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Question Paper Code: 45706

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

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)

- The engineering science pertaining liquid pressure and flow is
 - hydraulics
 - pneumatics
 - both (a) and (b)
 - none of the above
- How is power transmitted in fluid power systems?
 - gradually
 - instantaneously
 - both (a) and (b)
 - very slowly
- Rotary motion in a hydraulic power unit is achieved by using
 - hydraulic cylinder
 - pneumatic cylinder
 - hydraulic and pneumatic cylinder
 - one of the above
- _____ converts pressure energy of fluid into mechanical work.
 - Pump
 - Actuator
 - Compressor
 - 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. In which of the following compressors, air is drawn in axially, accelerated to high velocity and then expelled in a radial direction.
- (a) reciprocating piston compressor (b) rotary screw compressor
(c) rotary vane compressor (d) turbo compressor
8. Which of the following is used to sense the initial and final positions of a piston rod?
- (a) lever operated direction control valve (b) roller lever valve
(c) limit switch (d) all the above
9. The inability of any pump to draw full charge of oil is known as
- (a) cavitation (b) efficiency (c) deficiency (d) none of these
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. Define the term fluid power.
12. List the six basic components used in a hydraulic systems.
13. List applications of fluid power in the automotive industry.
14. What is the use of bleed-off circuit?
15. List basic elements of PLC.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Compare different power systems used in industry based on their properties. (8)
(ii) Discuss any four applications of hydraulic systems. (8)

Or

- (b) Explain the major and minor losses in pipes with suitable sketches. (16)
17. (a) Explain with neat sketch the working principle of external gear pump. (16)

Or

- (b) Explain any three types of special cylinders used in hydraulic circuit with neat sketch. (16)
18. (a) (i) Explain with a neat sketch about the construction of pilot operated check valve. (8)
(ii) Describe the working of a pressure sequence valve with a typical example. (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) What is the synchronizing? Explain the synchronizing circuit with suitable approaches? (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) Elaborate in detail about the capabilities of electro-hydraulic servo system and also discuss why hydraulic servo system is preferred than electrical motor drives. (16)

Or

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

