designed using XNOR gates.
 - 8) A 4-bit full adder requires seven half adder.

8

2. Write a short note on :

- i) Synthesis
- ii) ALU
- iii) 3-bit ripple counter.

14



3. a) A sequential circuit with two D flip flops A and B, input X and output Y is specified by the following next state and output equations.
- $A(t + 1) = AX + BX$
- $B(t + 1) = A'X$
- $Y = (A + B) X'$
- i) Draw the logic diagram of the circuit
 - ii) Derive the state table
 - iii) Derive the state diagram. **8**
- b) Explain carry look ahead adder. **6**
4. a) Design 2 bit Gray Code Counter using JK flip flop. **8**
- b) Draw and explain block diagram of PLA. **6**
5. a) Draw the structure of MAX 7000 macrocell. Explain in brief. **8**
- b) Write a VHDL code for SR flip flop. **6**
6. a) Write a VHDL code for 4-bit binary adder. **8**
- b) Explain inertial and transport delay. **6**
7. a) Implement the function using PAL. **8**
- $f1 = \sum m(6, 3), \quad f2 = \sum m(0, 4, 7)$
- b) Write a program for 1 bit full subtracter. **6**
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SLR-JP – 217

Seat No.	
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**M.Sc. (Part – I) (Semester – II) Examination, 2015
ELECTRONICS (Communication Science) (Old)
Paper – VI : Microwave Engineering**

Day and Date : Saturday, 18-4-2015

Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

- 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 scientific calculator is **allowed**.

1. Objective questions : 14
- a) Select correct alternatives : 6
- 1) If only magnetic field is transverse to the direction of propagation and the electric field is not transverse is referred as
a) TM wave b) TE wave c) TEM wave d) HE wave
- 2) If $E_z = 0$ and $H_z = 0$ then, it is indicated as
a) TE wave b) TEM wave
c) TM wave d) None of the above
- 3) The insertion loss is contributed by
a) matched load resistance
b) matching between input and output load
c) mismatching loss at input
d) None of the above
- 4) For an open circuited line, $z_L = \infty$, $I_L = 0$ and is given by
a) $Z_{in} = Z_0 \tan h \gamma l$ b) $Z_{in} = Z_0 \cot h \gamma l$
c) $Z_{in} = -jZ_0 \cot \beta l$ d) None of the above

P.T.O.



- 5) The time taken by the electron to travel into the repeller space and back to the gap is called as
- a) Repeller voltage
 - b) Transit time
 - c) Aperture effect
 - d) None of the above
- 6) One of the following modes cannot exist in a rectangular waveguide
- a) TE mode
 - b) TM mode
 - c) TEM mode
 - d) None of the above

b) State **true** or **false** :

8

- 1) The knowledge of plane wave propagation is very important to understand the propagation of microwaves.
- 2) The electromagnetic wave inside a waveguide can have an infinite number of patterns which are called as modes.
- 3) TWT is also used as broad band amplifiers in microwave applications.
- 4) In TEM wave, only electric field is transverse to the direction of propagation and magnetic field is not transverse.
- 5) The short circuit termination produces an adjustable reactive load at the desired point on microwave transmission line.
- 6) The passive elements are used to control the amount of microwave power transferred from one point to another on a transmission line is called phase shifter.
- 7) Gunn diodes are – Ve resistance devices which are normally used as low power oscillator at microwave frequencies.
- 8) When microwave propagates with phase remaining constant over a set of planes is called plane waves.

2. Write short notes :

- a) Write note on wave propagation.
- b) Explain TWT.
- c) Discuss Co-axial lines.

5

5

4



- | | |
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| 3. a) Starting from Maxwell's equation, derive the wave equations. | 10 |
| b) Explain the different types of wave polarization. | 4 |
| 4. a) With the help of neat sketch, explain the operation of various types of dielectric bead supports used in coaxial connectors. | 10 |
| b) Explain Gunn effect. | 4 |
| 5. a) Derive the equation for losses in co-axial lines. | 10 |
| b) What are strip lines ? Explain. | 4 |
| 6. a) With the help of neat sketch, explain the different types of waveguide attenuators. | 10 |
| b) Discuss the stripline attenuators. | 4 |
| 7. a) Derive the equation for attenuation in circular waveguide. | 10 |
| b) Explain rectangular waveguide with necessary equations. | 4 |
-



- 3. A) Write a VHDL code for 4-bit comparator using 1-bit comparator as a component. **8**
B) Write VHDL code for 1-bit latch. **6**
- 4. A) Design 4-bit synchronous up counter using JK flip flop. **8**
B) Write a short note on predefined attributes. **6**
- 5. A) Define synthesis. Explain different types of synthesis. Write a synthesis code for 2 : 1 multiplexer. **8**
B) Explain different types of delays. **6**
- 6. A) Design 1 digit BCD adder. Differentiate binary adder and BCD adder. **8**
B) Write a declaration for a function that test whether an integer is odd. The function declaration should appear in a package declaration. **6**
- 7. A) Write down the truth tables, VHDL codes for ring counter using behavioral modeling. **8**
B) Design a PLA to realize following three functions with internal connections : **6**

$$F_1(A, B, C, D, E) = A'.B'.D' + B'.C.D' + A'.B.C.D.E'$$

$$F_2(A, B, C, D, E) = A'.B.E + B'.C.D'.E$$

$$F_3(A, B, C, D, E) = A'.B'.D' + B'.C'.D'.E + A'.B.C.D$$



Seat No.	
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M.Sc. (Part – I) (Semester – II) Examination, 2015
ELECTRONICS (Communication Science)
(Paper – VIII)
Microprocessors and Advanced Microcontrollers

Day and Date : Thursday, 23-4-2015
Time : 11.00 a.m. to 2.00 p.m.

Total 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.

1. a) Choose correct alternatives.

14

- 1) $\overrightarrow{\text{BHE}}$ of 8086 microprocessor signal is used to interface the
a) Even bank memory b) Odd bank memory
c) I/O d) DMA
- 2) In 8086 the overflow flag is set when
a) the sum is more than the 16 bits
b) signed number go out of range after the arithmetic operation
c) carry and sign flag are set
d) during subtraction
- 3) The least significant four bits of 16-bit number to be moved into a segment register should be
a) 0000 b) 1111
c) can be any four bit number d) none
- 4) The advantage of memory mapped I/O over I/O mapped I/O is
a) Faster
b) Many instructions supporting memory mapped I/O
c) Require a bigger address decoder
d) All of the above

P.T.O.



- 5) ANDLW k instruction may affect
a) C b) DC c) Z d) None
- 6) PIR1 register contains _____ and PIE1 contains _____ bits.
a) Interrupt Priority, Interrupt Enable
b) Interrupt Flag, Interrupt Priority
c) Interrupt Priority, Interrupt Flag
d) Interrupt Flag, Interrupt Enable
- 7) PIC 16F877 consist of _____ channel and _____ bit ADC module.
a) 8, 8 b) 10, 8 c) 8, 10 d) none of these
- 8) PSA (Prescaler assignment) bit in the option register equals to 1 then
a) Prescaler enabled b) Prescaler disabled
c) Prescaler assigned to WDT d) Prescaler assigned to TIMER0
- b) Give **true/false** statement. **6**
- 1) Instruction op-codes are normally fetched from the code segment but can be overridden and fetched from the stack, data, or extra segment.
 - 2) The ASSUME statement loads the CS and DS registers when the program is loaded and run.
 - 3) The Trap flag controls the single step mode of operation of 8086.
 - 4) Not writable bits in the status register of PIC 16F877 are DC and C.
 - 5) Watch Dog Timer avoids the mal functioning of the PIC 16F877.
 - 6) PIC microcontroller RBO pin primarily not used for external interrupt input.
2. Attempt **any three**. **14**
- a) Describe the function of the following pins and their use in 8086 based system i) NMI ii) HLDA.
 - b) Explain the different directives used in 8086 programming.
 - c) Explain the interrupt structure of PIC 16F877.
 - d) Explain how SPI bus can be used for I/O expansion.



- 3. a) Explain in detail I2C module. Explain how to initialize MSSP module in I2C module. 8
 - b) Draw and explain the timing diagram for 8086 maximum mode memory write cycle. 6
 - 4. a) Draw the functional block diagram of 8288. Explain the command and control signals of 8288. 8
 - b) Explain how relay can be interfaced with PIC. Write a program to toggle the relay with some delay. 6
 - 5. a) Draw a power on reset circuitry and clock circuitry related to PIC family. 8
 - b) Interface 8255 to the 8086 in I/O mode. 6
 - 6. a) Interface I/O processor 8089 to 8086 and explain how communication takes place between them. 8
 - b) With block diagram explain Watch Dog Timer. 6
 - 7. a) What is an instructions pipelining in PIC ? Why does a branch instruction introduces an extra cycle in the CPUs execution of instructions ? 8
 - b) Explain the string instructions of 8086. 6
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SLR-JP-220

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M.Sc. (Part – II) (Semester – III) Examination, 2015
ELECTRONICS (Communication Science)
Paper No. IX Communication System Design

Day and Date : Wednesday, 15-4-2015

Total Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- Instructions :** 1) Q. (1) and Q. (2) are **compulsory**.
2) Answer **any three** questions from Q. (3) to Q. (7).
3) **All** questions carry **equal** marks.

1. A) Select correct alternative. 8
- 1) The cell site transmitter power increased by 3dB. It means it is increased by
a) two b) four c) three d) unchanged
 - 2) Multipath fading is a type of _____ fading ?
a) large-scale b) small – scale c) both a and b d) none of the above
 - 3) Which of the following is digital modulation technique ?
a) ASK b) FSK c) PSK d) All of the above
 - 4) A loss of signal strength is called
a) Attenuation b) Amplification c) Fading d) All of these
 - 5) Which one of the following is analog communication system ?
a) AMPS b) CDMA c) GSM d) GPRS
 - 6) The technique to monitor the clocks at the transmitter and receiver operate at same rate is known as
a) Synchronization b) Demodulation
c) Modulation d) Scrambling
 - 7) Redundancy of a signal is truly removed in _____ system.
a) DPCM b) PCM c) Delta d) PDM
 - 8) The change in frequency is called
a) Doppler shift b) Coherent time
c) Fading d) Dispersion

P.T.O.

B) State **true** or **false**.**(6×1=6)**

- 1) FHSS spectrum technique used in Bluetooth.
- 2) Durkins propagation model is indoor type of propagation model.
- 3) The paging system usually employs FSK modulation technique.
- 4) Functional architecture design is done after the preliminary design review.
- 5) Soft hand-off is called make before break hand-off.
- 6) The propagation path loss increases with frequency of transmission as well as the distance.

2. Attempt the following.

(14)

- 1) Explain cordless telephone system. **5**
 - 2) Explain in brief subsampling receiver. **5**
 - 3) Write a short note on heat sink. **4**
 3. a) Discuss the problems associated with homodyne receiver. **8**
b) Explain concept of image reject receiver. **6**
 4. a) Explain and derive the expression for link budget design using path loss model. **10**
b) Explain channel assignment strategies in cellular system. **4**
 5. a) Explain cellular telephone system in detail with suitable diagram. **8**
b) Explain Hand-off mechanism with its types. **6**
 6. a) Explain FHSS with slow hopping and fast hopping. **8**
b) Explain packaging concept in system design consideration. **6**
 7. a) With suitable diagrams explain working of PSTN. **8**
b) Explain the architecture of Digital-IF receivers. **6**
-



- 5) In which of the following the part of satellite subsystem make a help to satellite to move in orbit ?
- Frequencies translator
 - Attitude control subsystem
 - Propulsion subsystem
 - Communication subsystem
- 6) In which of the following refers to satellite service that can be receive at many unspecified location by relatively simple receiver only earth station ?
- FSS
 - BSS
 - MSS
 - None
- 7) The satellite system which provides global communication service is
- Intelsat
 - Iridium
 - Eulelsat
 - Both a) and b)
- 8) For C band the frequency range
- 200-400 Mhz
 - 3400-6425 Mhz
 - 50-100 Mhz
 - 10.95-14.5 Mhz

B) State **true** or **false** :

6

- In circular orbit speed of satellite is not constant.
- During an eclipse, the satellite is powered by earth station.
- LEO is placed in the range 400 to 1000 mi above the earth.
- Attitude correction is made by firing jet thrusters.
- Military satellites often operate in the C band.
- Single conversion transponder uses a single mixer to translate the uplink signal to the downlink signal.

2. Write a short note :

- DBS-TV receiver 5
 - TDMA 5
 - Launches and launch vehicles. 4
3. a) Briefly describe Attitude and Orbit Control System (AOCS). 8
- b) With the help of block diagram explain the working of transponder. 6



4. a) A 12 GHz receiver consists of an RF stage with $G_1 = 30$ dB and noise temperature $T_1 = 20$ K, a down converter with gain $G_2 = 10$ dB and noise temperature $T_2 = 360$ K and an IF amplifier stage with $G_3 = 15$ dB and noise temperature $T_3 = 1000$ K. Calculate the effective noise temperature, individual noise figure of the three stages and overall noise figure of the system. Take reference temperature to be 290 K. **8**
- b) Explain the terms angle of inclination and angle of elevation with neat diagram. **6**
5. a) What are Kepler's three laws of planetary motion ? Explain the parameter to describe the satellite orbit. **10**
- b) What is meant by geostationary satellite ? **4**
6. a) Explain the term : **8**
- i) C-band and Ku band
 - ii) delay and throughput considerations.
- b) Explain Radio and Satellite Navigation. **6**
7. a) Explain in detail 'Teledesic'. **8**
- b) Explain the working of VSA T hub master control station. **6**
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M.Sc. II (Semester – III) Examination, 2015
ELECTRONICS (Communication Science)
Paper – XI : Digital Communication

Day and Date : Monday, 20-4-2015

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- 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.

1. a) Select correct alternatives :

6

- 1) Granular noise is associated with
a) PCM b) DM c) DPCM d) QAM
- 2) $I(mk) \rightarrow 0$ as
a) $pk \rightarrow 1$ b) $pk \rightarrow 1/4$ c) $pk \rightarrow 0$ d) $pk \rightarrow 1/2$
- 3) The overall S/N ratio of DM system is _____ than overall S/N ratio of a PCM system using the same bandwidth.
a) higher b) lower c) very high d) none of these
- 4) The integer K is a parameter in convolution code is known as
a) length of message b) length of modulo two adders
c) rate of a code d) constraint length
- 5) For a rate $1/n$ convolutional encoder, the state is represented by the contents of the rightmost _____ stages.
a) $N - 1$ b) $K - 1$ c) $K - 2$ d) $N - 2$
- 6) It is more practical to consider maximum likelihood decoding with
a) Tree structure b) State representation
c) Polynomial representation d) Trellis structure

P.T.O.



b) State **True** or **False** :

8

- 1) A random process defined are ergodic if of all types of ensemble average are not changeable.
- 2) PCM systems use non uniform quantization in order to raise SNR for low level signals.
- 3) Parity check code can correct and detect two errors.
- 4) Hartley law states that amount of information is proportional to the bandwidth of the channel.
- 5) According to Shannon's theorem the output from any source of rate R can be coded and transmitted over a channel of capacity C with the condition that $C < R$.
- 6) A carrier recovery is not required in QPSK.
- 7) The slope overload problem of ADM can be overcome using DM.
- 8) M^{th} power loop technique is used for carrier recovery.

2. Write short notes :

a) Properties of convolution codes.

5

b) Uniform and Non uniform Quantization.

5

c) Normal PDF.

4

3. a) Explain the properties of Entropy. An event has six possible outcomes with the probabilities $1/2, 1/4, 1/8, 1/16, 1/32$ and $1/32$ respectively. Find the entropy of the system. Also find the rate of information if there are 16 outcomes per second.

8

b) Explain characteristics of Burst error and Random error correcting codes.

6

4. a) The generator polynomial for a (15, 7) cyclic code is

$$g(x) = 1 + x^4 + x^6 + x^7 + x^8.$$

8

i) Find code vector in systematic form for the message polynomial

$$D(x) = x + x^2 + x^5$$

ii) Find code vector in non systematic form for the message polynomial

$$D(x) = x + x^2 + x^3$$

b) What is the importance of symbol synchronization ? Explain any one method of symbol synchronization.

6



- 5. a) Find out all code words for a(6, 3) linear block code with given Generator matrix. 8

$$G = \begin{pmatrix} 100 & 110 \\ 010 & 011 \\ 001 & 101 \end{pmatrix}$$

Also find its parity check matrix. If the received code vector is 1001011, is the correct code vector ?

- b) With block diagram explain working of ADM. 6

- 6. a) Apply the Shannon-Fano coding procedure for the following message ensemble. Calculate its efficiency. 8

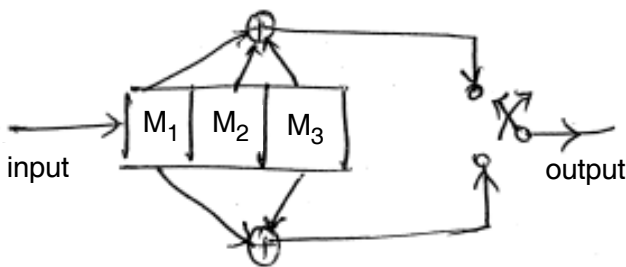
$$[X] = [x_1 \quad x_2 \quad x_3 \quad x_4 \quad x_5 \quad x_6 \quad x_7 \quad x_8]$$

$$[P] = [1/8 \quad 1/16 \quad 1/8 \quad 1/16 \quad 1/16 \quad 1/4 \quad 1/16 \quad 1/4]$$

Take $M = 2$

- b) Compare digital modulation schemes with respect to Bandwidth, power requirements and Equipment complexity. 6

- 7. a) Find convolution code for the message 11011 for given convolution encoder. (Fig. 1) Also draw code tree for the same. 8



- b) What is polynomial representation ? Explain the same with suitable example. 6
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SLR-JP – 223

Seat No.	
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M.Sc. – II (Semester – III) Examination, 2015
ELECTRONICS (Communication Science)
Paper – XII : Internetworking and Data Communication

Day and Date : Wednesday, 22-4-2015

Total. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions : 1) Q. 1 and Q. 2 are **compulsory**.

2) Answer **any three** questions from Q. 3 to Q. 7.

3) **All** questions carry **equal** marks.

1. Objective questions. 14

a) Choose the correct alternatives : 8

1) Routers operate at which layer of the OSI Model ?

- A) Network
- B) Physical
- C) MAC sublayer of the Data Link layer
- D) Transport

2) Bits are packaged into frames at what layer of the OSI Model ?

- A) Physical
- B) Application
- C) Presentation
- D) Data Link

3) Which of the following are benefits of using a layered network model ?

- A) It facilitates troubleshooting
- B) It breaks the complex process of networking into more manageable chunks
- C) It allows layers developed by different vendors to interoperate
- D) All of the above

P.T.O.



- 4) The layer of the OSI Model, from the top down are
- A) Physical, Data Link, Network, Transport, Session, Presentation, Application
 - B) Application, Presentation, Session, Transport, Network, Data Link, Physical
 - C) Application, Encryption, Network, Transport, Logical Link Control, Physical
 - D) Session, Presentation, Data Transport, MAC, Network, Physical
- 5) Which of the following operates at the Presentation layer ?
- A) UDP
 - B) FTP and HTTP
 - C) MIDI and JPEG
 - D) SMTP
 - E) All of the above
- 6) Which of the following are Transport layer protocols ?
- A) CISC
 - B) TCP and UDP
 - C) HTTP and FTP
 - D) ATM
- 7) Which of the following are considered to be the upper layer protocols ?
- A) Application, Presentation and Session
 - B) Application
 - C) Application, Presentation, Session and Transport
 - D) Application and Presentation
- 8) Flow control takes place at what layer ?
- A) Transport
 - B) Application
 - C) Data Link
 - D) Network



b) State True or False :	6
1) Bridge and Routers work on same principle.	
2) Terrestrial Microwave is an Unguided media.	
3) Routing can be used for mobile hosts.	
4) Congestion control can be done in virtual subnets and Choke packets.	
5) Domain Name Specification is Website address.	
6) Sliding window is a Data Link Protocol.	
2. Answer in brief	14
1) List the modes of operation of HDLC.	5
2) What is the 'Channel Allocation Problem' ?	5
3) Compare between LAN and WAN.	4
3. a) State the functions of each layer in an OSI model.	10
b) Compare between TCP/IP and OSI model.	4
4. a) What is congestion in networks ? How is it controlled in TCP ?	10
b) Define DNS and give examples.	4
5. a) Explain the Shortest Path Routing Algorithm.	10
b) Compare between flow based and mobile host routing.	4
6. a) State and elaborate on the Design issues of physical layer.	8
b) What is unguided media ? How is it dealt with ?	6
7. a) With block schematics explain the different types of modems.	8
b) Why do we need Computer Networks ? State the applications of Computer Networks.	6



- 7) ISDN relies on _____ Kbps connections.
 a) 16 b) 32 c) 64 d) 128
- 8) ISDN datalink layer uses _____ protocol.
 a) LAPD b) LAPB c) LAPF d) HDLC

- B) Choose correct option **True/False**. **6**
- a) GFC function generates flow control information for placement in cell header.
- b) Retrieval services of B-ISDN are distributive services.
- c) I.113 standard defines the vocabulary terms for B-ISDN.
- d) DLCI is used to identify logical connection.
- e) Reference point S separates two networks in ISDN.
- f) Primary access is intended to provide low speed capabilities.

2. Answer **any three** : **(5+5+4)**
- 1) Explain the terms – circuit switching and packet switching.
- 2) Draw ISDN protocol at user network interface.
- 3) Explain central queuing in ATM switching.
- 4) Draw LAPB and LAPF protocols.
3. a) Explain in detail ATM switching matrix. **10**
- b) List the I series standards for ISDN. **4**
4. a) Explain in detail the header format for ATM cell. **8**
- b) Explain AAL-5 in detail. **6**
5. a) Explain header error control in ATM. **8**
- b) Explain SONET/SDH in brief. **6**
6. a) Explain physical layer in B-ISDN. **8**
- b) Explain ATM cell processing in a switch. **6**
7. a) Explain frame mode call control alternatives. **8**
- b) Compare X.25 and frame relay. **6**
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**M.Sc. II (Semester – IV) Examination, 2015
ELECTRONICS (Communication Science)
Paper – XIV : Mobile Communication**

Day and Date : Saturday, 18-4-2015

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

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

1. Objective questions.

A) Choose the correct alternatives.

8

- 1) Bluetooth is a wireless _____ technology that connects devices in a small area.
a) LAN b) MAN c) PAN d) WAN
- 2) _____ is based on client / server model.
a) DHCP b) FTP c) HTTP d) HDLC
- 3) A smaller cluster size in cellular system leads to a _____ capacity.
a) Small b) Large c) Medium d) All of these
- 4) _____ TCP does not maintain end-to-end semantics.
a) Snooping b) Indirect c) Mobile d) Traditional
- 5) _____ is a second generation cellular phone system based on CDMA and DSSS.
a) GSM b) D-AMPS c) IS – 95 d) GPRS
- 6) During handover _____ requires rerouting all connections and maintaining connection quality.
a) WATM b) WLAN c) WMAN d) WWAN



- 7) HIPERLAN is defined by
 a) IEEE b) ETSI c) ISO d) Both (a) and (b)
- 8) Wireless LAN standards defined by committee.
 a) IEEE 802.11 b) IEEE 802.15 c) IEEE 802.16 d) IEEE 802.5
- B) State the following statement is **True** or **False**. **6**
- 1) TDMA is a discontinuous transmission scheme.
 - 2) IMSI is a unique identify number, resides in EIR.
 - 3) The forward link in CDMA IS – 95 system uses 63 pilot channels.
 - 4) The access point is essential in ad hoc network.
 - 5) Bluetooth is an example of IEEE 802.11.
 - 6) The cluster size reserved for GSM is 7.
2. Answer in brief.
- a) Mention in brief application of wireless communication. **5**
 - b) Compare : Infrared and Radio transmission. **5**
 - c) Explain in brief Snooping TCP. **4**
3. a) Explain IEEE 802.11 system architecture and protocol architecture in detail. **10**
 b) Explain advantages and disadvantages of WLAN. **4**
4. a) Draw GSM network architecture. Explain the subsystems of GSM network with its functionality. **8**
 b) Write a short note on mobile and wireless devices. **6**
5. a) What is mean by cell ? How the cellular concept helped to solve the problem of spectral congestion and user capacity ? **8**
 b) Write a note on WATM services. **6**
6. a) Explain mobile IP in detail with IP packet delivery mechanism. **10**
 b) Compare : Infrastructure and ad-hoc network. **4**
7. a) Explain the following term with respect to Traditional TCP **8**
 i) Congestion control
 ii) Slow start
 iii) Fast retransmit /fast recovery.
- b) Explain registration mechanism in mobile IP. **6**
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**M.Sc. (Part – II) (Semester – IV) Examination, 2015
ELECTRONICS (Communication Science)
Paper – XV : Fiber Optic Communication**

Day and Date : Tuesday, 21-4-2015
Time : 3.00 p.m.to 6.00 p.m.

Max. Marks : 70

- Note :** 1) *All questions carry equal marks.*
2) *Question 1 and 2 are compulsory.*
3) *Write any three questions from question No. 3 to 7.*

1. Answer the following : 14
- A) Objective questions : 8
- 1) The word “laser” is an acronym for “Light Amplification by _____ of Radiation”.
- a) Stimulated Emission b) Spontaneous Emission
c) Absorption d) None of these
- 2) In laser diode, resonant cavity used is _____
- a) Fabri-parrot cavity b) Velocity modulation cavity
c) Mirror cavity d) None
- 3) In order to achieve population inversion it is necessary to excite atoms into the upper energy level E_2 and hence obtain a non-equilibrium distribution. This process is achieved using an external energy source and is referred to as _____
- a) Bombing b) Pumping c) Exiting d) Inversing
- 4) Attenuation in fiber is calculated as _____
- a) $10 \log (P_i/P_o)$ b) $10 \log (P_o/P_i)$
c) $20 \log (P_i/P_o)$ d) $20 \log (P_o/P_i)$

Where P_i -input power, P_o -output power.



3. Answer the following questions : 14
- a) Explain Ray theory of transmission for optical fiber. Also define critical angle, acceptance angle. 10
 - b) Explain different modes in optical fiber. 4
4. Answer the following questions : 14
- a) Explain liquid phase optical fiber formation technique. 8
 - b) Explain dispersion in optical fiber. 6
5. Answer the following questions : 14
- a) Explain Fusion splicing of optical fiber. 8
 - b) Explain hetero junction laser with neat diagram. 6
6. Answer the following questions : 14
- a) Explain principle of LED in details. 8
 - b) Explain Avalanche photodiode. 6
7. Answer the following questions : 14
- a) When the mean optical power launched into an 8 km length of fiber is $120 \mu W$, the mean optical power at the fiber output is $3 \mu W$. Determine :
 - a) the overall signal attenuation or loss in decibels through the fiber assuming there are no connectors or splices.
 - b) the signal attenuation per kilometer for the fiber.
 - c) the overall signal attenuation for a 10 km optical link using the same fiber with splices at 1 km intervals, each giving an attenuation of 1 dB
 - d) the numerical input/output power ratio in (c). 8
 - b) Explain coupling of optical fiber with LED. 6
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M.Sc. (Part – II) (Semester – IV) Examination, 2015
ELECTRONICS (Communication Science)
Paper No. – XVI : Communication Protocols

Day and Date : Thursday, 23-4-2015
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions:** 1) Q. No. 1 and 2 are **compulsory**.
2) Answer **any three** questions from Q. No. 3 to Q. No. 7.
3) **All** questions carry **equal** marks.

1. A) Multiple choice questions :

6

- 1) Flex Ray protocol is used in
 - a) Optoelectronics
 - b) Microcontroller
 - c) Automobiles
 - d) All applications
- 2) Which of the following is not a 1G standard ?
 - a) Nippon telephone and Telegraph
 - b) Global system for mobile communication
 - c) Advanced Mobile system for Phone System
 - d) Nordic Mobile Telephones
- 3) In Signaling System 7 of GSM, STP stands for
 - a) Standalone Port
 - b) Signal Transfer Port
 - c) Service Transfer port
 - d) None of the above
- 4) Modulation technique of IEEE 802.11b is
 - a) FSK
 - b) PPM
 - c) QAM
 - d) PSK
- 5) In GSM signaling protocol network Layer-3 is divided into
 - a) 2-Sublayers
 - b) 4-Sublayers
 - c) 3-Sublayers
 - d) 5-Sublayers
- 6) In UTRAN mobility managed by
 - a) SRNS
 - b) CRNC
 - c) DRNC
 - d) None of the above



- B) State **true** and **false** : **8**
- 1) Cells are always hexagonal.
 - 2) MIP maintains active TCP connections and UDP port binding.
 - 3) GPRS roaming is more difficult than GSM.
 - 4) RS-422 supports double ended mode operation.
 - 5) In 3G data rate of fast moving users is up to 2MBPS.
 - 6) FCCH is broadcast logical channel of GSM.
 - 7) I²C is faster than USB.
 - 8) Use of Wi-Fi is simple for local area network.
2. A) Explain GPRS logical channel. **5**
- B) Compare between MIPv6 and MIPv4. **4**
- C) Specify limitations of 1G cellular network. **5**
3. A) Explain propagation models for wireless networks. Derive the expression for Two-Ray Ground reflection model. **10**
- B) Discuss UMTS interfaces. **4**
4. A) Explain briefly 2G wireless cellular networks. Specify various standards of 2G networks. **10**
- B) Explain the term “MAGIC” related to 4G IP-network. **4**
5. A) Draw and explain GSM network architecture. **10**
- B) Write a note on SGSN of GPRS. **4**
6. A) Explain with suitable block diagram of the architecture of 802.16 standards. **10**
- B) Explain the L1N protocol briefly. **4**
7. A) List out different radio access technologies utilized under IMT-2000 group of 3G network. **10**
- B) What is I²C protocol ? List benefits of I²C. **4**
-