

# CBCS SCHEME

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18AE733

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2023 Hydraulics and Pneumatics

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- Explain pressure compensated vane pump, with a neat figure. (08 Marks)
  - Derive an expression for theoretical displacement of a axial piston pump. (06 Marks)
  - Explain the working of internal gear pump, with a neat figure. (06 Marks)

OR

- Explain how bent axis motor differs with axial motor with schematic sketches. (10 Marks)
  - A hydrostatic transmission operating at 10MPa has the following data ;:

Hydraulic pump	Hydraulic motor
$V_D = 100\text{cm}^3$	$V_D = ?$
$\eta_{\text{vol}} = 90\%$	$\eta_{\text{vol}} = 92\%$
$\eta_{\text{mech}} = 85\%$	$\eta_{\text{mech}} = 700\text{rpm}$
$N = 1500\text{rpm}$	$N = 700\text{rpm}$

Find the i) Displacement of the motor ii) Output torque to motor. (10 Marks)

### Module-2

- Explain with a neat diagram, the working of a compound relief valve. (10 Marks)
  - Explain how a pressure compensated flow is obtained through a flow control valve, with the help of a neat diagram. (10 Marks)

OR

- Explain with neat sketch of 3/2 poppet valve with symbolic representation. (10 Marks)
  - Explain with a neat sketch the working of shuttle valve with symbolic representation. (10 Marks)

### Module-3

- Explain how speed of a hydraulic cylinder is controlled using a regenerative hydraulic circuit. (10 Marks)
  - Sketch the hydraulic circuit for use of accumulator as an auxiliary power source and explain its working. (10 Marks)

OR

- Explain with a neat circuit diagram, the working of double pump hydraulic system. (10 Marks)
  - Explain with a neat circuit diagram, the counter balance valve application. (10 Marks)

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.



**Module-4**

- 7 a. Write notes about service properties of hydraulic fluids. (06 Marks)  
b. What are the undesirable effects of solid contaminations? (06 Marks)  
c. Explain with neat sketches the working of full flow and By-pass filter. (08 Marks)

OR

- 8 a. Describe the structure of pneumatic control, with a block diagram. (07 Marks)  
b. Explain the working of cylinder cushioning, with a neat sketch. (07 Marks)  
c. Describe any two basic mounting arrangements of pneumatic actuators. (06 Marks)

**Module-5**

- 9 a. Explain the different methods employed for controlling the speed of pneumatic cylinders with a neat sketch. (10 Marks)  
b. What is the function of a time delay valve? Explain the constructional features of a typical time delay valve with a neat sketch. (10 Marks)

OR

- 10 a. Explain the working of a puppet valve, with a schematic diagram and graphic symbol. (07 Marks)  
b. Explain how a shuttle valve functions as an OR gate. (04 Marks)  
c. Explain with a circuit diagram, controlling of extension of a double acting cylinder using logic gates. (09 Marks)

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