Reg. No. : ☐☐☐☐☐☐☐☐☐☐

Question Paper Code: 59072

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Elective

Mechanical Engineering

15UME904 - APPLIED HYDRAULICS AND PNEUMATICS

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The relation between temperature and viscosity of hydraulic oil

   (a) The temperature and viscosity vary linearly
   (b) as temperature decreases viscosity decreases at atmospheric pressure
   (c) as temperature increases viscosity decreases at atmospheric pressure
   (d) remains constant

2. The ratio of inertia force to viscosity is known as

   (a) Biot number   (b) Reynold number
   (c) Cauchy number   (d) Euler number

3. Which of the following is used as a component in hydraulic power unit?

   (a) pressure gauge   (b) filler gauge
   (c) valve   (d) reservoir

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

   (a) hydraulic cylinder   (b) pneumatic cylinder
   (c) hydraulic motor   (d) both a and b

5. Head loss hf due to friction is given by

   (a) $4\,f\,l\,v^2 / g\,d$ (b) $4\,f^2\,l\,v / 2\,g\,d$
   (c) $2\,f\,l\,v^2 / 2\,g\,d$ b   (d) $4\,f\,l\,v^2 / 2\,g$

6. Which energy is converted into mechanical energy by the hydraulic cylinders?

    (a) hydrostatic energy   (b) hydrodynamic energy

    (c) electrical energy   (d) chemical energy

7. What does the numbers in 4/2 valve mean?

    (a) 4 positions and 2 ways   (b) 4 ways and 2 positions

    (c) 2 pump and 4 cylinders   (d) 4 pump and 2 cylinders

8. Overlapping of signals in pneumatic systems can be avoided by using

    (a) rolling lever valve   (b) idle roller lever valve

    (c) both a and b   (d) none of these

9. A pneumatic symbol is

    (a) different from a hydraulic symbol used for the same function

    (b) the same as a hydraulic symbol used for the same function

    (c) not to be compared to a hydraulic symbol used for the same function

    (d) none of these

10. How is strong magnetic field in a solenoid achieved?

    (a) strong magnetic field in a solenoid is achieved, if coil acts as conductor

    (b) coil is surrounded by a iron frame

    (c) iron core is placed at the centre of the coil

    (d) all the above

<center>PART - B (5 x 2 = 10 Marks)</center>

11. Define the term fluid power.

12. Show the symbol for pump and filter with its direction.

13. List the components of the hydraulic system.

14. Relate the importance of accumulator.

15. Compare linear actuators and valve actuators.

<center>PART - C (5 x 16 = 80 Marks)</center>

16. (a) (i) Explain any four properties of hydraulic fluid.   (8)

       (ii) List the advantages of fluid power and its applications.   (8)

<center>Or</center>

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(b) (i) State Pascal's law. Explain the basic hydraulic power system with a sketch and also its advantages. (8)

(ii) Illustrate any four fluid power symbols used in a hydraulic system. (8)

17. (a) (i) Classify hydraulic pump. Explain in detail. (8)

(ii) Inference the importance and construction of the vane pump with a sketch. (8)

Or

(b) (i) Classify actuators. Explain any one type in detail. (8)

(ii) Categorize the operation and function of piston pump with example. (8)

18. (a) (i) Explain the significance of pressure control valve and its limitations. (8)

(ii) Compare between globe valve and needle valve used for fluid flow control. (8)

Or

(b) (i) Conclude with an application the need for accumulators in a fluid power. (8)

(ii) Select a suitable hydraulic intensifier circuit diagram for a hydraulic system and elaborate in detail. (8)

19. (a) (i) Illustrate with a line diagram the components of a pneumatic system. (8)

(ii) Outline with a sketch for any four actuation symbols used in pneumatic system. (8)

Or

(b) (i) Relate the significance of speed control circuits design with neat sketch. (8)

(ii) Explain the cascade system and explain the two group cascade circuit system. (8)

20. (a) (i) Develop the pneumatic closed loop control system with an example. (8)

(ii) Select for a simple application of the electro hydraulic servo system with a sketch. (8)

Or

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(b) (i) Develop the PLC relay logic ladder diagram with a sketch. (8)

(ii) Identify in detail the maintenance and troubleshooting methods in pneumatic systems. (8)

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