CBCS Scheme

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15MT53

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Hydraulics and Pneumatics

Time: 3 hrs. Max. Marks: 80

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. State Pascal's law and with a neat sketch explain the structure of hydraulic system. **(08 Marks)**

b. What is positive displacement pump? In what way it differs from centrifugal pump? **(04 Marks)**

c. A hydraulic press has a ram of 250mm diameter and plunger of 40mm diameter. If a load of 40kN is to be lifted, find the minimum force to be applied on the plunger to keep the load in balance. **(04 Marks)**

OR

2 a. What is fluid power? List the advantages. **(04 Marks)**

b. Explain the construction and operation of external gear pump with a neat sketch. **(08 Marks)**

c. Derive expression for volumetric displacement of vane pump. **(04 Marks)**

Module-2

3 a. Differentiate between hydraulic pump and hydraulic motor. **(04 Marks)**

b. Explain with neat sketch the construction and operation of swash plate piston motor. **(08 Marks)**

c. A hydraulic motor has a $82cm^3$ volumetric displacement. If it has a pressure rating of 70 bars and it receives oil at 0.0006 m^3/s theoretical flow rate pump, find the motor (i) Speed (ii) Theoretical torque (iii) Theoretical power. **(04 Marks)**

OR

4 a. Sketch the symbols of
   i) Lever operated, spring centered 4/3 way direction control valve
   ii) Pressure sequence valve. **(04 Marks)**

b. Explain with neat sketch the operation of compound pressure relief valve. **(08 Marks)**

c. With neat sketch explain the construction and working of flow control valve. **(04 Marks)**

Module-3

5 a. Explain the operation of double pump hydraulic system, list the components required, sketch neat circuit diagram explain one complete cycle. **(10 Marks)**

b. List the functions of an accumulator and explain the operation of diaphragm accumulator with a neat sketch. **(06 Marks)**

OR

6 a. List the desirable properties of hydraulic oils. **(04 Marks)**

b. With the help of neat sketch explain the construction and working of reservoir system used in hydraulics. **(06 Marks)**

c. Sketch and explain the hydraulic locked cylinder circuit using pilot check valve. **(06 Marks)**

Module-4

7 a. With neat sketch explain the construction and working of pneumatic filter, regulator and lubricator unit and mention its importance. **(10 Marks)**

b. Mention the applications of 3/2 way puppet valve and explain its operation with a neat sketch. **(06 Marks)**

OR

8 a. Explain with the help of neat sketch the construction and working cushioned cylinder. **(08 Marks)**

b. What is supply and exhaust air Throttling explain with necessary circuit diagram. **(08 Marks)**

Module-5

9 a. With a neat sketch explain the construction and operation of solenoid actuation of a valve. **(04 Marks)**

b. Design pneumatic circuit for the actuation of a double acting, cylinder extends only when a work piece is placed in position, a safety guard is lowered and a push button is pressed. The cylinder is to retract upon release of any one of the three. Sketch the symbolic circuit and explain the operation for one cycle. **(12 Marks)**

OR

10 a. With a neat sketch explain the construction and working of electromechanical relay and mention its applications. **(04 Marks)**

b. Design the pneumatic circuit for the actuation of a double acting cylinder using the push button. The return of the cylinder is to be effected only after reaching a pre set pressure. The embossing pressure is to be adjustable.

i) Sketch the pneumatic circuit diagram using symbols and designate the valves.

ii) List the components and explain the operation for one complete cycle. **(12 Marks)**

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