

THE CHARUTAR VIDYA MANDAL UNIVERSITY
M. Sc. INSTRUMENTATION AND CONTROL – SEMESTER 2
SUMMER 2022 EXAMINATION

Course Title: ANALYTICAL INSTRUMENTATION

Course Code: 101390201

Total Printed Pages : 2

Date: 5/05/2022

Time: 2:00 pm to 4:00 pm

Maximum Marks: 60

Instructions:

- Attempt all questions.
- Numbers to the right indicate full marks for each question.
- Make suitable assumptions wherever necessary.

Q. 1 Answer the following multiple choice questions. **(12)**

- (1) For optical transmission the best suitable material is
(a) Sapphire (b) Pyrex (c) Quartz (d) Diamond
- (2) A ceramic of Zirconium oxide-Yttrium oxide is used as the glowing rod in
(a) Globar (b) Nernst lamp (c) Mercury arc (d) Nichrome wire
- (3) The heart of FTIR spectrometer is two beam..... interferometer
(a) Miliman (b) Michelson (c) Scintillator (d) Raman
- (4) The emission of photon from triplet state causes the
(a) Fluorescence (b) Phosphorescence (c) Chemiluminescence (d) none
- (5) Sputtering is the process observed in
(a) LED (b) UV lamp (c) LASER (d) Hollow cathode lamp
- (6) When intensity-modulated light is absorbed by surface of a sample located in an acoustically isolated chamber filled with an inert gas the effect
(a) Pyroelectric (b) Piezoelectric (c) Photoacoustic (d) none
- (7) The pH value is dependent on.....
(a) current (b) resistance (c) temperature (d) viscosity
- (8) The radioactive high energy photons which have high penetration and low ionizing power:
(a) β rays (b) α rays (c) γ rays (d) λ rays
- (9) Which nuclei can be studied by NMR?
(a) ^1H (b) ^2He (c) ^8O (d) ^{12}C
- (10) If the sample weight loss is to be measured, the method is
(a) Thermo gravimetric (c) Differential Thermal Analysis
(b) Derivative Thermo gravimetric (d) Calorimetric
- (11) With excitation of intra-molecular energy states, method used for gas analysis is:
(a) Potentiometric (c) Flame-ionization
(b) Galvanometric (d) Thermal conductivity
- (12) Oxidation Reduction Potential (ORP) is method to detect pollution in
(a) Water (b) Air (c) Solid (d) Plasma

- Q.2** Attempt **any eight** of the following. (16)
- (1) What are the important properties of Radiation sources?
 - (2) What are constructive and destructive interferences?
 - (3) List different atomization emission sources.
 - (4) Enlist the requirements for Pneumatic Nebulizer.
 - (5) Show the diagram of Phosphorescence generation and define the term: Triplet state.
 - (6) Write the characteristics of α particles.
 - (7) Define buffer. What are the precautions to handle buffer?
 - (8) Enlist pollutant gases and name the methods to detect them.
 - (9) What is the function of column in GC? Why it is helical in shape?
 - (10) On what basis chromatography is named? Why?
- Q.3** State Beer's law and explain optical split beam spectrophotometer. (08)
OR
- Q.3** Draw the block diagram of Flame photometry and explain Atomizer. (08)
- Q.4** Write a note on Raman Spectrometer and list its applications. (08)
OR
- Q.4** With neat diagram explain the principle of Fluorescence and spectrofluorometer. (08)
- Q.5** What information is extracted from Electron Spin Resonance? Draw neat block diagram and explain its working. (08)
OR
- Q.5** What do you understand by Mass Spectrometer? Explain Magnetic Deflection MS. (08)
- Q.6** Draw block diagram of Gas Chromatography. Explain components in brief. (08)
OR
- Q.6** Explain in brief different techniques for Water pollution monitoring. (08)

THE CHARUTAR VIDYA MANDAL UNIVERSITY
M.Sc. INSTRUMENTATION & CONTROL – SEMESTER 2
SUMMER (REGULAR) 2022 EXAMINATION

Course Title: Advanced Microprocessor & Microcontrollers

Course Code: 101390202

Total Printed Pages : 02

Date: 06/05/2022

Time: 02.00 pm to 04.00 pm

Maximum Marks: 60

Instructions:

- Attempt all questions.
- Numbers to the right indicate full marks for each question.
- Make suitable assumptions wherever necessary.

- Q. 1** Answer the following multiple choice questions. **(12)**
- (1) 8086 can access up to?
a) 512 KB b) 1 MB c) 2.5 MB d) 64 KB
 - (2) Which instruction is Used to load the address of operand into the provided register?
a) LEA b) LDS c) LES d) LAHF
 - (3) The different ways in which a source operand is denoted in an instruction is known as
a) Instruction Set b) Interrupts c) 8086 Configuration
d) Addressing Modes
 - (4) If MN/MX is low the 8086 operates in _____ mode
a) Minimum b) Maximum c) Central d) medium
 - (5) _____ signal is generated by combining RD and WR signals with IO/M
a) Control b) memory c) register d) system
 - (6) In which T-state does the CPU sends the address to memory or I/O and the ALE signal for de-multiplexing
a) T2 b) T3 c) T1 d) T4
 - (7) During the execution of an interrupt, the data pushed into the stack is the content of
a) IP b) CS c) PSW d) All of the mentioned
 - (8) The INTR interrupt may be masked using the flag
a) direction flag b) overflow flag c) interrupt flag d) sign flag
 - (9) The NMI pin should remain high for at-least
a) 4 clock cycles b) 3 clock cycles c) 1 clock cycle d) 2 clock cycles
 - (10) How much flash memory does the Atmega328 have?
a) 13K bytes b) 32K bytes c) 23K bytes d) 64K bytes
 - (11) How many comparators does the Atmega328 have?
a) 1 b) 2 c) 3 d) 4
 - (12) What is the operating voltage of Atmega328?
a) 12V to 9V b) 1.9V to 5V c) 1.8V to 5.5V d) 1.1V to 5V

- Q.2** Attempt **any eight** of the following. **(16)**
- (1) Explain Shift instruction in 8086.
 - (2) Describe dedicated, reserved, and general-use memory.
 - (3) What is the function of an Instruction pointer register?
 - (4) Write a note on system clock generation using 8284.
 - (5) Describe the Difference between Minimum and Maximum mode system in 8086.
 - (6) Draw Block Diagram of minimum mode I/O Interface.
 - (7) List out Interrupt instruction in 8086.
 - (8) List Arduino like systems.
 - (9) List out features of ATmega328 Microcontroller.
 - (10) What is the function of Lock signal in 8086.
- Q. 3** Explain Software model of 8086 advanced microprocessor. **(08)**
- OR**
- Q.3** List out Different addressing modes of 8086 and Explain with Example. **(08)**
- Q. 4** Classify the minimum mode signals of 8086 and explain in detail. **(08)**
- OR**
- Q. 4** Draw and explain minimum and maximum mode read bus cycles. **(08)**
- Q. 5** Explain Interrupts in detail of 8086 Microprocessor. **(08)**
- OR**
- Q. 5** Explain I/O Data transfer in 8086 Microprocessor with Input Bus cycle. **(08)**
- Q. 6** Explain ATmega328 Memory in detail with diagram. **(08)**
- OR**
- Q. 6** Explain Pin-diagram of Arduino board's microcontroller in brief. **(08)**

Seat No.: _____

Enrolment No.: _____

THE CHARUTAR VIDYA MANDAL UNIVERSITY

M. Sc. Instrumentation and Control - SEMESTER 2

SUMMER 2022 EXAMINATION

Course Title: Computer-Aided Process Control

Course Code: 101390203

Total Printed Pages: 02

Date: 07/05/2022

Time: 02.00 pm to 04.00 pm

Maximum Marks: 60

Instructions:

- Attempt all questions.
- Numbers to the right indicate full marks for each question.
- Make suitable assumptions wherever necessary.

Que 1 **Answer the following multiple-choice questions.** **(12)**

- (1) A _____ is defined as a set of operations that perform a physical or chemical transformation or a series of transformations in which the fluid or solid materials are converted into a healthier state.
- a) Control action b) Controller
c) Solenoid d) Process
- (2) The _____ is used to detect the shaft rotation speed to automatically open up the steam supply when a drop in rotation speed is registered.
- a) Solenoid b) Relay
c) Flyball d) Actuator
- (3) _____ is/are known as primary and secondary elements used to control variables and transmit the measured values to the controller.
- a) Controller b) Sensor and transmitter
c) Final control element d) Process
- (4) A _____ describes the processing activities required to convert the raw materials into finished products.
- a) Process model b) Process action
c) Process stage d) Process
- (5) Each level of _____ corresponds to a level in the control activity model.
- a) Physical model b) Process control modelling
c) Unit procedure d) Process stage
- (6) _____ plays a central role in computer-aided process control and is a critical element of successful control application.
- a) Physical model b) Process modelling
c) Control model d) Controller
- (7) A _____ is used for the process control computer application.
- a) Physical model b) Smart sensor
c) RTOS d) Process time management
- (8) BDOS stands for _____.
- a) Basic Disk Output System b) Bipolar Disk Output System
c) Bidirectional disk out sensor d) Basic disk operating system

THE CHARUTAR VIDYA MANDAL UNIVERSITYM.Sc. in Instrumentation & Control, Sem-IInd

Examination: May 2022

101390207: Power Electronics

Date: 09th May 2022

Day: Monday

TOTAL MARKS: 60

Time: 2.00 PM to 4.00 PM

Q. 1 Choose the most correct answer.**[12]**

- (1) Internal control of inverter using single PWM has _____.
- (A) Constant amplitude (C) Both (A) & (B)
(B) Modulated pulse width (D) None of above
- (2) In SCR latching current is _____ than holding current.
- (A) Greater (C) less
(B) Equal (D) All of above
- (3) DIAC and TRIAC is similar, except _____.
- (A) Get terminal (C) Anode terminal
(B) Cathode terminal (D) All of above
- (4) The commutation techniques of thyristors are classified into _____.
- (A) Natural commutation (C) Both (A) & (B)
(B) Forced commutation (D) None of above
- (5) Thyristor Conducting interval is called the overlap interval if _____.
- (A) Any one thyristor is on (C) All thyristor is off
(B) Half no of thyristor is on (D) All thyristor is on
- (6) Class F is _____ commutation.
- (A) Ac line (C) Both (A) & (B)
(B) Self (D) None of above
- (7) A three-phase converter has _____ frequency than single phase converter.
- (A) higher (C) Equal
(B) Lower (D) none of above
- (8) A cycloconverter refers to a frequency changer that can change AC power from one frequency to _____.
- (A) AC power at another frequency (C) DC power at another frequency
(B) AC power at same frequency (D) DC power at same frequency
- (9) Class C Chopper can be used for _____.
- (A) Dc motor control (C) Both (A) & (B)
(B) Regenerative braking of dc motor (D) None of above
- (10) A DC chopper is a static device that converts fixed dc input voltage to a _____ output voltage directly.
- (A) variable AC (C) Both (A) & (B)
(B) variable DC (D) None of above
- (11) For motor, Electromagnetic power $P =$ _____ watt.
- (A) T_e / W_M (C) $W_M \times T_e$
(B) W_M / T_e (D) All of above
- (12) Motor speed can be varied by controlling the _____.
- (A) Armature voltage (C) Both (A) & (B)
(B) Field current (D) None of above

- Q.1** **Answer the following in short. (Attempt any eight, each two marks)** **[16]**
- (1) Draw ideal characteristic of SCR.
 - (2) Give classification of rectifier and explain any one in short.
 - (3) Explain external pulse source commutation technique.
 - (4) List disadvantages of frequency chopper.
 - (5) Write a note on ASCR.
 - (6) What is DIAC? How it is useful in power electronics?
 - (7) List the application of inverter
 - (8) What is source impedance?
 - (9) What is variable frequency control in motor?
 - (10) What is slip power recovery in motor?
- Q.2** Why is SCR parallel connection required? Explain with necessary diagram and equations. **[08]**
- OR**
- Explain thyristor turn on methods in detail. **[08]**
- Q.3** Discuss in detail three phase full wave converter. **[08]**
- OR**
- Write a note on class A, B and C type commutating system. **[08]**
- Q.4** Illustrate the principle of step-up chopper. **[08]**
- OR**
- Explain working of step up cyclo converter **[08]**
- Q. 5** Write a note on shunt and series DC motor. **[08]**
- OR**
- Describe squirrel cage motor construction and working principle. **[08]**

-: All The Best: -