



Name: Roll No.:

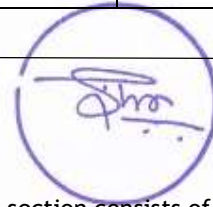
Branch: Signature of Invigilator:

Semester: VIth Date: 29/04/2022 (MORNING)

Subject with Code: ME377 MECHATRONICS

Marks Obtained	Section A (30)	Section B (20)	Total Marks (50)

INSTRUCTION TO CANDIDATE



1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. Candidates should write their roll no. in each page of the booklet.
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to submit the question paper cum answer sheets before leaving the examination hall.

CLASS: B. TECH.
BRANCH: MECHANICAL

SEMESTER : VI
SESSION : SP/22

SUBJECT: ME377 MECHATRONICS

TIME: 02 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains two sections. Section A is a subjective type while section B is a multiple choice question (MCQ) type. Each question of section A carries 4 marks while each question of section B carries 2 marks. All questions are compulsory.
 2. The missing data, if any, may be assumed suitably.
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SECTION A

1. What are the different elements of a Mechatronic system? Explain the role of each element briefly.
2. What is signal conditioning? Explain amplification, attenuation, filtering, and isolation required to convert sensor output to feed ADC.
3. Draw block diagrams of the Microprocessor and Microcontroller and explain the differences between them.
4. Explain various components of (a) Hydraulic system and (b) Pneumatic system.
5. What are the basic elements of a robot? Explain briefly the various applications of an industrial robot.

SECTION B

- i. Number of cells in a 4-variable K-map is
 - a) 12
 - b) 16
 - c) 18
 - d) 8
- ii. Which of the following is the advantage of the pneumatic system?
 - a) Low maintenance
 - b) Air does not ignite
 - c) Components are simple in design and cheaper
 - d) All of the above
- iii. Which one is not correct?
 - a) In the proportional controller, the output is directly proportional to the input
 - b) Integral controller is used to correct any steady-state offset
 - c) Derivative controller should have a large gain
 - d) The most common controller in a process plant is PID
- iv. LVDT is
 - a) An inductive transducer
 - b) A capacitive transducer
 - c) A resistive transducer
 - d) None of the above
- v. Which of the following buses are present in the microcontroller?
 - a) Data bus only
 - b) Data bus and address bus
 - c) Data bus, addresses bus, and control bus
 - d) Data bus and control bus
- vi. Which one is not correct?
 - a) Solid state relays need less current in comparison to electromechanical relays
 - b) Solid state relays have a high switching response time as compared to electromechanical relays
 - c) Solid state relays have no moving parts to wear out

- d) Electrical noise and contact bounce associated with conventional mechanical relays are absent in solid state relays
- vii) How many Boolean functions can be defined on 3 input variables?
 - a) 9
 - b) 8
 - c) 12
 - d) 6
- viii) Which of the following is not the advantage of CNC machine?
 - a) Reduced lead time
 - b) Higher flexibility
 - c) Improved quality
 - d) Increased scrap rate
- ix) Which of the following is not an actuator?
 - a) Stepper motor
 - b) Hydraulic motor
 - c) Hydraulic cylinder
 - d) Accumulator
- x) An ideal operational amplifier has
 - a) Infinite open loop gain
 - b) Very high output impedance
 - c) Limited bandwidth
 - d) Zero input impedance
- xi) Which one is not correct?
 - a) As the number of bits increases the resolution of the analogue to digital converter decreases
 - b) Low pass filter passes the low frequency and attenuates the high frequency
 - c) An ideal operational amplifier has an infinite band width
 - d) Signal to noise ratio is often expressed in dB
- xii. Which one is not correct?
 - a) Motion in a hydraulic power unit is achieved by using a hydraulic motor
 - b) Pressure relief valve opens when spring force is more than fluid pressure force on the poppet
 - c) Pressure relief valve is a safety measure
 - e) Operating pressure in the hydraulic system is more than the pneumatic system
- xiii. Which one is not a basic part of a robot?
 - a) End effector
 - b) Controller
 - c) Drive
 - d) Compressor
- xiv. Several machine tools can be controlled by a central computer in
 - a) NC
 - b) CNC
 - c) DNC
 - d) All of the above
- xv. Smallest change that a sensor can detect is
 - a) Accuracy
 - b) Sensitivity
 - c) Hysteresis
 - d) precision



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