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M.Sc. (Semester - I) (New) (NEP CBCS) Examination: March/April-2024
ELECTRONICS SCIENCE
Electronic System Design (2320101)

Day & Date: Friday, 10-05-2024
 Time: 03:00 PM To 05:30 PM

Max. Marks: 60

- Instructions:** 1) Question No. 1 and 2 are compulsory.
 2) Attempt any three questions from Q. No 3 to Q. No 7
 3) Figures to the right indicate full marks.

Q.1 A) Choose Correct Alternative.

08

- 1) In a Digital system Multiplexers are used _____.
 a) To accepts the single o/p b) To accept multiple i/p
 c) To accept multiple o/p d) To accept single input.
- 2) Piezoelectric transducer consists of _____.
 a) copper rod b) aluminum wire
 c) gold crystal d) quartz crystal
- 3) Which one of the following is the example of linear regulator?
 a) transistor series regulator b) SMPS
 c) step down converter d) All the of above
- 4) In Astable multivibrator both states are _____.
 a) unstable b) one state is stable
 c) both state stable d) none of the above
- 5) Which of the following circuits is used in the signal conditioning?
 a) Amplification b) Isolation
 c) Filtering d) All of above
- 6) Zener diode is used as _____ regulator.
 a) series
 b) shunt
 c) can be used as series or shunt
 d) none of above
- 7) Clock generator can be design by using the _____ gate.
 a) Inverter b) NAND gate
 c) AND gate d) a and b
- 8) The input impedance of the instrumentation amplifier in thermocouple signal conditioning should be _____.
 a) Infinite b) Very small
 c) Zero d) High

B) State true or false

04

- 1) The response of a thermistor overs the whole of its temperatures range is linear.
- 2) A capacitance transducer can be used to measure displacement.
- 3) For accurate measurement of voltage input impedance of voltmeter should be high.
- 4) Current meter has very low input impedance.

- Q.2 Answer the following. (Any Six) 12**
- a) Draw the circuit diagram of 12V power supply using IC 7905.
 - b) What is active transducer & passive transducer? Give one example for each.
 - c) Draw a circuit diagram of clock circuit using NAND.
 - d) Write design steps of full adder.
 - e) What is an intelligent sensor?
 - f) Draw diagram of piezoelectric transducer.
 - g) What is need of signal conditioning circuit?
 - h) Write any four characteristics of transducer with short explanation.
- Q.3 Answer the following. (Any Three) 12**
- a) With neat diagram explain design of Zener series regulator.
 - b) What is sensor? Write short note on various analog sensors.
 - c) Discuss in brief RTD transducer.
 - d) Design of 16:1 multiplexer using 4:1 multiplexer.
- Q.4 Answer the following. (Any Two) 12**
- a) With neat labelled diagram explain the working of LVDT.
 - b) Explain the construction and working of thermistor transducer.
 - c) With neat Diagram explain design of 5v voltage regulator using 7805.
- Q.5 Answer the following. (Any Two) 12**
- a) Discuss the design process of DVM using 7107 IC.
 - b) With functional block diagram discuss the measurement system in brief.
 - c) Write a note on strain gauge transducer.

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Microcontroller & Interfacing (2320102)

Max. Marks: 60

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose the correct alternative **08**

- 1) _____ register is used to configure and manage interrupts of PIC16F877A.
a) INTCON b) EECON1
c) RCREG d) SFR
- 2) _____ instruction can be used to set any bit while performing bitwise operation in PIC.
a) BCF b) BSF
c) BSR d) BCR
- 3) The PIC16F87XA devices has _____ bit program counter.
a) 16 b) 4
c) 8 d) 13
- 4) Timer 0 in the ATmega328p is an _____ Timer/Counter.
a) 16 b) 4
c) 12 d) 8
- 5) ATmega328p has _____ KB of Electrically Erasable Programmable Read-Only Memory (EEPROM) for non-volatile data storage.
a) 1 b) 2
c) 3 d) 4
- 6) In ATmega328p: p means _____.
a) pointer b) pull
c) pico-power d) pickup
- 7) Prescaler is not accessible but can be configured using _____ bits of OPTION_REG.
a) PS2:PS0 b) PS3:PS1
c) PSA d) PSA:PS2
- 8) The ATmega328 has a _____ bit successive approximation ADC.
a) 12 b) 2
c) 8 d) 10

B) Will in the blanks or write True or False. 04

- 1) The Atmega328 is an 8 bit chip.
- 2) SLEEP command enables the PIC to enter into the power down mode during the operation of watchdog timer (WDT).
- 3) The Timer 2 module is a 16 bit timer/counter.
- 4) Setting a TRISB bit = 1 will make the corresponding PORTA pin as input.

Q.2 Answer the following. (Any Six) 12

- a) Write a short note on Stack Pointer.
- b) Which communication interface supported by Atmega328p?
- c) List the various applications of PIC16f877A microcontroller.
- d) Define RISC and CISC.
- e) Explain Oscillator and clock circuit of PIC16f877A.
- f) Differentiate between Program Memory and Data memory.
- g) Define BCF and BSF instruction working.
- h) Write a short note on Seven-segment display.

Q.3 Answer the following. (Any Three) 12

- a) Discuss in detail about the memory organization of PIC microcontroller.
- b) Write a short note on Special function registers of PIC16F877A.
- c) Write the all features of Atmega328p microcontroller.
- d) Explain status register of PIC microcontroller with the help of diagram.

Q.4 Answer the following. (Any Two) 12

- a) Write an embedded c code for LED interface with PIC16F877A.
- b) With neat schematic explain the architecture of AVR microcontroller.
- c) Describe in short about the timers of PIC microcontroller.

Q.5 Answer the following. (Any Two) 12

- a) With interface diagram write an embedded c code for LM35 interface with PIC16F877A.
- b) Draw a pin diagram of Atmega328p Microcontroller. Explain function of each pin.
- c) Explain the below instructions of PIC16F877A with example.
 - i) ANDWF
 - ii) RLF
 - iii) ADDLW
 - iv) COMF

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Digital Electronics & Verilog HDL (2320108)

Max. Marks: 60

08

- 1) A Parity check usually can detect _____.
a) 1 bit error
b) 8 bit error
c) 2 bit error
d) Any bit error
- 2) Demultiplexer circuit is: _____.
a) a decoder circuit
b) a decoder circuit with enable input
c) an encoder circuit with enable input
d) an encoder circuit
- 3) _____ is standardised as IEEE 1364.
a) C
b) C++
c) FORTRAN
d) Verilog
- 4) Flip- Flop can store _____.
a) 1 -bit data
b) 2 -bit data
c) 3 -bit data
d) 4 -bit data
- 5) The addition of two decimal digits in BCD can be done through _____.
a) BCD adder
b) Full adder
c) Ripple carry adder
d) Carry look ahead
- 6) Digital Circuits are _____.
a) Less susceptible to noise or degradation in quality
b) Use transistors to create logic gates to perform Boolean logic
c) Easier to perform error detection and correction with digital signal
d) All of the mentioned
- 7) _____ hardware description language is more flexible.
a) VHDL
b) Verilog
c) C
d) C++
- 8) To operate correctly, starting a ring shift counter requires _____.
a) Clearing all the flip-flops
b) Presetting one flip-flop and clearing all others
c) Clearing one flip-flop and presetting all others
d) Presetting all the flip-flops

B) State true or false**04**

- 1) ALU is the place where the actual executions of instructions take place during the processing operation.
- 2) Carry look ahead adder also known as carry predictor.
- 3) In PLA, Both the AND and OR arrays are programmable
- 4) In even parity bit scheme, the parity bit is '0' if there are odd number of 1 s in the data stream.

Q.2 Answer the following. (Any Six)**12**

- a) What is FPGA?
- b) What are the Operators in Verilog?
- c) What is the difference between PROM and PAL?
- d) What is state reduction?
- e) Explain Encoder.
- f) What is Parity bit?
- g) Define combinational and sequential logic circuit.
- h) Write Verilog code for OR gate using gate-level modeling?

Q.3 Answer the following. (Any Three)**12**

- a) Explain n-bit parallel adder in short.
- b) Explain gate level modelling in Verilog.
- c) Differentiate encoder and decoder.
- d) Design 1:2 Demultiplexer.

Q.4 Answer the following. (Any Two)**12**

- a) Design counter using state diagram, state table, state assignment and realize it using basic gates and flip-flop.
- b) Design 2 to 4 line decoder using basic gates.
- c) Explain SIPO and PISO in detail.

Q.5 Answer the following. (Any Two)**12**

- a) Design priority encoder using K. map and realize it using basic gates.
- b) Explain bi-directed shift register.
- c) Explain PLD in detail.

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M.Sc. (Semester - I) (New) (NEP CBCS) Examination: March/April-2024
ELECTRONICS SCIENCE
Research Methodology (2320103)

Day & Date: Friday, 17-05-2024
 Time: 03:00 PM To 05:30 PM

Max. Marks: 60

Instructions: 1) All Questions are compulsory.
 2) Figure to right indicate full marks.

Q.1 A) Choose the correct alternatives from the options. 08

- 1) In the process of conducting research 'Formulation of Hypothesis' is followed by _____.
 a) Statement of Objectives b) Analysis of Data
 c) Selection of Research Tools d) Collection of Data
- 2) The main objective of _____ study's to acquire knowledge.
 a) Exploratory b) Descriptive
 c) Diagnostic d) Descriptive and Diagnostic
- 3) Research is _____.
 a) Searching again and again
 b) Finding solution to any problem
 c) Working in a scientific way to search for truth of any problem
 d) None of the above
- 4) Survey is a _____ Study.
 a) Descriptive b) Fact finding
 c) Analytical d) Systematic
- 5) Concepts are _____ of Research.
 a) Guide b) Tools
 c) Methods d) Variables
- 6) The first page of the research report is _____.
 a) Appendix b) Bibliography
 c) Index d) Title Page
- 7) Questionnaire is filled by _____.
 a) Respondent b) Everybody
 c) Enumerator d) None of the above
- 8) Random sampling is also called _____.
 a) Availability sampling b) Probation sampling
 c) Probability sampling d) Prospect sampling

B) State True or False. 04

- 1) Line chart is useful for showing trends or changes over time.
- 2) The chi-square test is a mean.
- 3) Final stage in the Research Process is report writing.
- 4) Second step in problem formulation is Understanding the nature of the problem.

- Q.2 Answer the following. (Any Six) 12**
- a) Write objective of research?
 - b) What are advantages of qualitative research?
 - c) What are advantages of quantitative research?
 - d) What are functions of literature review?
 - e) Define Hypothesis?
 - f) What do you mean by research explain briefly?
 - g) What do you mean by graphical representation of data?
 - h) What do you mean by analysis of Data?
- Q.3 Answer the following. (Any Three) 12**
- a) Explain criteria for good research.
 - b) What is qualitative and quantitative research?
 - c) Write sources of research problem? Explain in short.
 - d) Write a note on Methods of Collecting Secondary Data.
- Q.4 Answer the following. (Any Two) 12**
- a) Explain types of research.
 - b) Explain research process.
 - c) Explain criteria for selection of research problem.
- Q.5 Answer the following. (Any Two) 12**
- a) Explain procedure for reviewing the literature.
 - b) Explain the steps involved in writing research report in detail.
 - c) Write Steps in the formulation of a research problem.

- 9) The PIC16F87XA devices have a _____ bit program counter.
a) 16 b) 4
c) 8 d) 13
- 10) The contents of register 'f' are complemented using _____ instruction.
a) COMF b) CLRF
c) CMF d) CMR

B) Fill in the blanks OR Write True/False.

06

- 1) PIC 16F877A have 256 bytes of data EEPROM.
- 2) PORT-D of PIC16F877A is an 8-bit wide.
- 3) The instruction set of PIC microcontroller consists of just 111 instructions.
- 4) The PIC 16F877A is a 40-Pin available in DIP package.
- 5) PIC 16F877A has 8 channels of 10-bit Analog-to-Digital (A/D) converter.
- 6) ADC stores the lower 8 bits in ADRESL and the upper bits in the ADRESH register.

Q.2 Answer the following.

16

- Write a short note on ports of PIC16F877A.
- Draw a 40 pin diagram of PIC16F877A.
- What is CCP module? Explain capture mode in short.
- Write a short note on Oscillator and clock circuit.

Q.3 Answer the following.

- a) Explain how to interface 7-Segment with PIC microcontroller with C program.
- b) Describe in detail about the timers of PIC microcontroller.

Q.4 Answer the following.

- a) Write an embedded c program for Relay interface with PIC microcontroller.
- b) What are the addressing modes of PIC microcontroller?

Q.5 Answer the following.

- Draw an internal architecture of PIC microcontroller Explain each block in short.
- Explain how to interface 16x2 LCD with PIC microcontroller with C program.

Q.6 Answer the following.

- Describe the Instruction set of PIC16F877A microcontroller.
- Explain the Memory organisation in PIC microcontroller.

Q.7 Answer the following.

- Describe the ADCON0 register in detail.
- Explain the serial communication in PIC microcontroller.

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Set P

M.Sc. (Semester - II) (New) (NEP CBCS) Examination: March/April-2024
ELECTRONICS SCIENCE
Control System (2320201)

Day & Date: Thursday, 09-05-2024
 Time: 11:00 AM To 01:30 PM

Max. Marks: 60

Instructions: 1) All question are compulsory.
 2) Figures to the right indicate full marks.

Q.1 A) Multiple Choice Questions

08

- 1) A system with transfer function $[(2S/4S) + 1]$ is of _____ order.
 - a) 2nd
 - b) 3rd
 - c) 1st
 - d) 4th
- 2) Control system is a system in which the output is controlled by varying the _____.
 - a) input
 - b) output
 - c) Both a & b
 - d) signal
- 3) _____ element is not used in an automatic control system.
 - a) Final control
 - b) Sensor
 - c) Oscillator
 - d) Error detector
- 4) In a temperature control system _____ conversion takes place.
 - a) A to D
 - b) D to A
 - c) A to A
 - d) D to D
- 5) _____ is strongest tool to determine the stability and transient response of the system.
 - a) Bode plot
 - b) Nyquist plot
 - c) Root locus
 - d) Routh Hurwitz
- 6) With negative feedback in a closed loop control system, the system sensitivity to parameter variation _____.
 - a) decrease
 - b) becomes zero
 - c) increases
 - d) becomes infinite
- 7) The characteristic equation of a system is given as $s^3 + 25s^2 + 10s + 50 = 0$. _____ is the number of the roots in the right half s-plane and the imaginary axis respectively.
 - a) 1,1
 - b) 0,0
 - c) 2,1
 - d) 1,2
- 8) When the number of poles is equal to the number of zeroes _____ branches of root locus tends towards infinity.
 - a) 1
 - b) 2
 - c) 0
 - d) Equal to number of zeroes

B) State true or false.

04

- 1) PD controller cannot eliminate the offset.
- 2) Signal flow graphs are reliable to find transfer function than block diagram reduction technique.
- 3) A input node having only outgoing branches.
- 4) In a control system the output of the controller is given to sensor.

- Q.2 Answer the following. (Any Six) 12**
- a) Write the Manson's gain formula.
 - b) What is SFG?
 - c) What are the standard test signals used in control systems?
 - d) Distinguish between type and order of a system.
 - e) Define a stable system.
 - f) Explain the basics of root locus plot.
 - g) What is polar plot?
 - h) Define gain and phase margins.
- Q.3 Answer the following. (Any Three) 12**
- a) Explain Open loop and closed loop control system with transfer function.
 - b) Write a short note on proportional controller.
 - c) What is electrical analogy? Explain force-voltage analogy.
 - d) What is meaning of Transfer function? Explain it in short.
- Q.4 Answer the following. (Any Two) 12**
- a) Define poles and zeroes with general form of transfer function.
 - b) Explain the block diagram reduction technique.
 - c) Explain Proportional Integral (PI) controller and derive its transfer function. Write the advantages of PI over PD controller.
- Q.5 Answer the following. (Any Two) 12**
- a) What is Effect of feedbacks on Control System performance? Explain in short.
 - b) Write the equations for time domain specifications of a standard second order system with unit step input.
 - c) The open loop transfer function is given by $G(s)/H(s) = \frac{K(1+4s)}{s^2(1+s)(1+2s)}$ determine the stability of closed loop system.

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Set P

M.Sc. (Semester - II) (New) (NEP CBCS) Examination: March/April-2024
ELECTRONICS SCIENCE
Mechatronics (2320202)

Day & Date: Saturday, 11-05-2024
Time: 11:00 AM To 01:30 PM

Max. Marks: 60

Instructions: 1) All questions are compulsory.
2) Figure to right indicate full marks.

Q.1 A) Choose correct alternative.

08

- 1) _____ is the primary objective of mechatronics?
 - a) To integrate mechanical and electronic systems
 - b) To design software for industrial robots
 - c) To study the history of automation
 - d) To develop new materials for engineering applications
- 2) _____ of the following is NOT a typical component of a mechatronic system.
 - a) Sensor
 - b) Actuator
 - c) Microcontroller
 - d) Hydraulic pump
- 3) _____ of the following is a key advantage of mechatronic systems.
 - a) Higher cost
 - b) Lower complexity
 - c) Limited functionality
 - d) Decreased efficiency
- 4) _____ is the purpose of a PID controller in mechatronic systems.
 - a) To measure temperature
 - b) To control the position of a motor
 - c) To filter noise from sensor data
 - d) To store program instructions
- 5) _____ type of sensor is commonly used to detect proximity in mechatronic systems.
 - a) Thermocouple
 - b) Ultrasonic sensor
 - c) Strain gauge
 - d) pH sensor
- 6) _____ does HMI stand for in mechatronics.
 - a) Human-Machine Interface
 - b) High-Modulation Input
 - c) Hybrid Mechanical Integration
 - d) Haptic Motion Interface
- 7) _____ type of control system continuously adjusts itself based on feedback.
 - a) Open-loop control system
 - b) Closed-loop control system
 - c) Feedback control system
 - d) Feed forward control system
- 8) _____ is the purpose of a stepper motor in mechatronic systems.
 - a) To provide linear motion
 - b) To generate rotary motion
 - c) To convert electrical energy into heat
 - d) To produce light output

B) State True or False.**04**

- 1) Mechatronics is the integration of mechanical, electrical, and computer engineering.
- 2) A hydraulic actuator uses pressurized fluid to generate mechanical motion.
- 3) A PID controller stands for Proportional, Integral, Derivative controller.
- 4) A potentiometer is a type of sensor commonly used to measure temperature.

Q.2 Answer the following. (Any Six)**12**

- a) Explain the concept of closed-loop control in mechatronics.
- b) Describe the basic components of a mechatronic system.
- c) Discuss the advantages of using microcontrollers in mechatronic systems.
- d) Differentiate between open-loop and closed-loop control systems.
- e) Define Mechatronics and explain its importance in modern engineering.
- f) What is the role of sensors in mechatronic systems? Give examples of sensors used in mechatronics.
- g) Explain the concept of feedback control in mechatronics. Provide an example of a feedback control system in a mechatronic application.
- h) Discuss the advantages and disadvantages of using actuators in mechatronic systems.

Q.3 Answer the following. (Any Three)**12**

- a) Give the names of the mechanical components & Explain briefly about Pulleys.
- b) What is Two stroke IC engine & explain briefly.
- c) What is single phase & Three phase power supply?
- d) Explain Positional sensor & level sensor.

Q.4 Answer the following. (Any Two)**12**

- a) Explain Pneumatic actuation system.
- b) Explain DC motor & Stepper motor.
- c) Explain mechatronics system 1) Washing Machine.

Q.5 Answer the following. (Any Two)**12**

- a) Explain Electrical actuation system.
- b) Explain AC motors.
- c) Explain mechatronics system 1) Electronic Printer.

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Set **P**

M.Sc. (Semester - II (New) (NEP CBCS) Examination: March/April-2024
ELECTRONICS SCIENCE
Advanced Power Electronics (2320209)

Day & Date: Tuesday, 14-05-2024
 Time: 11:00 AM To 01:30 PM

Max. Marks: 60

Instructions: 1) All questions are compulsory.
 2) Figure to right indicate full marks.

Q.1 A) Multiple choice questions.**08**

- 1) In the forward conduction mode of a silicon controlled rectifier, the SCR in _____ state.
 - a) On
 - b) OFF
 - c) forward
 - d) reverse
- 2) _____ is a modern semiconductor device that combines the characteristics of MOSFET and BJT.
 - a) SCR
 - b) IGBT
 - c) FET
 - d) Diode
- 3) MOSFET is a _____ carrier device.
 - a) majority
 - b) minority
 - c) bipolar
 - d) leakage
- 4) Leakage current flows through the thyristor in _____.
 - a) Two ways
 - b) Three ways
 - c) Four ways
 - d) Five ways PLC
- 5) The GTO can be turned off by applying the _____ gate pulse.
 - a) positive
 - b) negative
 - c) removing
 - d) anode
- 6) A forward-biased PN junction acts as a/an _____.
 - a) thyristors
 - b) closed switch
 - c) Amplifier
 - d) Chopper
- 7) A snubber circuit is used to limit the rate of rising in _____ across SCR.
 - a) voltage
 - b) current
 - c) frequency
 - d) power
- 8) _____ is the fastest switching device.
 - a) BJT
 - b) Diode
 - c) MOSFET
 - d) JFET

B) Fill in the blanks or write True or False.**04**

- 1) The type of commutation in which the pulse to turn off the SCR is obtained by separate voltage source is class E commutation.
- 2) For a step-up chopper, when the T on time is increased the average value of the output voltage increases.
- 3) The rectifier converts DC power to AC power.
- 4) SCR is a three terminals and three layer device.

- Q.2 Answer the following. (Any Six) 12**
- a) Draw IV characteristics of power diode.
 - b) What is meant by half wave and full wave rectifier?
 - c) Draw waveforms of three phase half wave converter.
 - d) What is full converter?
 - e) What is meant by adjustable voltage regulator?
 - f) List out any 2 positive and negative voltage regulator IC numbers?
 - g) What is boost converter?
 - h) Define the necessity of filter circuit in regulator.
- Q.3 Answer the following. (Any Three) 12**
- a) What is buck converter? Explain in short its construction and working.
 - b) What is GTO? Describe its switching characteristics.
 - c) With neat circuit diagram explain 7805 regulator.
 - d) Explain in short the switching characteristics of MOSFET.
- Q.4 Answer the following. (Any Two) 12**
- a) Describe the various protection circuit of thyristors.
 - b) With the help of a neat circuit diagram and waveforms, explain the operation of single phase full wave controlled rectifier with R load and freewheeling diode.
 - c) Explain in details power transistor with neat circuit diagram and describe its switching characteristics.
- Q.5 Answer the following. (Any Two) 12**
- a) Explain the operation and working of SCR. Sketch the necessary circuit diagram and output waveforms.
 - b) Draw and explain the block schematic of SMPS and mention its advantages over linear power supply.
 - c) What is the principle of step down chopper? Explain its operation and derive an expression for its output voltage.

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Set **P**

M.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2024
ELECTRONICS SCIENCE
Control Systems (MSC02201)

Day & Date: Thursday, 09-05-2024
 Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- Instructions:** 1) Q. No. 1 and 2 are compulsory.
 2) Attempt any three questions from Q. No. 3 to 7.
 3) Figures to the right indicate full marks.
 4) Use of non-programmable calculator is allowed.

Q.1 A) Choose the correct alternative from the options. 10

- 1) The overall transfer function of two blocks in parallel are _____.
 a) Sum of individual gain
 b) Product of individual gain
 c) Difference of individual gain
 d) Division of individual gain
- 2) The fundamental function of a tachometer is the conversion of angular _____ into voltage.
 a) Velocity
 b) Displacement
 c) Acceleration
 d) Current
- 3) Transfer function of a system is defined as the ratio of output to input in _____.
 a) Z-transformer
 b) Fourier transform
 c) Laplace transform
 d) All of these
- 4) Signal flow graphs _____.
 a) They apply to linear systems
 b) The equation obtained may or may not be in the form of cause or effect
 c) Arrows are not important in the graph
 d) They cannot be converted back to block diagram
- 5) In P-I controller, _____ curve is an integral of a function compute.
 a) Density of
 b) Area under the
 c) Volume over the
 d) Circumference
- 6) A system is said to be _____ if its roots lies on the left half of the s-plane.
 a) unstable
 b) stable
 c) marginally stable
 d) Both b and c
- 7) _____ is exhibited by Root locus diagrams.
 a) The poles of the transfer function for a set of parameter values
 b) The bandwidth of the system
 c) The response of a system to a step input
 d) The frequency response of a system
- 8) Mass, in force-voltage analogy, is analogous to _____.
 a) charge
 b) current
 c) inductance
 d) resistance

- 9)** _____ are used to reduce speed as per load requirements.
- a) Gear trains b) Tachogenerator
c) Servo motors d) Potentiometer
- 10)** A Refrigerator is an example of _____ system.
- a) Open loop b) Closed loop
c) Linear d) Non-linear

B) Write True or False.

06

- 1) Frequency response of a system is the steady state response to a unit step input signal.
- 2) A compensating network is added to alter the locus of the roots as the system parameter is varied.
- 3) For critically damped system, the damping factor ξ is 1.
- 4) The characteristic equation of a system is given as $3s^4 + 10s^3 + 5s^2 + 2 = 0$. This system is unstable.
- 5) Root locus technique is applicable to single as well as multiple loop system.
- 6) A signal flow graph is the graphical representation of the relationships between the variables of set linear algebraic equations.

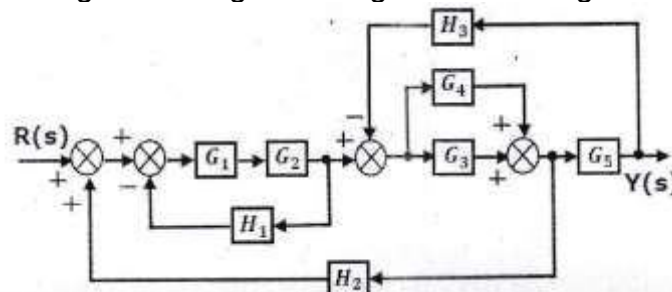
Q.2 Answer the following.

16

- Write a short note on the ON-OFF controller.
- Explain the terms utilised in Signal flow graph.
- Explain Frequency response specifications.
- Explain Electrical analogy.

Q.3 Answer the following.

- a) Simplify the following block diagram using the block diagram reduction rules.



- b) Explain open loop and closed loop control systems by giving suitable example & also highlights their merits & demerits.**

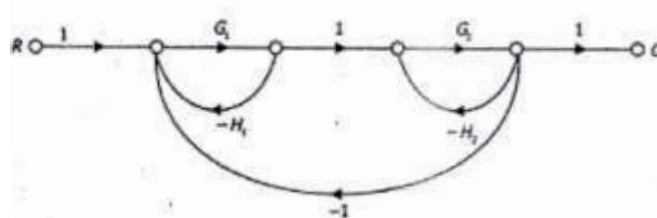
Q.4 Answer the following.

- a) Explain the stability of given equation using Hurwitz method.
 $7S^3 + 5S^2 + 4S + 9 = 0$

- b) Explain in detail the second order system for critically damped case for unit step input.**

Q.5 Answer the following.

- a) Find the gain of the system represented by the following signal flow graph.



- b) Consider the system with $G(S) \cdot H(S) = K/S(S+2)(S+4)$ and $S = -1.21$, decide whether system is on root locus or not using angle condition and determine its root locus using magnitude condition **08**

Q.6 Answer the following.

- a) Design and explain a PD controller. Mention its advantages and disadvantages. **08**
- b) Draw and explain the working of lead compensator network and represent in block diagram form. **08**

Q.7 Answer the following.

- a) What is Stability? Using Routh criterion determine the stability of the system whose Characteristics equation is $S^6 + S^5 - 2S^4 - 3S^3 - 7S^2 - 4S - 4 = 0$. **08**
- b) Explain design of Tacho-generators with its transfer function and draw its block diagram. **08**

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M.Sc. (Semester - II) (Old) (CBCS) Examination: March/April-2024
ELECTRONICS SCIENCE
Digital Signal Processing (MSC02202)

Day & Date: Saturday, 11-05-2024
 Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- Instructions:** 1) Q. No. 1 and 2 are compulsory.
 2) Attempt any three questions from Q. No. 3 to Q. No. 7.
 3) Figure to right indicates full marks.

Q.1 A) Choose the correct alternative.

10

- 1) _____ of following is done to convert a continuous time into discrete time signal.
 - a) Modulating
 - b) Sampling
 - c) Differentiating
 - d) Integrating
- 2) All energy signals will have an average power of _____.
 - a) Infinite
 - b) Zero
 - c) Positive
 - d) Cannot be calculated
- 3) The even part of a signal $x(t)$ is _____.
 - a) $x(t) + x(-t)$
 - b) $x(t) - x(-t)$
 - c) $(1/2)^*(x(t) + (-t))$
 - d) $(1/2)^*(x(t) - x(-t))$
- 4) If a signal $x(t)$ is processed through a system to obtain the signal $(x(t)^2)$, then the system is said to be _____.
 - a) Linear
 - b) Non-linear
 - c) Exponential
 - d) None of these
- 5) _____ is the physical device that performs an operation on the signal.
 - a) Signal source
 - b) System
 - c) Medium
 - d) None of these
- 6) The Nyquist sampling rate is given by:
 - a) $F_s = 2 F_m$
 - b) $F_s = 3 F_m$
 - c) $F_s = 4 F_m$
 - d) $F_s = F_m$
- 7) _____ of the following is/are standard test signals.
 - a) Step
 - b) Impulse
 - c) Exponential
 - d) All of the above
- 8) The product of two odd signals is _____.
 - a) Odd
 - b) Even
 - c) Both (a) and (b)
 - d) Zero
- 9) _____ is the characteristic of the power signal.
 - a) Power signal is infinite
 - b) Power signals are time-limited.
 - c) A periodic signals are power signals
 - d) None of the above
- 10) _____ of the following form is used for the IIR filters.
 - a) Direct form-I
 - b) Indirect form-I
 - c) Direct form-III
 - d) Direct form-IV

- B) Write True or False. 06**
- 1) Digital signal processors must be programmed to perform specific tasks.
 - 2) Digital filtering is faster than analog filtering.
 - 3) Padding of zeros increases the frequency resolution.
 - 4) ROC is the set of all values of z for which $X(z)$ attains a infinite value.
 - 5) One-sided Z-transform is also known as Bilateral Z-transform.
 - 6) Type- I Chebyshev filters type of filters are all pole filters.
- Q.2 Answer the following. 16**
- a) State and prove properties of Discrete time fourier transform.
 - b) What do you meant by sampling process? State Shannon's sampling theorem?
 - c) What is aliasing effect? How can aliasing be avoided?
 - d) What are the different types of structures for realization of IIR systems?
- Q.3 Answer the following.**
- a) What are the different types of operations performed on discrete time signals? **10**
 - b) Define Z - transform. What are the properties of z- transform? **06**
- Q.4 Answer the following.**
- a) Explain types of Discrete Time signals. **10**
 - b) What is meant by ROC? What are the properties of region of convergence? **06**
- Q.5 Answer the following.**
- a) Determine the Z Transform and ROC of the following finite duration signals **10**
 - 1) $x(n) = \{3, 2, 2, 3, 5, 0, 1\}$
 - 2) $x(n) = \mathcal{Z}(n - k)$
 - b) Define Fourier transform of a discrete time signal. Find the Fourier transform of a sequence **06**

$$x(n) = 1, \text{ for } -2 \leq n \leq 2$$

$$= 0, \text{ otherwise}$$
- Q.6 Answer the following.**
- a) Define Convolution. Explain properties of discrete convolution. **10**
 - 1) Commutative
 - 2) Associative
 - 3) Distributive
 - b) What are the applications of DSP processor? **06**
- Q.7 Answer the following.**
- a) Explain discrete time system properties. **08**
 - b) Compare the Butterworth and Chebyshev Type -1 filter. **08**

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Day & Date: Friday, 10-05-2024
Time: 11:00 AM To 02:00 PM

Instructions: 1) Question No. 1 and 2 are compulsory.
2) Attempt any three questions from Q. No 3 to Q. No 7
3) Figures to the right indicate full marks.

10

- Page 1 of 2

B) State True or False.**06**

- 1) The term hysteresis is associated with ON-OFF controller.
- 2) In a stable control system backlash can cause due to over damping.
- 3) Actuators are responsible for manipulating the process variables to achieve the desired set point.
- 4) Temperature control system is known as Process control system.
- 5) A system with transfer function $[(2S/4S) + 1]$ is of 1st order.
- 6) Smith Predictor Compensator is a control strategy used to mitigate the effects of dead time in control loops.

Q.2 Answer the following.**16**

- a) Write a short note on Interacting Systems.
- b) What is only-P controller? Write equation for its output.
- c) Explain Feed forward control scheme.
- d) Write the advantages and disadvantages of PID controller.

Q.3 Answer the following.

- a) What are the elements of process control? Explain each in short.
- b) Write Comparison between P, PI, PD and PID in short.

10**06****Q.4 Answer the following.**

- a) Consider the process with transfer function $G(s) = \frac{1}{(s+1)(s+3)(s+5)}$ and calculate PID controller parameters.

08

- b) With a neat diagram and necessary equations, explain Dynamic behavior of first order system.

08**Q.5 Answer the following.**

- a) Explain Ziegler-Nichols method as applied to P, PI and PID controller.
- b) Write comparison between Open-loop and Closed loop system.

10**06****Q.6 Answer the following.**

- a) With a neat diagram and equation explain the design implementation of proportional derivative (PD) control.
- b) What are the Dynamic elements in a control loop? Explain each in short.

10**06****Q.7 Answer the following.**

- a) Explain in detail the Fuzzy logic systems and Fuzzy controller.
- b) With a neat diagram explain the Dynamic matrix controller (DMC).

08**08**

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Set **P**

M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2023
ELECTRONIC SCIENCE

Microwave Devices and Applications (MSC02302)

Day & Date: Monday, 13-05-2024

Max. Marks: 80

Time: 11:00 AM To 02:00 PM

- Instructions:** 1) Q. Nos. 1 and. 2 are compulsory.
 2) Attempt any three questions from Q. No. 3 to Q. No. 7
 3) Figure to right indicate full marks.

Q.1 A) Choose correct alternatives.

10

- 1) The tunneling involves _____.
 - a) acceleration of electrons in p side
 - b) movement of electrons from n side conduction band to p side valance band
 - c) charge distribution management in both the bands
 - d) positive slope characteristics of diode
- 2) The number of semiconductor layers in a TRAPATT diode is:
 - a) Two
 - b) Three
 - c) Four
 - d) One
- 3) Field effect transistors are different from BJTs in that they are _____.
 - a) unipolar devices
 - b) bipolar devices
 - c) bidirectional device
 - d) None of the mentioned
- 4) The purpose of attenuator in a TWT is _____.
 - a) to prevent saturation
 - b) to increase gain
 - c) to help bunching
 - d) to prevent oscillation
- 5) _____ is NOT true for JFET.
 - a) Drain current is controlled by changing the channel width
 - b) Gate-source p-n junction is always forward biased
 - c) JFET is a voltage-controlled three terminal device
 - d) Gate-source p-n junction is always reverse biased
- 6) Microwave tubes are grouped into two categories depending on the type of:
 - a) Electron beam field interaction
 - b) Amplification method
 - c) Power gain achieved
 - d) Construction methods
- 7) The klystron tube used in a klystron amplifier is a _____ type beam amplifier.
 - a) Linear beam
 - b) Crossed field
 - c) Parallel field
 - d) None of the mentioned
- 8) The main advantage of TWT over a multi-cavity klystron is:
 - a) greater bandwidth
 - b) more efficient
 - c) higher number of modes
 - d) higher output power

- 9) GaAs is used in fabricating Gunn diode. Gunn diode is:
 - a) sliced device
 - b) bulk device
 - c) made of different type of semiconductor layers
 - d) None of the mentioned
- 10) When a reverse bias voltage exceeding the breakdown voltage is applied to an IMPATT diode, it results in P:
 - a) avalanche multiplication
 - b) break down of depletion region
 - c) high reverse saturation current
 - d) None of the mentioned

B) State True or false.

06

- 1) Both IMPATT and TRAPATT devices use avalanche effect.
- 2) P layers is heavily doped in Gunn diode.
- 3) Tunnel diode was invented by Dr. Leo Esaki in 1957.
- 4) In crossed field tubes, the electron beam transverses the length of the tube and is parallel to the electric field.
- 5) Magnetrons are microwave devices that offer very high efficiencies of about 80%.
- 6) Avalanche transit time devices uses both avalanche effect and transit time effect.

Q.2 Answer the following.

16

- a) What is Tunnel diode? Explain its V-I characteristics.
- b) Explain JFET and Write its applications.
- c) Explain TEDs and Avalanche transit time devices.
- d) Explain reentrant cavities of Klystron.

Q.3 Answer the following.

- a) What is IMPATT diode? With neat diagram explain the construction and working in detail.
- b) Write characteristics of IMPATT diode.

10

06

Q.4 Answer the following.

- a) Explain MOSFET physical structure, principle of operation and modes of operation in detail.
- b) Explain configurations of Microwave Bipolar Transistor.

10

06

Q.5 Answer the following.

- a) Explain working of Two-cavity Klystron in brief with bunching process.
- b) Derive the equation of velocity modulation in Two-cavity Klystron.

08

08

Q.6 Answer the following.

- a) Describe Ridley- Watkins- Hilsum theory in detail.
- b) What is Gunn diode? Explain Gunn effect in detail.

10

06

Q.7 Answer the following.

- a) Explain Helix TWT⁺ amplification process in detail.
- b) Explain Parametric amplifier.

10

06

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ELECTRONICS SCIENCE

Max. Marks: 80

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
2) Attempt any Three questions from Q.No.3 to Q.No.7.
3) Figures to the right indicate full marks.

10

- The ARM core uses _____ Architecture.
 - RISC
 - CISC
 - Both
 - None of these
- ARM Processor specifically designed for to reduce _____.
 - Size
 - Power Consumption
 - Both a & b
 - None
- ARM Processor core is a key component of _____ bit embedded system.
 - 8
 - 16
 - 32
 - 64
- _____ is the processing of instruction broken down to smaller unit.
 - Pipeline
 - ALU
 - MCU
 - All
- Register contains _____.
 - address
 - data
 - both a&b
 - none
- In ARM consists of _____ processor mode.
 - 7
 - 5
 - 4
 - 6
- _____ many bank registers are available in ARM.
 - 20
 - 25
 - 30
 - 40
- The SPSR store the _____ mode of CPSR.
 - present
 - previous
 - both
 - none
- _____ are used to stop specific interrupt.
 - Interrupt mask
 - Interrupt request
 - both
 - none
- CPSR has _____ interrupt mask bits.
 - 2
 - 5
 - 6
 - 4

B) State True or False.**06**

- 1) Fetch is the process of loading instructions.
- 2) MMU means memory mask unit.
- 3) ARM instruction commonly take 4 operands.
- 4) BUS is used to communicate between part of the device.
- 5) Real time systems must have preemptive kernels.
- 6) ISR stand for interrupt standard routine.

Q.2 Answer the following.**16**

- a) What is USB bus? Write down its main features.
- b) Write down the main differences between Von Neumann and Harvard architecture.
- c) Draw the Program Status Register and mention FLAG bits.
- d) Explain functions of real time operating systems.

Q.3 a) Discuss case study of Camera.**10**

- b) Explain Barrel shifter in ARM block diagram.

06**Q.4 a) Explain in any five instructions of ARM from Data processing instruction group.****10**

- b) Differentiate between Traditional OS & Real Time OS.

06**Q.5 a) Explain objects (message, queue, pipes, mailbox & event) of RTOS.****10**

- b) Explain the 5-stage pipeline of ARM organization.

06**Q.6 a) Explain ARM nomenclature.****10**

- b) Write a note on basic block diagram of any Embedded systems.

06**Q.7 a) Explain I2C & SPI Protocol.****10**

- b) Explain terms:

06

- 1) WDT
- 2) ADC
- 3) RTC module

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Set P

M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024
ELECTRONICS SCIENCE
Optical Fiber Communication (MSC02401)

Day & Date: Thursday, 09-05-2024
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

Instructions: 1) Question 1 and 2 are compulsory.
 2) Attempt any Three from Q.3 to Q.7
 3) Figures to the right indicate full marks.

Q.1 A) Multiple choice questions. 10

- 1) _____ is done to create an extrinsic semiconductor.
 - a) Refractive index is decreased
 - b) Doping the material with impurities
 - c) Increase the band-gap of the material
 - d) Stimulated emission
- 2) A multimode step index fiber has a large core diameter of range
 - a) 100 to 300 μm
 - b) 100 to 300 nm
 - c) 200 to 500 μm
 - d) 200 to 500 nm
- 3) Graded index optical fiber behave the step index when _____.
 - a) $\alpha = 1$
 - b) $\alpha = 2$
 - c) $\alpha = 10$
 - d) $\alpha = \infty$
- 4) The fraction of incident photons generated by photodiode of electrons generated collected at detector is known as _____.
 - a) Quantum efficiency
 - b) Absorption coefficient
 - c) Responsivity
 - d) Anger combination
- 5) infrared absorption tails is _____.
 - a) Mie scattering
 - b) Rayleigh scattering
 - c) Stimulated Raman scattering
 - d) Stimulated Brillouin scattering
- 6) _____ is provided by an optical receiver for the regeneration of data signal with minimum error.
 - a) Photo-diode
 - b) Signal Processing Circuits
 - c) Linear Circuitry
 - d) None of the above
- 7) The quantum efficiency of photodiode is 40% with wavelength of 0.90×10^{-6} . Determine the responsivity of photodiodes
 - a) 0.20
 - b) 0.52
 - c) 0.29
 - d) 0.55
- 8) Rayleigh scattering and Mie scattering are the types of _____.
 - a) Linear scattering losses
 - b) Non-linear scattering losses
 - c) Fiber bends losses
 - d) Splicing losses

- 9) The phenomenon leading to avalanche breakdown in reverse-biased diodes is known as
 a) Augerre combination b) Mode hopping
 c) Impact ionization d) Extract ionization
- 10) A permanent joint formed between two different optical fibers in the field is known as _____.
 a) Fiber splice b) Fiber connector
 c) Fiber attenuator d) Fiber dispersion

B) Fill in the blanks OR Write True or False.

06

- 1) The fiber-optic cable transmits data as pulses of light through tiny tubes of glass.
- 2) Multimode graded index fibers use incoherent source only
- 3) An optical fiber is a waveguide for light
- 4) Fiber has greater bandwidth than copper cable.
- 5) Optical fiber has greater loss per kilometer than copper cable.
- 6) Fiber is immune to crosstalk.

Q.2 Answer the following.

16

- a) Compare single mode and multimode fiber.
- b) Write difference between SLED and ELED.
- c) Write a note on population inversion.
- d) Explain bending loss in optical fiber.

Q.3 Answer the following.

- a) Explain general optical communication system in detail and write its advantages and disadvantages.

08

- b) Explain Ray theory of transmission in detail. Also define critical angle, acceptance angle, Numerical aperture.

08

Q.4 Answer the following.

- a) Explain liquid phase optical fiber formation technique with suitable diagram.

08

- b) What is fiber splicing? Explain fusion splicing in detail.

08

Q.5 Answer the following.

- a) Explain Semiconductor injection laser and write its characteristics.
- b) Explain basic concept of LASER in detail.

10

06

Q.6 Answer the following.

- a) Explain Avalanche photodiode with electric field region.

08

- b) When the mean optical power launched into an 8 km length of fiber is 120 μW , the mean optical power at the fiber output is 3 μW . Determine:

08

- i) the overall signal attenuation or loss in decibels through the fiber assuming there are no connectors or splices;
- ii) the signal attenuation per kilometre for the fiber.
- iii) 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;
- iv) the numerical input/output power ratio in (c).

Q.7 Answer the following.

- a) What is the main difference between semiconductor photodiode with and without internal gain? Explain PN and PIN photodiode. **10**
- b) A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and a cladding refractive index of 1.47. Determine: **06**
- i) The critical angle at the core-cladding interface;
 - ii) The NA for the fiber;
 - iii) The acceptance angle in air for the fiber.

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M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024
ELECTRONICS SCIENCE
Power Electronics (MSC02402)

Day & Date: Saturday, 11-05-2024
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

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

Q.1 A) Select correct alternative for the following. 10

- 1) SCR has _____ Terminals.
 - a) two
 - b) three
 - c) four
 - d) five
- 2) Dual converter requires _____ quadrant operation.
 - a) single
 - b) two
 - c) three
 - d) four
- 3) The rectifier converts _____.
 - a) AC to DC
 - b) AC to AC of higher frequency
 - c) DC to AC
 - d) AC to AC of lower frequency
- 4) The single phase half wave controlled bridges uses _____ SCR'S.
 - a) 2
 - b) 4
 - c) 1
 - d) 6
- 5) The most commonly used method of firing as SCR is _____.
 - a) radiation triggering process
 - b) gate triggering process
 - c) thermal triggering process
 - d) voltage triggering process
- 6) SMPS are based on the _____ principle.
 - a) Phase control
 - b) Integral control
 - c) Chopper
 - d) MOSFET
- 7) 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
- 8) The effect of over-voltages on SCR is minimized by using _____.
 - a) RL circuits
 - b) Circuit breakers
 - c) Varistors
 - d) di/dt inductor
- 9) The effects of EMI can be reduced by _____.
 - a) Suppressing emissions
 - b) Reducing the efficiency of the coupling path
 - c) Reducing the susceptibility of the receptor
 - d) All of these

10) Two fully controlled converters connected in antiparallel in _____ converter.

- a) single phase dual
- b) single phase half
- c) single phase full
- d) three phase half

B) Write True or False.

06

- 1) Snubber circuit is used to limit the rate of Rise of voltage across SCR.
- 2) The dual converter is a combination of rectifier and Inverter.
- 3) The most commonly used method of firing as SCR is gate triggering process.
- 4) The self commutated by resonating the load is class B forced commutation method.
- 5) Power electronics essentially deals with control of a.c. power at 60 Hz frequency.
- 6) In the principle of phase control, control is achieved by adjusting the firing angle of the devices.

Q.2 Answer the following.

16

- a) What is SMPS? List out the applications of SMPS.
- b) Differentiate between conventional power supply vs switching power supply.
- c) Give working of SCR with a neat diagram.
- d) Describe the different classes of forced commutation techniques.

Q.3 Answer the following.

- a) Derive the average voltage expression of three phase half wave controlled rectifier with R load operated on discontinuous conduction mode.

10

- b) An ac voltage controller has a resistive load of $R = 10\Omega$ and rms input voltage is $V_s = 120V$, 60 Hz . The thyristor switch is on for $n = 25$ cycles and is off for $m = 75$ cycles. Determine its rms output voltage.

06

Q.4 Answer the following.

- a) Explain the class A commutation method of SCR with circuit diagram and waveforms.

08

- b) What is Chopper? Explain step down chopper in detail with neat diagram.

08

Q.5 Answer the following.

- a) With the help of a neat circuit diagram and waveforms, explain the operation of single phase full wave controlled rectifier with RL load.

08

- b) Draw the circuit diagram of cuk regulator and explain the operating principle.

08

Q.6 Answer the following.

- a) With the help of a neat circuit diagram and waveforms, explain the operation of 3- phase fully controlled bridge rectifier with R load.

08

- b) Explain in detail AC on-off controller with its waveform.

08

Q.7 Answer the following.

- a) Explain the following terms:

08

- 1) di/dt
- 2) dv/dt

- b) Discuss the principle and operation of boost converter.

08

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- 10) The functions of the SCADA systems performed by using _____.
a) Sensors, communication network
b) SCADA master units
c) Remote telemetry units
d) All of the above

B) Fill in the blanks or write True or false.**06**

- 1) The distributed control system is Process oriented.
- 2) The full form of SCADA is supervisory control and data acquisition.
- 3) Object oriented programming principle in clear SCADA system.
- 4) Tag/data logging alarm Report are the features SCADA system.
- 5) The human machine interface information like Temperature, pressure, Running time, material counts, the process steps, etc.
- 6) The SCADA is Data analysis oriented.

Q.2 Answer the following.**16**

- a) Write a ladder program for AND gate. Draw its truth table.
- b) Differentiate between SCADA and PLC.
- c) Write a short Note on Coaxial Cable.
- d) Differentiate between Guided and Unguided media.

Q.3 Answer the following.

- a) What is OSI reference model? Explain each layer of stack in details.
- b) Write a short note on Twisted Pair cable.

10**06****Q.4 Answer the following.**

- a) With a neat diagram explain the TCP/IP reference model give a brief description of each layer.
- b) Draw block diagram of SCADA. Explain each block in brief.

10**06****Q.5 Answer the following.**

- a) What is serial communication? Explain the RS-485 interface standard.
- b) What is Transmission media? Explain the Optical fiber media in detail.

08**08****Q.6 Answer the following.**

- a) Explain about PLC Timers and Counters with example.
- b) Draw the block diagram of PLC and explain the function of CPU.

08**08****Q.7 Answer the following.**

- a) Define following w.r.t. DCS system:
 - i) Tags
 - ii) Function block
 - iii) Nodes
 - iv) Alarms
- b) Compare MODBUS and PROFIBUS on any six points.

10**06**

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M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024
ELECTRONICS SCIENCE
Internet of Things (IoT) (MSC02406)

Day & Date: Thursday, 16-05-2024
 Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Q. No. 1 and. 2 are compulsory.
 2) Attempt any three questions from Q. No. 3 to Q. No. 7
 3) Figure to right indicate full marks.

Q.1 A) Select the correct answer.

10

- 1) _____ of the following can not be considered an IoT device?
 - a) Smartwatch
 - b) Android Phone
 - c) Laptop
 - d) Tube light
- 2) The storage is _____ in IoT.
 - a) limited
 - b) unlimited
 - c) not available
 - d) all of these
- 3) IoT is based on _____ technology.
 - a) Hardware
 - b) Software
 - c) None
 - d) Both of these
- 4) _____ level does the router operate in the OSI reference model.
 - a) Data Link
 - b) Network
 - c) Physical
 - d) None of these
- 5) _____ of the following is not an IoT platform?
 - a) Amazon Web Services
 - b) Microsoft Azure
 - c) Salesforce
 - d) Flipkart
- 6) _____ of the following is used to capture data from the physical world in IoT devices.
 - a) Sensors
 - b) Actuators
 - c) Microprocessors
 - d) Microcontrollers
- 7) _____ of the following command is used to trigger the Amazon echo IOT device.
 - a) Hello
 - b) Suri
 - c) Alexa
 - d) Hey
- 8) _____ of the following is not an actuator in IoT.
 - a) Steeper motor
 - b) A fan
 - c) An LED
 - d) Arduino
- 9) _____ of the following is used to reprogram a Boot loader in IoT devices.
 - a) VHDL programming
 - b) IDE
 - c) ICSP
 - d) MANET
- 10) _____ of the following is not related to Arduino IDE IoT software.
 - a) Serial monitor
 - b) Verify
 - c) Upload
 - d) Terminate

B) State True or False.**06**

- 1) IoT stands for Internet of Technology.
- 2) IoT is used through internet connection, software application and electronic devices to get the learning and teaching materials.
- 3) A microcontroller is the component that executes a program in an IoT system.
- 4) IOT collects machine generated data.
- 5) CoAP can be thought of as an alternative to MQTT.
- 6) VPN is a short-range wireless network.

Q.2 Answer the following.**16**

- a) Define IoT. Write some common applications of IoT.
- b) What are the features of UAV network?
- c) Explain what is wireless sensor network?
- d) What are advantages of cloud computing?

Q.3 Answer the following.

- a) What is sensor? Explain different types of sensors used in IoT.
- b) Explain different network IoT communication Protocols.

08**08****Q.4 Answer the following.**

- a) What are different advantages & disadvantages of IoT?
- b) Explain simplified IoT architecture.

08**08****Q.5 Answer the following.**

- a) What is cloud computing? Explain block diagram of cloud computing.
- b) What are different layers IoT protocol stack?

08**08****Q.6 Answer the following.**

- a) What is actuator? Explain actuator in detail?
- b) What are the differences between IoT and M2M?

08**08****Q.7 Answer the following.**

- a) Discuss different challenges of IoT.
- b) Explain characteristics of IoT.

08**08**