# University of Mumbai
# Examination 2021 under cluster 9 (FAMT)

**Examinations Commencing from 1st June 2021 to 15th June 2021**

Program: Mechanical Engineering

Curriculum Scheme: Rev2016

Examination: Third Year Semester VI

Course Code: MEDLO6023 and Course Name: Industrial Automation

Time: 2 hour | Max. Marks: 80

| **Q1.** | **Choose the correct option for following questions. All the Questions are compulsory and carry equal marks** |
|---|---|
| | |
| 1. | Select an Internal Sensor used in Robot |
| Option A: | Force |
| Option B: | Torque |
| Option C: | Touch |
| Option D: | Acceleration |
| | |
| 2. | Which of the following element does not belong to Block diagram? |
| Option A: | System Gain |
| Option B: | Summing Point |
| Option C: | Take off Point |
| Option D: | Function Block |
| | |
| 3. | Which type of Joints have single degree of freedom? |
| Option A: | Spherical |
| Option B: | Prismatic |
| Option C: | Cylindrical |
| Option D: | Ball & Socket |
| | |
| 4. | In Brushless DC Motor, |
| Option A: | Rotor has coils and Stator is of permanent magnet. |
| Option B: | Both stator and Rotor are of permanent magnet. |
| Option C: | Rotor is of Permanent Magnet and Stator has coil. |
| Option D: | Both Stator and rotor has coils. |
| | |
| 5. | Which one is not a principle of Material Handling? |
| Option A: | Ergonomic Principle |
| Option B: | Work Principle |
| Option C: | Planning Principle |
| Option D: | Control Principle |
| | |
| 6. | _____ storage is a more recent application of an automated storage technology. |
| Option A: | Vertical Lift |
| Option B: | Work in Process |
| Option C: | Computer Control |
| Option D: | Numeric control |

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| 7. | In Mechanization, we normally make use of: |
| Option A: | Vision Sensor |
| Option B: | Capacitive Sensor |
| Option C: | Limit Switches |
| Option D: | Optical Sensor |
| | |
| 8. | Geneva mechanism was invented by: |
| Option A: | Watch Maker |
| Option B: | Mechanical engineer |
| Option C: | Car Mechanic |
| Option D: | Dentist |
| | |
| 9. | A Group of CNC machines is a _____ level of automation |
| Option A: | Device Level |
| Option B: | System Level |
| Option C: | Machine Level |
| Option D: | Enterprise Level |
| | |
| 10. | Which transmission system should be used for Limited space? |
| Option A: | Gears |
| Option B: | Belts |
| Option C: | Chain Drive |
| Option D: | Pulleys |
| | |
| 11. | The failure diagnostics mode is invoked when a …… occurs. |
| Option A: | Process |
| Option B: | Malfunction |
| Option C: | Completion |
| Option D: | Smoothness |
| | |
| 12. | Which is not the strategy of Automation & Production system? |
| Option A: | Increased Flexibility |
| Option B: | Offline Inspection |
| Option C: | Process Control & Optimization |
| Option D: | Improved Material Handling & Storage |
| | |
| 13. | Which automation is suited for high production quantities |
| Option A: | Fixed Automation |
| Option B: | Flexible Automation |
| Option C: | Programmable Automation |
| Option D: | Custom Automation |
| | |
| 14. | Programmable automations is suited for |
| Option A: | Mass Production |
| Option B: | Batch Production |
| Option C: | Job Production |

| | |
|---|---|
| Option D: | Custom Product |
| | |
| 15. | The Robot designed with Polar coordinate systems has |
| Option A: | Three Linear Movements |
| Option B: | Three Rotational Movements |
| Option C: | Two Linear & One Rotational Movement |
| Option D: | Two Rotational & One Linear Movement |
| | |
| 16. | Where this Limited sequence robots are used? |
| Option A: | Loading/Unloading |
| Option B: | Welding |
| Option C: | Pick & Place |
| Option D: | Spray Painting |
| | |
| 17. | Which type of Control system is preferred for spray painting operation using robot? |
| Option A: | Point to Point |
| Option B: | Continuous Path |
| Option C: | Limited Sequence |
| Option D: | Limited Point to Point |
| | |
| 18. | Find odd man out for motions of Robotic ARM |
| Option A: | Roll |
| Option B: | Pitch |
| Option C: | Yaw |
| Option D: | Swing |
| | |
| 19. | A combination of equipment and controls which handles, stores and retrieves materials with precision, accuracy and speed under a defined degree of automation is known as _____. |
| Option A: | Automated storage and retrieval system |
| Option B: | Flexible Manufacturing System |
| Option C: | Automated Guided Vehicle |
| Option D: | Conveyor system |
| | |
| 20. | _____ grippers are used to pick up materials such as glass, paper, cloth etc. |
| Option A: | Mechanical Grippers |
| Option B: | Adhesive Grippers |
| Option C: | Vacuum Cup Grippers |
| Option D: | Magnetic Grippers |

| **Q2.** **(20 Marks Each)** | **Solve the following questions as mentioned** |
|---|---|
| A | **Solve any Two** **5 marks each** |
| i. | *Explain working Principle of DC Motor.* |

| | |
|---|---|
| ii. | *Write a short note on: Interfacing Requirements.* |
| iii. | *Write a short note on BLDC.* |
| B | **Solve any One ( 10 marks each)** |
| i. | *Two double acting pneumatic cylinders A and B are selected for an industrial application. Design PLC system to achieve the given output. The sequence of movement for cylinders is as indicated below: (Draw Solenoid and Ladder Logic diagram)*<br>*A+ B+ A—B—* |
| ii. | *Two pneumatic cylinders (double acting) A and B are selected for an automation. The motion sequence is as follows. Design PLC system using 4/2 & 5/2 as a final directional valve. (Draw Solenoid and Ladder Logic Diagram)*<br>*B +, A—, Delay, B—, A+.* |

| **Q3.**<br>**(20 Marks Each)** | **Solve any Two Questions out of Three 10 marks each**<br>***Please delete the instruction shown in front of every sub question*** |
|---|---|
| A | *Design a Pneumatic circuit for work clamping on a milling table, the sequence is (A+ B+) A— B—. Use required components and sketch the arrangement or layout for it.* |
| B | *Two double acting pneumatic cylinders A and B are selected for an industrial application. Design Electro- pneumatic system to achieve the given output. The sequence of movement for cylinders is as indicated below:*<br>*A— B+ Delay A+ B—* |
| C | *Three double acting hydraulic cylinders A, B and C are selected for an industrial application. Design Electro- hydraulic system to achieve the given output. The sequence of movement for cylinders is as indicated below:*<br>*A+ B+ C+ A— B—C—* |