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Pages: 2

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Supplementary Examination May 2023 (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		What is an actuator? Mention the different types.	(3)
2		Draw and explain the internal architecture of a 4- way DCV.	(3)
3		Explain about the operation of check valve with a neat diagram.	(3)
4		Describe the role of hydraulic and pneumatic systems in automation.	(3)
5		Explain about internal and external feedback devices.	(3)
6		What are the uses of field buses?	(3)
7		Explain the role of PLC in the Fluid power system application.	(3)
8		Define combinational logic circuit and list the steps for the design for combinational logic circuit.	(3)
9		Describe proportional valves.	(3)
10		With rough sketch, write the logical sequence of operation of two pneumatic cylinders A and B. Where A is used to hold the bottle from the top and B is used to punch a mark on the bottle and return.	(3)

PART B

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

Module I

11	a)	Explain the working of three different type of hydraulic gear pumps used in the industry with the help of neat labelled diagrams.	(14)

OR

12	a)	A vane pump is to have a volumetric displacement of 95 cm; it has a rotor diameter of 60 mm, a cam ring diameter of 85 mm, and a vane width of 50 mm. What must be eccentricity?	(7)
	b)	Describe the working and types of vane pump with a neat figure.	(7)

Module II

13	a)	Discuss about proportional directional control valve and proportional pressure relief valve.	(14)

OR

14	a)	Explain the Need for automation in the industry.	(7)

b) Give an elaborated comparison between Hydraulics and pneumatics. (7)

Module III

15 a) State the advantages of frequency domain analysis. How is phase margin determined from Bode plots? (7)

b) State and explain open loop and closed loop control systems. Also compare their merits and demerits. (7)

OR

16 a) Explain analog and digital circuits. Give a detailed comparison between them. (10)

b) State the advantage of frequency response analysis. (4)

Module IV

17 a) Construct a pneumatic circuit by cascade method for the sequence of drilling machine operation in which two cylinder 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 in detail about the control of hydraulic cylinder using limit switch a neat sketch. Explain about different electrical components used in the system with its symbol. (14)

Module V

19 a) Explain the block diagram and components of the closed loop electro hydraulic servo system. (14)

OR

20 a) With appropriate ladder diagrams, and Boolean equations explain the control of a hydraulic cylinder using a single limit switch. (14)

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