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Seventh Semester B.E. Degree Examination, Jan./Feb. 2021
Hydraulics and Pneumatics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, selecting at least TWO full questions from each part.

PART – A

- 1 a. Define a hydraulic power system. With a neat sketch explain the structure of a hydraulic system. (07 Marks)
- b. Mention the classification of pumps used in a hydraulic power system. Explain the working of a balanced vane pump with a neat sketch. (08 Marks)
- c. A pump has displacement volume of 100cm^3 . It delivers $0.0015\text{m}^3/\text{s}$ at 1000rpm and 70 bars. If the prime mover input torque is 120Nm. Determine overall efficiency and theoretical torque required to operate the pump. (05 Marks)
- 2 a. Mention the classification of an actuator. Explain with a neat sketch the construction and working of a double acting cylinder. (08 Marks)
- b. A hydraulic motor has a 82cm^3 volumetric displacement. If it has a pressure rating of 70 bars and it receives oil from a $0.0006\text{m}^3/\text{s}$ theoretical flow rate pump. Find the motor speed, theoretical torque and theoretical power. (06 Marks)
- c. Explain with a neat sketch bent axis type piston motor. (06 Marks)
- 3 a. Explain with a neat sketch, working of a pressure relief valve. (06 Marks)
- b. Mention the function and symbolic representation of the following values:
 - i) 4/3 direction control valve
 - ii) Pressure reducing valve
 - iii) Sequence valve
 - iv) Pressure compensated flow control valve. (08 Marks)
- c. Explain with a neat sketch the working of a poppet valve. (06 Marks)
- 4 a. Explain with a neat sketch different types of accumulator. (08 Marks)
- b. Explain the working of a double pump hydraulic circuit and mention its application. (06 Marks)
- c. Explain with a circuit diagram, the speed control of a hydraulic motor. (06 Marks)

PART – B

- 5 a. Name the four problems of a hydraulic system and mention the four causes for each problem. (10 Marks)
- b. Explain the desirable properties of hydraulic fluid and explain any four types of hydraulic fluid. (08 Marks)
- c. Mention the different types of scaling devices. (02 Marks)
- 6 a. Explain with a neat sketch end cushioning of a pneumatic cylinder. (08 Marks)
- b. Explain a FRL unit of a pneumatic power system. (06 Marks)
- c. Mention the advantages and limitations of a pneumatic system. (06 Marks)
- 7 a. Explain the working of a quick exhaust valve with a neat sketch. (06 Marks)
- b. Explain with a circuit diagram direct and indirect actuation of pneumatic cylinder. (08 Marks)
- c. Explain supply air throttling and exhaust air throttling of pneumatic cylinder. (06 Marks)
- 8 a. Explain the sequential motion control of two cylinders with a neat diagram. (12 Marks)
- b. Explain the working of radial piston pump with a neat sketch. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.