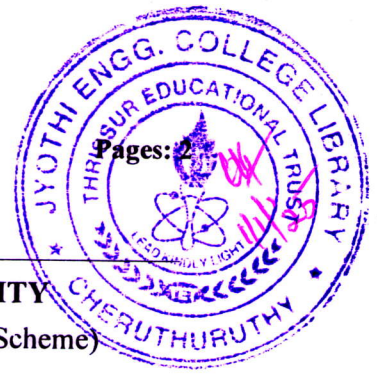


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Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech Degree S6 (S, FE) Examination December 2024 (2019 Scheme)

Course Code: MRT306

Course Name: INDUSTRIAL HYDRAULICS & PNEUMATICS

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- | | | |
|----|--|-----|
| 1 | Differentiate between open centre and closed centre design in a DCV. | (3) |
| 2 | Define a electro hydraulic servo system. | (3) |
| 3 | Illustrate the symbols of any three types of actuating mechanism of valves | (3) |
| 4 | Compare pneumatic and hydraulic systems | (3) |
| 5 | Describe frequency response analysis. list various techniques used to do frequency response analysis | (3) |
| 6 | Explain the advantages of pulse width modulation. | (3) |
| 7 | Brief about sequencing circuits with example | (3) |
| 8 | Explain the use of relays and timers in PLC circuit | (3) |
| 9 | List out and explain the advantages of electro hydraulic servo systems | (3) |
| 10 | Describe proportional valves | (3) |

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

- | | | |
|----|--|-----|
| 11 | a) Explain the working of pressure relief valves with neat sketches | (7) |
| | b) Depict the operation of an accumulator and brief about its application in a fluid power circuit | (7) |

OR

- | | | |
|----|---|-----|
| 12 | a) With neat sketch describe the construction of a pressure compensated flow control valve. | (9) |
| | b) Illustrate the working of a centrifugal pump with suitable diagram | (5) |

Module II

- | | | |
|----|---|-----|
| 13 | a) Demonstrate the working of a solenoid operated valve | (7) |
| | b) Explain the working of a proportional valve and show its symbol. | (7) |

OR

- 14 a) Differentiate between Conventional and proportional valves. (7)
b) With the help of a block diagram explain the working of a Electro hydraulic servo valve (7)

Module III

- 15 a) State and explain open loop and closed loop control systems with examples. Also compare their merits and demerits (7)
b) Brief about bode plot and its applications (7)

OR

- 16 a) Explain the use of a PID controller and show how it stabilises a response with suitable equations and diagrams (14)

Module IV

- 17 a) Construct a pneumatic circuit by cascade method for the sequence of drilling machine operation in which two cylinders A & B are used. (14)
(A) Cylinder A extends to clamp the work piece.
(B) Cylinder B extends to perform drilling operations.
(C) Cylinder B retracts after doing a drilling operation.
(D) Finally Cylinder A retracts to unclamp the work piece.

OR

- 18 a) Explain the use of Karnaugh map method in circuit design? (7)
b) Brief about the use of relays, timers and counters in PLC circuits (7)

Module V

- 19 a) List and explain the advantages of using a servo system (7)
b) Illustrate speed control with the help of meter-in, meter-out and bleed-off circuits. (7)

OR

- 20 a) Illustrate the trouble shooting of a hydraulic system using tree branching chart (7)
b) List down some of the possible troubles that can happen in a hydraulic system. (7)
Also mention their causes and remedies
