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

Question Paper Code: 41756

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

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. The engineering science pertaining liquid pressure and flow is

   (a) hydraulics (b) pneumatics
   (c) both (a) and (b) (d) none of the above

2. How is power transmitted in fluid power systems?

   (a) gradually (b) instantaneously
   (c) both (a) and (b) (d) very slowly

3. Which of the following pump ejects variable quantity of fluid per revolution?

   (a) centrifugal pump (b) gear pump
   (c) screw pump (d) rotary pump

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

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

5. What does the number 4/3 in valve mean?

   (a) 4 positions and 3 ways (b) 4 ways and 3 positions
   (c) 4 ways or 3ways (d) 3 ways or 4 positions

6. Check valve is a type of

(a) pressure reducing valve (b) pressure relief valve
(c) directional control valve (d) pressure sequencing valve

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. 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) (i) Compare different power systems used in industry based on their properties. (8)

(ii) Discuss any four applications of hydraulic systems. (8)

Or

(b) (i) With neat sketch explain the components of hydraulic fluid power systems. (12)

(ii) Write short notes on laminar and turbulent flow. (4)

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) Represent the working principle of external gear pump and determine its performance measures. (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) Illustrate the working of bladder type accumulator and its application. (16)

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

Or

(b) Design the following fluid power circuits with examples

(i) Cylinder synchronizing circuit (ii) Hydro-pneumatic circuit (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

(b) Explain the structure and features of a PLC with neat block diagram also write the advantages of PLC. (16)

———————