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Reg. No. :

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**Question Paper Code: 99703**

B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

Elective

Mechanical Engineering

19UME903– APPLIED HYDRAULICS AND PNEUMATICS

(Regulation 2019)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- Which is the measure of the ability of a fluid flow CO1- R  
(a) Fire point                      (b) Pour point                      (c) Viscosity                      (d) Volatility
- In flow, the liquid particles may possess CO1- R  
(a) potential energy    (b) kinetic energy                      (c) pressure energy                      (d) all the above
- Tandem cylinders can be used in CO2- R  
(a) Synchronizing circuits.                      (b) Mid stroke stop circuits  
(c) two speed circuits                      (d) all of the above
- Maximum swash plate angle for axial piston pump is CO2- R  
(a) 0°                      (b) 15°                      (c) 17.5°                      (d) 22.5°
- Shuttle valves allow flow in. CO3- R  
(a) one direction only                      (b) both directions  
(c) either direction after reaching set pressure                      (d) none of these
- Gas loaded accumulators works on the basis of the CO3- R  
(a) Pascal law                      (b) Boyle's law                      (c) Both A & B                      (d) None of these
- $P V = \text{Constant}$  CO4- R  
(a) Boyle's law                      (b) Charle's law                      (c) Gay-Lussac's law                      (d) General gas law

8. Quick exhaust valves allow CO4- R  
 (a) air to exit the cylinder rapidly (b) oil to exit the cylinder rapidly  
 (c) both of the above (d) none of these
9. In an automatic control system which of the following elements is not used? CO5- R  
 (a) Error detector (b) Final control element (c) Sensor (d) Oscillator
10. .... Devices are miniature valve type devices that perform switching operations in fluid logic CO5- R  
 (a) MPL (b) PLC (c) Fluidic (d) All of the above

PART – B (5 x 2= 10 Marks)

- 11 Define the term "Fluid Power". CO1- U
- 12 Explain the Pumping theory CO2- U
- 13 List out the types of valve actuation methods. CO3- U
- 14 Explain the function of air filter and dryer CO4- U
- 15 State any four common causes for hydraulic system breakdowns. CO5- U

PART – C (5 x 16= 80 Marks)

- 16 (a) Explain the working principle of Hydraulic Power System. Also draw the symbols of Hydraulic Fixed displacement, unidirectional pump. CO1-U (16)
- Or
- (b) Hydraulic pump delivers oil at 60 bar, 120 l/min into a circuit laid on a horizontal plane. There are 4 elbow ( $K=0.75$ ), one globe valve fully open ( $K=10$ ) and a direction control valve (pressure drop = 3 bar) with the inside diameter of pipe as 30 mm. The total length of the straight run pipe is 20 m and the specific gravity of the oil is 0.9. The kinematic viscosity of the oil is  $0.0001 \text{ m}^2/\text{s}$ . Find the pressure in bar at the exit point of the pipe. CO1-Ana (16)
- 17 (a) Explain the construction and working principle of External Gear pump with neat Sketch CO2-U (16)
- Or
- (b) Explain the construction and working principles of double acting cylinder and cylinder cushioning with neat sketch. CO2-U (16)

- 18 (a) Explain the construction and working principle of 4/3 DCV and Centre flow configuration for 4/3 DCV with neat sketch. CO3-U (16)
- Or
- (b) Explain any two application circuits employing accumulator for different purposes with neat sketch. CO3-U (16)
- 19 (a) Explain the construction and working principle of a screw compressor with neat sketch CO4-U (16)
- Or
- (b) Design an electro pneumatic circuit using cascade method for the following sequence A+ B+ B- A- C+ C- CO4-Ana (16)
- 20 (a) Explain the Hydro mechanical servo valve with an industrial example. CO5-U (16)
- Or
- (b) Explain the various types of pneumatic switching elements with simple sketch CO5-U (16)

