Reg. No. : | | | | | | | | | | |

Question Paper Code: 45706

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

Fifth Semester

Mechanical Engineering

14UME506 - APPLIED HYDRAULICS AND PNEUMATICS

(Regulation 2014)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which fluid is used in hydraulic power systems

   (a) Water (b) Oil
   (c) Non Compressible Fluid (d) All the above

2. One litre of water occupies a volume of

   (a) 100 cm^3 (b) 250 cm^3 (c) 500 cm^3 (d) 1000 cm^3

3. Rotary motion in a hydraulic power unit is achieved by using

   (a) hydraulic cylinder (b) pneumatic cylinder
   (c) hydraulic and pneumatic cylinder (d) one of the above

4. _____ converts pressure energy of fluid into mechanical work.

   (a) Pump (b) Actuator (c) Compressor (d) Motor

5. A _____ is designed into most hydraulic systems to prevent damage due to excessive pressure

(a) Directional control valve (b) Relief valve
(c) Lift control valve (d) Flow control valve

6. The most common accumulator circuit is

(a) supplementing pump flow (b) making up for system leaks
(c) emergency power supply (d) none of the above

7. Pneumatic systems usually do not exceed.

(a) ½-1 *HP* (b) 1-2 *HP* (c) 2-3 *HP* (d) 4 - 6 *HP*

8. The lubricator in a pneumatic circuit is the

(a) first element in line (b) second element in line
(c) last element in line (d) middle element in the line

9. Hydraulic and pneumatic circuits

(a) perform the same way for all functions (b) perform differently for all functions
(c) perform the same with some exceptions (d) none of the above

10. Find the sequence for the operations mentioned below
    1. Cylinder *A* undergoes forward stroke
    2. Cylinder *B* undergoes forward stroke
    3. Cylinder *A* undergoes backward stroke
    4. Cylinder *B* undergoes backward stroke

(a) $A^- B^- A^+ B^+$ (b) $A^+ B^- A^+ B^-$ (c) $A^+ B^+ A^- B^-$ (d) $A^+ B^- A^+ B^-$

PART - B (5 x 2 = 10 Marks)

11. Recall four primary functions of a hydraulic fluid.

12. Define Pascal's law.

13. Interpret backpressure in fluid system.

14. What is the use of bleed-off circuit?

15. List basic elements of PLC.

PART - C (5 x 16 = 80 Marks)

16. (a) Explain various types of fluid power systems. (16)

Or

(b) Explain the major and minor losses in pipes with suitable sketches. (16)

17. (a) (i) Construct a neat sketch of balanced vane pump and explain its working principle. (10)

(ii) Give details on cylinder cushioning in actuators. (6)

Or

(b) Explain any three types of special cylinders used in hydraulic circuit with neat sketch. (16)

18. (a) (i) Explain the working of four way two position direction control valve. (8)

(ii) With neat sketch describe the construction and operation of pressure regulated valve. (8)

Or

(b) (i) How does the pilot operated direction control valve function? Explain with neat diagram. (8)

(ii) Design a suitable circuit for Two hydraulic cylinders two work in sequence. (8)

19. (a) Discuss the construction and working principle of a rotary vane and lobe compressors. (16)

Or

(b) Develop an electro pneumatic circuit for the following sequence A+B+A-B- where A & B stand for cylinder (+) indicates extension and (-) indicates retraction of cylinders. (16)

20. (a) Explain the hydro mechanical servo system with suitable application. (16)

Or

(b) How the PLC is used in fluid power control Explain with suitable example. (16)

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