SLR-UH-296

Seat No.	

Set P

M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Electronic Science
COMMUNICATION SYSTEMS

Time: 2½ Hours 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) BPSK stands for _____.
   a) Binary Phase Shifting Key b) Broad Phase Shifting Key
   c) Bit Phase Shifting Key d) Binary Pulse Shifting Key

2) Probability of error in DPSK is less than PSK _____.
   a) true b) false
   c) equal d) depend upon noise

3) Two sine waves of amplitude A_1 and A_2 are multiplied. The amplitude of the spectral component is _____.
   a) $\frac{A_1A_2}{2}$ b) A_1A_2
   c) $\frac{A_1A_2}{4}$ d) $(A_1A_2)^{1/2}$

4) The phase of colour subcarrier burst in PAL is along the axis at _____.
   a) $+180^0$ b) -180^0
   c) $\pm 180^0$ d) $\pm 45^0$

5) The resonant frequency of an R_F amplifier is 1 MHz and its bandwidth is 10 KHz. The Q factor will be _____.
   a) 10 b) 100
   c) 0.01 d) 0.1

6) An AM signal is detected using an envelope detector, the carrier frequency and modulating single frequency are 1 MHz and 2 KHz respectively. An appropriate value for the time constant of the envelope detector is _____.
   a) 500 μ sec b) 20 μ sec
   c) 0.2 μ sec d) 1 μ sec

7) If transmitted power is 10 kW, the field strength at a distance d is 50 mV/m. If transmitted power is reduced to 2.5 kW, the field strength at the same point will be _____.
   a) 25 mV/m b) 12.5 mV/m
   c) 6.25 mV/m d) 3.125 mV/m

8) The carrier frequency will be _____, if L = 50 μH and C = 1 nF.
   a) 512 b) 612 kHz
   c) 712 kHz d) 812 kHz

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

1) A digital signal is a smoothly and continuously varying voltage or current.
2) Examples of transceivers include televisions, fax machines, cellular telephones, and computer modems.
3) All electronic communication systems have a transmitter, a communication channel or medium, and an antenna.
4) A receiver is a collection of electronic components and circuits that accepts the transmitted message from the channel and converts it to a form understandable to humans.
5) Optical media communication channels are used for audio or video analog signals.
6) The communication channel is the medium by which the electronic signal is sent from place to place.

Q.2 Attempt the following:-

a) Explain the block diagram of F.M. transmitter. **05**
b) Differentiate between Class A and Class C power amplifiers. **05**
c) Write a note on FSK. **04**

Q.3 a) Explain the effect of cross talk in TDM. **08**
b) How PTM signals are demodulated? Explain. **06**

Q.4 a) Differentiate between Bipolar, RZ and NRZ transmission modes. **08**
b) Explain the modulation process of ASK with a block diagram. **06**

Q.5 a) What is signal tracking? Explain in detail. **08**
b) List the characteristics of PN sequences. **06**

Q.6 a) What is CDMA? Explain in detail. **08**
b) Discuss the course synchronization of FM signal. **06**

Q.7 a) Explain Sampling theorem. **08**
b) Explain the demodulation of PPM signals. **06**

SLR-UH-297

Seat No.	

Set P

M.Sc. (Semester - I) (CBCS) Examination Mar/Apr-2018
Electronic Science
MICROCONTROLLERS AND INTERFACING

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Questions 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.

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

1) What decides the bit size of the microcontroller?
   a) Data bus b) Address bus
   c) ALU d) Program counter

2) What is the size of on-chip data memory of 8051?
   a) 128 bytes b) 4KB
   c) 256 bytes d) 8KB

3) How many interrupts are there for 8051?
   a) 2 b) 4
   c) 5 d) 7

4) What is the range of LM35 temperature sensor?
   a) -50^0C to 150^0C b) 0^0C to 150^0C
   c) 0^0C to 100^0C d) -50^0C to 100^0C

5) Transducer used for measurement of displacement is _____
   a) Thermister b) LVDT
   c) LDR d) Thermocouple

6) The _____ register is not bit addressable.
   a) P0 b) SCON
   c) TCON d) SP

B) State true or false. **08**

1) There are 20 SFRs available in 8051.
2) MCU 8051 have 4KB of program memory.
3) Range of ADC 0809 is 0 – 10V.
4) Tachogenerator is to measure voltage.
5) LM35 is unable to measure negative temperature.
6) The sensitivity of thermocouple is high.
7) Accelerometer is used for measurement of pressure.
8) GSM modem is interfaced to the 8051 with its on-chip serial port.

Q.2 a) What is matrix keyboard? **05**
b) Describe in brief serial port of 8051 in different modes. **05**
c) Write a note on thermister. **04**

Q.3 a) Explain the addressing modes of 8051 and working of on-chip port-0 of 8051. **10**
b) Discuss the classification of instruction set of 8051. **04**

Q.4 a) What is an Interfacing? Explain interfacing of DAC with 8051 and write an ALP to generate triangular wave using the same. **10**
b) Write necessary ALP to read key code from it. **04**

Q.5	**a)**	With help of a diagram, explain interfacing of LCD with 8051. Write a program to display the “SOLAPUR UNIVERSITY, SOLAPUR”	**10**
	b)	Explain how to measure current with 8051.	**04**
Q.6	**a)**	With a good sketch, explain interfacing of Humidity sensor with 8051.	**10**
	b)	Explain how accelerometer can be interfaced with 8051.	**04**
Q.7	**a)**	With neat diagram, explain interfacing of GSM module with 8051.	**10**
	b)	What is PS-2 keyboard?	**04**

SLR-UH-299

Seat No.	

Set P

M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018
Electronic Science
CONTROL SYSTEMS

Time : 2½ Hours 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) A system with gain margin close to unity or a phase margin close to zero is _____
   a) highly stable b) oscillatory
   c) relatively stable d) unstable

2) Which condition is used to verify the existence of a particular point on the root locus?
   a) amplitude b) frequency
   c) magnitude d) angle

3) Which among the following are the elements of rotational motion?
   a) Mass, spring, friction b) Inertia, damper, spring
   c) Work, energy, power d) Force, pressure, viscosity

4) In the P-D controller, the derivative action plays a significant role in increasing _____ of response.
   a) time b) distance
   c) speed d) volume

5) A _____ system obeys the principle of superposition.
   a) Linear b) Non-linear
   c) Static d) Dynamic

6) The root locus is _____.
   a) An algebraic method b) A graphical method
   c) Combination of both d) None of these

7) From Routh's criterion all the terms in the _____ column of Routh's array must have same sign.
   a) first b) second
   c) third d) fourth

8) If there are repeated roots of the characteristics equation are on the imaginary (jw-axis), the system is _____
   a) stable b) unstable
   c) oscillatory d) conditionally stable

Q.1 B) State true and false : 06

1) Settling delay time is frequency domain specification.
2) The ramp signal is used as standard test signals for time domain studies.
3) Bode plot represent the two separate plots of magnitude and phase against frequency in logarithmic value.

4) The fundamental function of a tachogenerator is the conversion of rotational speed into proportional voltage.
5) By equating the denominator of transfer function to zero, poles will be obtained.
6) In mechanical translational system force is replaced by voltage in electrical system.

Q.2 Attempt the following:-

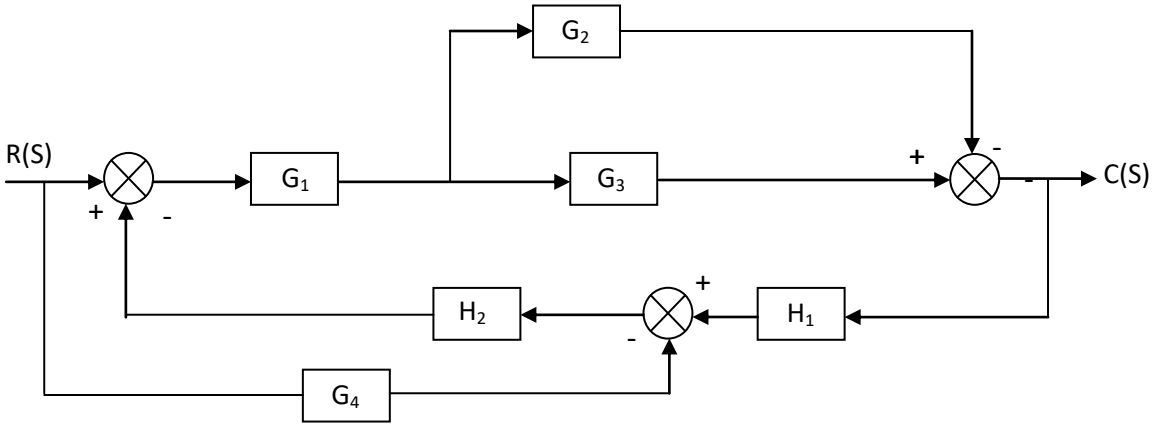
A) Explain stability analysis using Routh's criterion. **05**

B) Explain DC tachogenerator and represent in block diagram form. **05**

C) Describe the concept of poles and zeroes. **04**

Q.3 A) Draw and explain RLC circuit and obtain its transfer function. **08**

B) Reduce the following diagram and obtain its transfer function. **06**



Q.4 A) Design and calculate the transfer function for the following compensator: **10**
1) Lead compensator
2) Lag compensator

B) Write a note on classifications of control system. **04**

Q.5 A) Consider unity feedback system with G(S).H(S) = K/S(S+2). Obtain its roots locus. **08**

B) Determine the stability of a given characteristic equation by Routh's method: **06**

$F(s) = S^3 + 6S^2 + 11S + 6 = 0$ is characteristic equation.

Q.6 A) Explain the time response of second order system subject to unit step input for the following cases: **10**
1) under-damped
2) critically damped

B) List the advantages and disadvantages of P controller. **04**

Q.7 A) Explain the state space representation for the following: **10**
1) Electrical Network
2) n^{th} order differential equation

B) Compare : Open loop system and closed system **04**

SLR-UH-300

Seat No.	

Set P

M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018
Electronic Science
DIGITAL ELECTRONICS AND VHDL

Time : 2½ Hours 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) Which logic level is not supported by verilog?
   a) U b) X
   c) Z d) None of the above

2) Verilog supports _____ dimensional array of registers, integers, nets or times.
   a) one b) two
   c) three d) both a and b

3) The _____ may execute in non-zero simulation time.
   a) function b) task
   c) both a and b d) none of these

4) Which among the following is/are identical in Mealy and Moore machines?
   a) Combinational output signal b) Clocked process
   c) Both a and b d) None of the above

5) Which operators has highest precedence in Verilog?
   a) Unary b) Multiplication
   c) Addition d) Conditional

6) How may stable state/states present in flip-flop?
   a) 2 b) 6
   c) 0 d) 8

7) Which among the following are used in programming array logic (PAL) for reducing the loading on inputs?
   a) Output buffers b) Input buffers
   c) OR matrix d) AND matrix

8) Enable input of shift register is called a _____
   a) load b) store
   c) reset d) strobe

Q.1 B) State true and false : 06

1) Gate-level modeling is virtually the lowest-level of abstraction.
2) A ring counter is a type of combinational logic circuits.
3) Each square in a karnaugh map represents a maxterm.
4) The repeat loop block continuously executes the block for a given number of times.
5) Binary counter that counts incrementally and decrementally is called up counter.
6) A blocking assignment statement is executed in the order they are specified in a sequential block.

Q.2 Attempt the following:-

1) Mention the advantages and disadvantages referred to PAL. **05**
2) Design a full adder with its truth table. **05**
3) Briefly explain lexical conventions in Verilog. **04**

Q.3 A) Design 3:8 decoder and draw its logic diagram. **08**

B) What is ripple counter? **06**

Q.4 A) Design a 2-bit comparator with its truth table. **08**

B) Explain state table reduction and state assignment technique using the state table given below: **06**

Present State	Next State		Output (z)	
	Input (x)		Input (x)	
	X = 0	**X = 1**	**X = 0**	**X = 1**
*A	A	B	0	0
B	D	C	0	1
C	F	E	0	0
D	D	F	0	0
E	B	G	0	0
F	G	C	0	1
G	A	F	0	0

Q.5 A) Design and implement a full adder using Verilog HDL with gate level modeling (use half adder). **10**

B) Write a Verilog code for 8-bit binary counter using behavioral modeling. **04**

Q.6 A) Explain in detail behavioral modeling in Verilog with suitable example. **10**

B) Write a short note on shift registers. **04**

Q.7 A) Draw an architecture of CPLD and explain in brief. **08**

B) Write a Verilog HDL code for 2:4 decoder using data flow modeling. **06**

SLR-UH-301

Seat No.	

Set P

M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018
Electronic Science
PIC MICROCONTROLLER

Time : 2½ Hours 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) PIC18Fxxxx is _____ bit microcontroller.
   a) 4 b) 8
   c) 18 d) 32

2) ____ is not true about PIC microcontroller.
   a) It is a RISC microcontroller
   b) It has Von-Neumann architecture
   c) It has separate program and data memories
   d) None of these

3) With 4MHz clock crystal, the execution time of PIC instruction is _____.
   a) 1 μs b) 0.1 μs
   c) 10 μs d) ¼ μs

4) ____ PIC register controls port I/O direction.
   a) INDF b) IODIR
   c) TRISA d) PCLATH

5) _____ instruction/instructions do not clear the watchdog timer of PIC.
   a) CLRWDT b) CLEAR
   c) SLEEP d) both b and c

6) In PIC18Fxxxx devices the stack allows any combination of up to _____ program calls and interrupts to occur.
   a) 6 b) 8
   c) 16 d) 31

7) PIC microcontrollers RETURN instruction takes _____ machine cycles to execute.
   a) 1 b) 2
   c) 4 d) 8

8) _____ device use SDA/SCL lines.
   a) RS232 b) I^2C
   c) SPI d) all of these

Q.1 B) State true and false : 06

1) The Program Counter of PIC18Fxxxx device is 21 bits wide.
2) GOTO is a conditional jump instruction.
3) Most PORT pins of PIC microcontroller can drive LED directly.
4) For PIC18Fxxxx devices, the WDT is driven by the INTRC source.
5) PIC microcontroller is Reset by holding the MCLR pin high.
6) LM35 sensor is calibrated digital output temperature sensor.

Q.2	**Give a brief account of:-**		
	A)	List main features of PIC18Fxxxx microcontrollers.	**05**
	B)	Write a short note on PicKit2 kit.	**05**
	C)	Explain the need of optocoupler.	**04**
Q.3	**A)**	Draw and explain the architecture of PIC microcontroller.	**08**
	B)	Write a program to generate square wave on PORTB_0 pin.	**06**
Q.4	**A)**	What is the need of RESET? Explain the reset sources of PIC18Fxxxx microcontroller.	**10**
	B)	Explain the applications of Timer in embedded systems.	**04**
Q.5	**A)**	Give a brief overview of MPLAB IDE.	**10**
	B)	Explain any two assembler directives.	**04**
Q.6	**A)**	Design a humidity measurement system in RH% around PIC18Fxxxx microcontroller.	**08**
	B)	Write a program to transfer message “Hello” serially to PC with baud rate 2400, assume crystal frequency of 20MHz.	**06**
Q.7	**A)**	Draw a schematic of DAC interfacing with PIC microcontroller and write a program to generate saw-tooth wave at the DAC output.	**08**
	B)	Draw schematic and write a program to drive Bicolor LED using PIC microcontroller.	**06**

SLR-UH-303

Seat No.	

Set P

M.Sc. (Semester - III) (New) (CBCS) Examination Mar/Apr-2018
Electronic Science
DIGITAL SIGNAL PROCESSING

Time : 2½ Hours 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) Signal with _____energy is called energy signal.
   a) zero b) infinite
   c) finite d) static

2) A discrete time signal is said to be even when _____
   a) x[n] = -x[n] b) x[n] = x[-n]
   c) x[n] = x[n-1] d) x[n] = x[-n-1]

3) For 8-point DFT, there are _____ stages.
   a) 1 b) 4
   c) 3 d) 8

4) Z – transform is a _____ operator.
   a) Linear b) Complex
   c) Integral d) Differential

5) If x(n)=1 for 0<n<3, then its z-transform X(Z) = _____
   a) $1+z^{1}+ z^{2}+ z^{3}$ b) $1-z^{1}- z^{2}- z^{3}$
   c) $1+z^{-1}+ z^{-2}+ z^{-3}$ d) $1-z^{-1}+ z^{-2}+ z^{-3}$

6) If x(n) is a input to z^{-1} building block, its output y(n) is _____
   a) x(n+1) b) x(-n)
   c) –x(n) d) x(n-1)

7) SFG form is called as _____.
   a) Transmittance form b) Admittance form
   c) Transposed form d) Sampling form

8) IIR digital filter is a _____.
   a) Recursive filter b) non-recursive filter
   c) quantized filter d) band-limited filter

Q.1 B) State true and false: 06

1) $S_1 = Ae^{j\omega t}$ is an example of complex valued signal.
2) A delay of signal is represented as x(n-k) if k is +ve.
3) Z-transform may be viewed as the DTFT.
4) The DFT provides a convenient way to perform convolution.
5) In DIF-FFT, output is in natural order.
6) Direct form-II realization is obtained by combining two transfer functions.

Q.2 **Give a brief account on –** **14**

A) Quantization
B) Properties of Z-transform
C) Cascade form of IIR

Q.3 **A)** If x(n)={-1,2,3,0,1,-2,-3}, draw a neat labeled discrete time signal diagram for **10**

i) x(n)
ii) x(n-2)
iii) x(-n+1)
iv) x(n+2)

B) Perform circular shift operation on x(n)={1,2,-1,0,3,4} to obtain y(n) as: **04**

i) x(n+2)
ii) x(n)*x(n-1)

Q.4 **A)** Describe the DIF-FFT algorithm. **10**

B) What is radix-2 DIT algorithm? **04**

Q.5 **A)** For a given sequence x(n), x(0)=1, x(1)=2, x(2)=3, x(3)=4 and x(n)=0 elsewhere. Find the DFT for the first four points. **10**

B) Find the IDFT using DIF method for the above x(n). **04**

Q.6 **A)** Distinguish between IIR and FIR digital filters. **10**

B) Obtain a parallel form of IIR system given by a system function **04**
$H_1(z) = (1+2z^{-1}+5z^{-2})/(1+4z^{-1}+5z^{-2})$ and $H_2(z) = (1+4z^{-1}+8z^{-2})/(1+3z^{-1}+6z^{-2})$

Q.7 **A)** Give a brief note on notch and comb filter. **10**

B) Consider a system function $H(z) = (1+0.5z^{-1})/(1+0.3z^{-1}+0.8z^{-2})\ (1-0.75z^{-1})$. **04**
Draw a SFG for the system using

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.

SLR-UH-312

Seat No.	

Set P

M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-2018
Electronics Science
OPTIC FIBER COMMUNICATION

Time: 2½ Hours 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 Select the most correct alternative **14**

1) Intrinsic absorption window is _____.
   a) 0.8 to 1.7 um b) 1.7 to 3.7 um
   c) 0.1 to 0.8 um d) 4.2 to 10 um

2) Graded index optical fiber behaves as the step index, when profile parameter is _____.
   a) $\alpha = 1$ b) $\alpha = 2$
   c) $\alpha = 10$ d) $\alpha = \infty$

3) Dispersion of light is low in _____ optical fiber.
   a) Multimode step index b) Single mode step index
   c) Multimode graded index d) Single mode graded index

4) Core diameter of single mode step index fibers _____.
   a) 100 to 1000 μm b) 10 to 30 μm
   c) 2 to 10 μm d) 50 to 100 μm

5) GaAs material is _____band gap material.
   a) Direct b) Indirect
   c) Both a) and b) d) None of the above

6) _____ gives very low loss while connecting the optical fiber.
   a) Fusion splice b) Mechanical splice
   c) Multicarrier system d) ASK heterodyne detection

7) Double-hetero junction LED has quantum efficiency of _____.
   a) 90-100% b) 10-40%
   c) 60-80% d) None of the above

8) In optical waveguide _____ is absent.
   a) Current density b) Magnetic field
   c) Electric field d) Electric flux density

9) As per the attenuation spectra for some common mid- and far-infrared fibers, it is found that _____ fiber has very low loss.
   a) Sapphire b) Chalcogenide glasses
   c) Hollow glass d) Fluoride glass

10) ST-connectors in optical fibers give _____ db loss.
   a) 0.60-1.00 b) 0.20-0.50
   c) 0.01-0.15 d) 0.30-0.60

11) Germanium devices are used in the _____ region.
   a) Near infrared
   b) Far infrared
   c) Both a) and b)
   d) Visible

12) Raman scattering optical power threshold is _____ orders of magnitude greater than the Brillouin threshold.
   a) Two
   b) Three
   c) Four
   d) Five

13) Microbending losses are caused by _____.
   a) During the manufacturing process
   b) Cable installation process
   c) Due to environmental effects
   d) All of the above

14) _____ ferrule connectors can be assembled in housings to form multiple-fiber configurations.
   a) Only cylindrical
   b) Only biconical
   c) Both cylindrical and biconical
   d) None of the above

Q.2 Answer the following.

a) What is a PIN photodiode? **05**

b) Explain Rayleigh scattering. **05**

c) Write a note on Fusion splices. **04**

Q.3 a) Explain in detail the following terms. **10**
   1) Total internal reflection
   2) Acceptance angle

b) What are the advantages of optical fiber communication? **04**

Q.4 a) Explain Liquid-phase techniques with suitable sketch. **10**

b) Give a brief account of vapor axial deposition. **04**

Q.5 a) A typical relative refractive index difference for an optical fiber designed for long distance transmission is 1%. Estimate the numerical aperture and the solid acceptance angle in air for the fiber when the core index is 1.46. Also, calculate the critical angle at the core-cladding interface within the fiber. (It may be assumed that the concepts of geometric optics hold for the fiber). **08**

b) Write a short note on LED. **06**

Q.6 a) What are the advantages of semiconductor injections laser over other semiconductor sources? Draw and explain schematic diagram of a GaAs homojunction injection laser. **10**

b) What is dispersion? **04**

Q.7 a) Draw and explain optical communication system. Discuss the applications of optical fiber. **10**

b) Give a brief account of the mid-infrared detector. **04**

SLR-UH-313

Seat No.		Set	P

M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-2018
Electronics Science
POWER ELECTRONICS

Time: 2½ Hours 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 Select the most correct alternative. **14**

1) SMPS is used for _____.
   a) Obtaining regulated ac power supply
   b) Obtaining regulated dc power supply
   c) Storage of dc power
   d) Switch from one source to another

2) SMPS can be used as an _____.
   a) AC to DC converter, for use in many mains powered circuits,
   b) DC to DC converter
   c) Both a and b
   d) None of these

3) The class A commutation or load commutation is possible in case of ____.
   a) DC circuits only b) AC circuits only
   c) Both DC and AC circuits d) None of the above mentioned

4) An SCR is usually turned on by _____.
   a) Break over b) A gate trigger
   c) Latching current d) Holding current

5) Thyristor can be protected from over voltages by using _____.
   a) voltage clamping device b) fuse
   c) heat sink d) snubber circuit

6) The _____ converter is used in SMPS circuits where the DC output voltage needs to be higher than the DC input voltage.
   a) Buck b) Cük
   c) Boost d) Buck-Boost

7) A thyristor (SCR) is a _____.
   a) P-N-P device b) N-P-N device
   c) P-N-P-N device d) P-N device

8) di/dt protection is provided to the thryistor by _____.
   a) Connecting an inductor in parallel across the load
   b) Connecting an inductor in series with the load
   c) Connecting an inductor in parallel across the gate terminal
   d) Connecting an inductor in series with the gate

9) The local hot spot formation in the cross-section of the SCR is avoided by _____
   a) reducing the junction temperature
   b) applying gate current nearer to the maximum gate current
   c) using only r loads
   d) proper mounting of the scr on heat sink

10) DC choppers converts _____.
   a) AC to DC
   b) DC to AC
   c) DC to DC
   d) AC to AC

11) A triac is a _____ switch.
   a) Bidirectional
   b) Unidirectional
   c) Mechanical
   d) None of these

12) For a single phase thyristor circuit with R load & firing angle α, the conduction angle can be given by _____.
   a) $\pi + \alpha$
   b) $2\pi + \alpha$
   c) $\pi - \alpha$
   d) α

13) In the principle of phase control, _____.
   a) the load is on for some cycles and off for some cycles
   b) control is achieved by adjusting the firing angle of the devices
   c) control is achieved by adjusting the number of on off cycles
   d) control cannot be achieved

14) Which is the disadvantage of an ac voltage controller?
   a) High efficiency
   b) Flexibility in control
   c) Less maintenance
   d) Harmonics in the supply current

Q.2	**Attempt the following.**		**14**
	a)	Discuss the complex characteristics of an SCR.	**05**
	b)	What are the different methods to turn on the thyristor?	**04**
	c)	What is meant by SMPS? What are different types of SMPS	**05**
Q.3	**a)**	Explain in detail SCR with its relevant diagrams.	**10**
	b)	What is a snubber circuit?	**04**
Q.4	**a)**	What is a forced commutation? Explain class A and B forced commutation techniques of thyristor in detail.	**10**
	b)	What is meant by di/dt protection?	**04**
Q.5	**a)**	Describe the working principle of a boost regulator with relevant waveforms.	**10**
	b)	Compare: SMPS with conventional power supply.	**04**
Q.6	**a)**	Draw and explain the single phase half controlled bridge rectifier with R and RL load.	**10**
	b)	Freewheeling diode improves the load current waveform - Comment.	**04**
Q.7	**a)**	Draw and explain the single phase half wave controller with R and RL load.	**10**
	b)	What is an ON-OFF control?	**04**

SLR-UH-314

Seat No.	

Set P

M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-2018
Electronics Science
ADVANCED MICROCONTROLLER

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Questions 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) Select the most correct alternative: **08**

1) RISC stands for _____
   a) Reduced instructions set computer
   b) Reduced instruction set controller
   c) Reduced instruction set calculator
   d) Reduced instruction set comparator

2) External oscillator pins of controller is _____
   a) XTAL1 & XTAL2 b) XTER1 & XTER2
   c) XLAT1 & XLAT2 d) None of the above

3) An arduino IDE uses _____ Language.
   a) Java b) C
   c) C++ d) Python

4) Relay is _____
   a) Electromechanical switch b) Electronic Switch
   c) Mechanical Switch d) None of the above

5) Opto-coupler is used as
   a) Optical isolator b) Mechanical isolator
   c) Voltage Isolator d) None of the above

6) Oscillator calibration register is _____
   a) OSCCAL b) OSCAL
   c) OSC d) OSCCCAL

7) Arduino voltage read function _____
   a) Analog read b) Analog _read
   c) analogRead d) analog read

8) SPI is a _____ wired interface protocol.
   a) 2 b) 3
   c) 4 d) 5

B) State true or false. **06**

1) Global interrupt enable bit presents in SREG.
2) For push instruction stack pointer is decremented by one.
3) Reset is not an Interrupt.
4) I/O locations are accessed by IN & OUT instructions.
5) CBI & SBI instructions will operate in byte in I/O register.
6) LM 35 is a pressure sensor.

Q.2 Attempt the followings:

a)	Explain features of simulator in AVR IDE (studio)	**05**
b)	Explain the operations of UART of AVR microcontroller	**05**
c)	Discuss various types of architectures of ARM.	**04**
Q.3 a)	Explain general purpose Register files in AVR.	**06**
b)	With a neat diagram explain analog comparator.	**08**
Q.4 a)	What is an ARM? Explain the processor modes of ARM microcontroller.	**08**
b)	What are program status registers of ARM microcontroller	**06**
Q.5 a)	Explain the reset and interrupt in AVR microcontroller.	**08**
b)	What is SRAM direct addressing?	**06**
Q.6 a)	With block a diagram explain working of ATmega16A.	**08**
b)	Explain memories of AVR microcontroller.	**06**
Q.7 a)	Explain PWM generation using arduino board.	**08**
b)	Explain interfacing of Switches and LEDs with Arduino board.	**06**

SLR-UH-315

Seat No.		Set	P

M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-2018
Electronics Science
SATELLITE COMMUNICATION

Time: 2½ Hours Max. Marks: 70

Instructions: 1) Questions 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) Select the most correct alternative: **14**

1) Orbital velocity of Iridiam (LEO) satellite system is _____, if the orbital height of the system is 780km.
   a) 3.0747 km/s b) 4.8954 km/s
   c) 1.1272 km/s d) 7.4624 km/s

2) _____ angle is an angle that the orbital plane makes with the equatorial plane.
   a) Elevation b) Azimuth
   c) Inclination d) Argument of perigee

3) At the point of Greenwich meridian, _____.
   a) Longitude is 0° b) Longitude is 180°
   c) Latitude is 360° d) Latitude is 90°

4) Which of the following is NGSO orbit?
   a) Equatorial orbit b) Elliptical orbits
   c) Sun synchronous orbit d) All of the above

5) A _____ satellite can make better use of its solar cell area.
   a) Spinner b) 3-axis stabilized
   c) LEO d) GEO

6) A dish antenna is a type of _____ antenna.
   a) Patch b) Reflector
   c) Array d) Wire

7) Outage time of Ka-band is _____ per year.
   a) 0.01% b) 0.1%
   c) 0.1-0.5% d) 0.5%

8) Change in the orbital plane is called _____.
   a) Doppler shift b) Retrograde
   c) Transit outage d) Precession

9) The orbital period of GPS satellite is equal to _____
   a) One sidereal day b) Half of a sidereal day
   c) 5hr 55min 48.4s d) 1hr 40 min 27s

10) Eccentricity of the molniya orbit is _____.
   a) 1 b) 0
   c) Greater than 1 d) 0.74

11) The diameter of a DTH antenna is _____.
   a) 0.45-0.9m b) 1m
   c) 5m d) 5-8 m

12) _____ orbit satellite maintains a constant aspects angle with the direction of sun.
   a) LEO b) MEO
   c) GEO d) Sun synchronous

13) An amplifier has a quoted noise figure of 2.5 dB. What is its equivalent noise temperature?
   a) 290K b) 120k
   c) 226k d) 279K

14) _____ constellation is specially designed for business links.
   a) GPS b) VSAT
   c) Iridium d) Teledesic

Q.2 Answer the following:

a) Explain TTC & M system. **05**
b) Explain uplink design. **05**
c) What is reliability? **04**

Q.3 **a)** Explain the look angle determination. Derive elevation and azimuthal angles. **10**
b) What are the selection factors of launch vehicle? **04**

Q.4 **a)** Explain the communication sub-system of a satellite. Give a brief account of transponder with a neat block diagram. **10**
b) Comment on three prototype models of space qualifications. **04**

Q.5 **a)** Give the brief explanation of system noise temperature. **10**
b) Discuss the satellite systems using small earth stations. **04**

Q.6 **a)** What is DBS-TV? Explain digital DBS-TV. **08**
b) Explain coverage and frequency considerations of NGSO satellite. **06**

Q.7 **a)** Explain the following segments of a GPS system. **10**
   1) Space
   2) User
   3) Control
b) What are the advantages of satellite communication? **04**