Reg. No.															

B.Tech. DEGREE EXAMINATION, NOVEMBER 2023

Fourth Semester

18MHC105J – FLUID POWER SYSTEM AND AUTOMATION

(For the candidates admitted from the academic year 2020-2021 & 2021-2022)

Note:

(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

(ii) **Part - B & Part - C** should be answered in answer booklet.

Time: 3 hours | Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Answer **ALL** Questions

	Marks	BL	CO	PO
1. In Hydro – Static system, _____ is used to transmit power (A) Fluid Motion (B) Fluid Pressure (C) Fluid Flow (D) Fluid Temperature	1	1	1	1,3
2. _____ is a chemical process in which water power is bound to absorption material. (A) Absorption Dryer (B) Adsorption Dryer (C) Refrigeration Dryer (D) Membrane Dryer	1	2	1	1,3
3. Select the odd one out on the basis of direct control of single acting cylinder (A) Pedal Operated direction control valve (B) Lever of operated direction control valve (C) Pilot operated direction control valve (D) Pneumatic Push Button	1	2	1	1,3
4. The law of physics applicable for $\frac{V_1}{V_2}=\frac{P_1}{P_2}$ (A) Boyle's Law (B) Charle's Law (C) Pascal's Law (D) Gay Lussac	1	1	1	1,3
5. Which of the following compressor is used to produce large volume of air with less pressure? (A) Piston Compressor (B) Vane Compressor (C) Screw Compressor (D) Centrifugal Compressor	1	1	1	1,3
6. And logic function can be achieved by (A) Shuttle Valve (B) Flow Control Valve (C) Direction Control Valve (D) Twin Pressure Valve	1	2	2	1,4
7. _____ are used in Pneumatic systems to regulate the flow rate of compressed air. (A) Dual Pressure Valves (B) Flow Control Valves (C) Check Valves (D) Pressure Reducing Valves	1	1	2	1,4

8. The minimum number of groups to be made in a cascading circuit for the following sequence $A^+A^-B^+B^-C^+C^-D^+D^-$ 1 2 2 1,4

(A) 5 (B) 4
(C) 3 (D) 2

9. Find the wrong grouping in given sequence. 1 2 3 1,3

(A) $A^+D^+/D^-B^+/B^-A^-$ (B) $A^+B^+/B^-C^-/A^-C^+$
(C) $A^+B^+C^+/C^-B^+A^-$ (D) C^-B^-/B^+C^+

10. What is the notation used for the sequence of operations mentioned below? 1 2 3 1,3

i. Cylinder A undergone forward stroke
ii. Cylinder B undergone forward stroke
iii. Cylinder A undergone Backward stroke
iv. Cylinder B undergone Backward stroke

(A) $A^-B^-A^+B^+$ (B) $A^+B^-A^+B^-$
(C) $A^+B^-A^-B^-$ (D) $A^+B^-A^+B^-$

11. Which of the following statement is true for cascade method which is used to draw a pneumatic circuit? 1 2 3 1,3

(A) Signal processing valves are connected in parallel
(B) When the number of signal processing valves are greater than 4, the signals are strong
(C) Cascade method does not consider the cost
(D) Cascade method can be consider the cost factor and maintain the sequence

12. What type of pump will have the pressure compensation capability? 1 1 3 1,3

(A) Lube Pump (B) Vane Pump
(C) Piston Pump (D) Gear Pump

13. _____ is a type of pressure control valve that is used in the applications. Where the two hydraulic cylinders are operating in a sequence to allow the fluid flow to those cylinder's in a pre-determined sequence 1 1 4 1,3

(A) Pressure sequence valve (B) Pressure reduction valve
(C) Pressure compensated valve (D) Pressure relief valve

14. _____ has infinitely variables positioning capability 1 1 4 1,3

(A) Dual Pressure Valve (B) Servo Valve
(C) Proportional Valve (D) One way Flow Control Valve

15. When the servo valve spool land is narrower than ports, it is said to be _____ 1 1 4 1,4

(A) Over Lapped (B) Zero Lapped
(C) Under Lapped (D) In-Line

16. Excessive noise in a hydraulic pump is attributed to _____ 1 1 4 1,3

(A) Improper setting of valve (B) Excessive Drive Speed
(C) Internal Leakage (D) Low Oil Level

17.	_____ is the most commonly used programming techniques of PLC (A) Functional Block Diagram (B) Instruction List (C) Structured Level (D) Ladder Logic Diagram	1	2	5	1,4
18.	In which part of the signal conditioning is done? (A) I/O modules (B) Memory (C) Power Supply (D) Processor	1	2	5	1,4
19.	Interlocking with inputs represents _____ logical Operation (A) EX-NOR (B) EX-OR (C) NOR (D) AND	1	2	5	1,4
20.	In which of the following modes of PLC processor, the CPU is stopped from working. (A) Program (B) Run (C) Remote (D) Monitor	1	1	5	1,4

PART – B (5 × 4 = 20 Marks)

Answer **ANY FIVE** Questions

		Marks	BL	CO	PO
21.	Compare and contrast between single acting reciprocating compressor and Diaphragm Compressor.	4	1	1	1,3
22.	A double acting cylinder is used for stamping a work piece. The process runs continuously once the start push button is actuated if the operator. The process stops only when the stop push button is pressed. Draw an electropneumatic circuit to implement the above operation.	4			
23.	Write the difference of logic valves types and working principles with neat sketch.	4	2	2	1,4
24.	Explain the details about pneumatics on delay time and off delay timer.	4	2	3	1,4
25.	Explain the working principle of pressure reducing valve.	4	1	4	1,3
26.	List out the advantages of PLCs over hardwired relays.	4	2	5	1,4
27.	List out the various steps of PLC operation. Explain each of them.	4	1	5	1,4

PART – C (5 × 12 = 60 Marks)

Answer **ALL** Questions

		Marks	BL	CO	PO
28. a.	Explain the various types of air dryer. Why it is necessity in fluid power system. Draw a neat sketch.	12	1	1	1,4
	(OR)				
b.	Explain the working of single stage and multistage piston compressor with neat diagrams. The presence of intercooler increases the efficiency of a multi-stage compressor compared to a single stage compressor. Write Justification.	12	2	1	1,4

29. a.	Design and construct Pneumatic circuit for implementing the sequence $A^+A^-B^+B^-C^+C^-$.	12	3	2	1,4
	(OR)				
b.	Draw on Electropneumatic for implementing the sequence. $A^+B^+C^+A^-B^-C^-$.	12	3	2	1,4
30. a.	Illustrate the construction and working of balanced vane pump with a neat diagram. Also derive the volumetric efficiency and flow rate of pump.	12	2	3	1,4
	(OR)				
b.	Explain the working of a simple pressure relief valve. How it is difference from pressure reducing valve with suitable applications.	12	2	3	1,4
31. a. i.	Explain cylinder synchronizing circuits using suitable applications.	6	2	4	1,4
ii.	Which circuit is more synchronous explain with diagram.	6	2	4	1,4
	(OR)				
b.	Explain the working principle of Jet typeservo valve. Write the functional features of proportional valve with a neat sketch.	12	3	5	1,4
32. a.	Explain with block diagram of the PLC architecture with suitable diagram. Also explain the stages involved in PLC operation. Discuss any two programming technique used in PLC.	12	3	5	1,4
	(OR)				
b.	Draw the pneumatic circuit, wiring diagram and ladder logic diagram for implementing the sequence $A^+B^+B^-C^+C^-A^-$ where out the cylinders are controlled by 5/2 double solenoid operated DCV's.	12	3	5	1,4

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