US – 406

VI Semester B.Sc. Examination, May 2017
(CBCS) (Fresh) (2016 – 17 & Onwards)
ELECTRONICS – VII
Communication – II

Time : 3 Hours

Max. Marks : 70

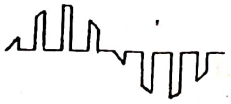
Instruction : *Answer* ***all*** *the questions from Part –* ***A, any five*** *from Part –* ***B*** *and* ***any four*** *from Part –* ***C.***

PART – A

Note : Answer **all** the questions of Part – **A** in **any one** page, answering the **same** question multiple times will **not** be considered for evaluation.

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

1. i) Pictorial representation of a typical PAM waveform is

a) 

b) 

c) 

d) 

ii) According to Nyquist rate,

a) the signal should be sampled at least twice each cycle of its lowest frequency

b) the signal should be sampled at least twice each cycle of its highest frequency

c) guard time should be as large as possible

d) guard time should be as small as possible

iii) Crosstalk occurs in a digital communication system due to

a) impedance mismatch

b) phase delay

c) over modulation of various carriers in a multiplexed system

d) simultaneous transmission of more signals

P.T.O.

iv) Maximum unambiguous range of a RADAR is decided by
a) nature of the target b) pulse repetition frequency
c) transmitted power d) capture area of the antenna

v) When the peak transmitted power in a RADAR is increased by a factor of 16 the maximum range changes by a factor of
a) 4 b) 8 c) 2 d) $\sqrt{2}$

vi) With reference to the satellite orbit, 'perigee' is the
a) farthest point in the orbit
b) nearest point in the orbit
c) point in the parking orbit
d) name of the boost motor that puts the satellite in the right parking slot

vii) For Global communication, the minimum number of satellites needed in Geo stationery orbit, is
a) 1 b) 3 c) 6 d) 4

viii) In satellite systems, the entire bandwidth of the channel is used at all the time in
a) FDMA b) TDMA
c) CDMA d) Both FDMA and CDMA

ix) A step index fiber has
a) Uniform distribution of refractive index
b) More value of refractive index at the centre and decreases towards the edges
c) More value of refractive index at the centre and decreases towards the edges in steps
d) Least value of refractive index at the centre and increases towards the edges

x) In an optical fiber, light travels along the fiber due to
a) refraction b) scattering
c) total internal reflection d) line of sight propagation

xi) The need for cell splitting is
a) Identification and authentication of the subscriber
b) Chatting and location based services
c) To meet the requirement of increased traffic
d) To overcome the power requirement

xii) Frequency reuse in cellular communication refers to
   a) allotting same frequency to many service providers
   b) sharing the same frequency by different channels
   c) using same frequency everyday
   d) using the same frequency for both Uplink and Downlink

xiii) IMEI number in a cell phone is the
   a) Information of Mobile Equipment Identity
   b) International Mobile Equipment Information Number
   c) International Mobile Equipment Identity Number
   d) Integrated Mobile Equipment Identity Number

xiv) The data rate of 3G system is around
   a) 2 Mbps b) 10 Mbps c) 20 Mbps d) 100 Mbps

xv) Wi-MAX is the wireless technology for
   a) Local Area Network b) Personal Area Network
   c) Wide Area Network d) Metropolitan Area Network

PART – B

Answer **any five** questions. **(5×7=35)**

2. a) Sketch the input and the output waveforms for ASK, FSK and PSK modulators.
   b) Mention the difference between the bit rate and the baud in digital communication system. **(5+2)**

3. Explain with a neat block diagram the functioning of a pulsed RADAR system. **(5+2)**

4. a) What is clutter in a RADAR system ?
   b) Draw the block diagram of a FM-CW RADAR and explain the function of each block. **(1+6)**

5. a) What are the different types of satellite orbits ?
   b) Draw the block diagram showing the uplink model of satellite sub system and explain its function. **(2+5)**

6. a) Explain with a necessary diagram, the working of PIN photo diode.
   b) Discuss the Rayleigh Scattering Loss in optical fibers. **(5+2)**

7. a) Write a note on the requirements of light sources in optical fiber communication system.

   b) Discuss with a necessary diagram the working of a semiconductor LASER diode. **(2+5)**

8. Draw the OSI Model Layers for a networking system and explain the function of each layer.

9. a) Explain 'roaming' and 'hand-off' with respect to cellular mobile communication system.

   b) Draw the block diagram of cellular phone handset. **(4+3)**

PART – C

Answer **any four** questions. **(4×5=20)**

10. A radio channel has a bandwidth of 6 kHz and 30 dB S/N ratio. Calculate the maximum information carrying capacity. What happens to the information carrying capacity if the S/N ratio becomes 20 dB.

11. List the advantages and disadvantages of digital communication over analog communication.

12. Calculate the maximum range of a radar system which operates at 3 cm with a peak power of 500 kW, if its minimum receivable power is 10^{-13} W, the capture area of its antenna is 5 m^2 and the radar cross-sectional area of the target is 20 m^2.

13. Calculate the path loss that occurs in a satellite system which operates with 4 GHz at a distance of

    i) 20000 Kms and

    ii) 36000 Kms.

14. Draw the block diagram of a satellite C band transponder and explain its operation.

15. A glass clad fiber is made with a core glass of refractive index 1.6. Cladding is doped to give a fractional difference of 0.005. Find the refractive index of cladding, critical internal angle of reflection and numerical aperture.

US – 407

VI Semester B.Sc. Examination, May 2017
(CBCS) (Fresh) (2016-17 and Onwards)
ELECTRONICS – VIII
Microcontrollers

Time : 3 Hours | Max. Marks : 70

Instructions : *Answer **all** 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. Answering the **same** questions in multiple pages will **not** be considered for valuation.*

PART – A

Answer **all** questions : **(15×1=15)**

1. 1) Which is said to be 'computer on a chip' ?
   a) Microprocessors b) Microcontrollers
   c) Both d) None of the above

   2) The 8051 has _____ parallel I/O ports.
   a) 2 b) 3 c) 4 d) 5

   3) The register that provides control and status information about serial port is
   a) IP b) IE
   c) TCON d) PCON and SCON

   4) The symbolic code for each instruction in assembly language programming is called as
   a) Mnemonic b) Operand c) Comment d) Op-code

   5) Which operator is used to indicate register indirect addressing ?
   a) $ b) # c) @ d) &

   6) The content of the register A after the execution of the following code is
   MOV A, #85H
   SWAP A
   a) 85 b) 58 c) 53 d) 35

7) The contents of the accumulator after this operation
MOV A, #2BH
XRL A, #78H
a) 2B H b) 54 H c) 3B H d) 28 H

8) After division operation instruction the quotient is stored in _____ register and the remainder is stored in _____ register.
a) A, B b) B, A c) A, A d) B, B

9) The register used for accessing external data memory is
a) DPH b) DPL c) DPTR d) None

10) If Timer 0 is to be used as a counter, then the pin at which clock pulse is to be applied is
a) P3.3 b) P3.4 c) P3.5 d) P3.6

11) Magnitude of the unsigned char data type is
a) 0 to 255 b) 0 to 256 c) –128 to 127 d) –127 to 128

12) Relative range for a branch instruction is
a) +127d to –128d b) –128d to +128d
c) –128d to –128d d) 127d to 128d

13) MOVX instruction is used access
a) External data memory b) Internal data memory
c) External memory d) Internal memory

14) The I/O port which does not have a dual-purpose role is
a) Port 0 b) Port 1 c) Port 2 d) Port 3

15) The step size for an 8-bit ADC interfaced to a 8051 microcontroller, with a reference voltage V_{ref} of 4 volt is
a) 15.62 mv b) 250 mv c) 20 mv d) 10 mv

PART – B

Answer **any five** questions : **(5×7=35)**

2. With a neat block diagram, explain the internal architecture of 8051. **7**

3. a) Explain internal RAM organization of an 8051 microcontroller. **(4+3)**
b) Explain the bit format of PSW register.

4. a) What are addressing modes ?

   b) With an example explain : (1+6)
      i) immediate addressing
      ii) register addressing
      iii) direct addressing modes of 8051 microcontroller.

5. Explain the interrupts of 8051 microcontroller. 7

6. a) Correct the syntax of the following instructions. (3+4)
      i) MOVA, @ R_7
      ii) MOV R_2, R_3
      iii) MOV #C, 0A

   b) List any 4 bit level logical instructions of 8051 microcontroller.

7. a) Write a note on stack and stack pointer of 8051 microcontroller. (3+4)

   b) Distinguish between ACALL and LCALL instructions in 8051 microcontroller.

8. Differentiate between a counter and a timer. Explain the timer modes of operations in 8051. (2+5)

9. With necessary diagram, explain the interfacing of 8051 to DAC. 7

PART – C

Answer **any four** questions : **(4×5=20)**

10. Draw the bit structure of TMOD register of 8051 and mention the function of each bit. 5

11. Write a program to add FFh and FEh stored in memory locations 30h and 31h and store the result in the consecutive memory locations. 5

12. Write a program to find the largest of five 8-bit numbers stored in memory locations 50 h and 54 h. Store the result in the memory locations 55 h. 5

13. Write a C-program to toggle the bits of P1 continuously with a 250 ms delay for a processor with crystal frequency 11.0592 MHz. 5

14. Write the bit assignment and specify each bit of SCON register. 5

15. With the necessary diagram, explain the interfacing of LCD to PIC 16F877A. 5