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03 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **10**

a) Define Specific Gravity and Demulsibilty.

b) Identify the type of flow –

i) Fluid particles moves in zig-zag (cross) manner

ii) Velocity of flow of Fluid particles is constant.

c) Draw labeled sketch of External gear pump.

d) State the function of Pressure intensifier in oil hydraulic system.

e) Write the effect if pressure relief valve is not provided in oil hydraulic system.

f) Write Chezy's equation and write meaning of each term.

g) Define Vacuum pressure and Atmospheric pressure.

Marks

2. Attempt any THREE of the following : **12**

a) Explain construction and working of Bourdon tube pressure gauge.

b) Identify the type of minor loss if pipe of larger diameter has velocity of 10 m/sec connected to smaller diameter pipe has velocity of 16 m/sec and calculate minor loss.

c) Compare Vane pump and Gear pump considering points –

i) Mechanical elements used

ii) Principle

iii) Pressure developed

iv) Efficiency

d) Classify control valves on the basis of –

i) Parameter of fluid to be controlled

ii) Type of control valve element.

3. Attempt any THREE of the following : **12**

a) A rectangular plate of 2 m wide and 4 m deep lies vertically in water. Determine the total pressure and position of center of pressure on plane surface when upper edge of 2 m is horizontal and coincides with water surface.

b) Draw labeled layout of pneumatic system and write function of compressor and muffler.

c) Explain Pressure Reducing valve with neat sketch.

d) State –

i) Pascal's law

ii) Bernoulli's theorem

Marks

4. Attempt any THREE of the following : **12**

a) The pipe carrying water of 25 cm is connected to pipe of 37 cm having flow rate of 5 m^3/sec. Calculate head lost due to sudden enlargement.

b) Differentiate between Oil hydraulic system and Pneumatic system on the basis of –

i) Medium

ii) Pressure generation device used

iii) Return lines

iv) Operating pressure

c) Explain Time delay valve with neat sketch.

d) Draw hydraulic circuit to operate D.A. Cylinder using 4/2 D.C valve for reciprocation movement.

e) State two causes and remedies for each fault –

i) Pump is not working

ii) Speed of actuator is very slow.

5. Attempt any TWO of the following : **12**

a) Suggest type of accessory for given function and draw symbol –

i) To clean the oil contaminations

ii) Oil heating/ Cooling

iii) Reduce noise in pneumatics

iv) Store hydraulic energy of oil

v) Boost the pressure of oil

vi) Store oil

b) i) Draw labeled sketch of Twin pressure valve and Shuttle valve.

ii) State the logic condition of use of above both valves with symbols.

c) Draw-and-explain-pneumatic speed control circuit for hand grinder using unidirectional air motor as an actuator.

Marks

6. Attempt any TWO of the following : **12**

a) Suggest type of valve for following function and draw symbol of –

i) DC valve to operate Spring return / SA Cylinder.

ii) to relief excessive pressure of oil.

iii) to change flow of oil without pressure compensation.

b) Draw and explain pilot control/impulse circuit for Double acting air cylinder.

c) Compare Meter-in and Meter-out circuit as per –

i) FCV position

ii) Suitable to type of load

iii) Effect of throttling

iv) Heat generated

v) Effect on movement of actuator

vi) Application
