



- Notes :
1. Answer **Three** question from Section A and **Three** question from Section B.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answer necessary with the help of neat sketches.
 5. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION – A

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| 1. | a) | With the help of a simple sketch, explain the working principle of Linear Variable Differential Transformer (LVDT), and state the advantages of LVDT. | 6 |
| | b) | What is an absolute optical encoder and an incremental optical encoder? Explain the working of any one rotary encoder. | 7 |
| 2. | a) | Explain the working of a stepper motor. What is half step phase sequencing? | 7 |
| | b) | What is the difference between a transducer and a sensor. | 3 |
| | c) | What are different types of pneumatic, hydraulic & electrical actuators? | 3 |
| 3. | a) | With the help of a neat block diagram, explain the concept of direct digital control. | 6 |
| | b) | Explain the concept of supervisory computer control with the help of a block diagram. | 7 |
| 4. | a) | What are the requirements of a good spindle drive? | 4 |
| | b) | What are the requirements of a good feed drive? | 4 |
| | c) | Explain the principle of servomechanism for a machine tool motor with tacho-generation. | 6 |
| 5. | a) | How monitoring and diagnostics are done in a CNC machine tool? | 6 |
| | b) | Compare DC servo drive with AC servo drive. | 7 |

SECTION – B

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| 6. | a) | Explain with the help of neat sketch, the working of a magazine used for material handling. | 6 |
| | b) | What are bunkers? Draw and explain the working of bunker as a loading facility. | 7 |
| 7. | a) | What is the role of an orientation mechanism? Explain the working of a disc and pocket mechanism. | 7 |
| | b) | What is the role of a feeder and a separator in material handling? Only sketch different types and label the sketches. | 7 |

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|-----|------|--|---|
| 8. | a) | Draw and explain the circuit for synchronizing two pneumatic cylinders. | 6 |
| | b) | Explain the pneumatic circuit used to move an object around a corner of a horizontal conveyor. | 7 |
| 9. | a) | Draw ISO symbol for | 6 |
| | i) | Separator with automatic drain. | |
| | ii) | Pressure reducing valve. | |
| | iii) | Pressure release valve. | |
| | iv) | Variable flow control valve. | |
| | v) | FRL unit. | |
| | vi) | Solenoid operated 3/2 direction control valve. | |
| | b) | Draw pressure dependent sequencing circuit to sequence two hydraulic cylinders. Explain the working. | 7 |
| 10. | a) | Draw and explain a hydro-pneumatic circuit used for a punching machine. | 6 |
| | b) | Draw and explain the circuit that is used to cause continuous reciprocation of the work table of a grinding machine. | 7 |
