

October 2018*Time – Three hours
(Maximum Marks: 75)*

*[N.B: (1) Q.No. 8 in PART – A and Q.No. 16 in PART – B are compulsory.
Answer any FOUR questions from the remaining in each PART – A
and PART – B*

(2) Answer division (a) or division (b) of each question in PART – C.

*(3) Each question carries 2 marks in PART – A, 3 marks in Part – B and
10 marks in PART – C.]*

PART – A

1. Define vacuum pressure.
2. What is piezometer?
3. What is continuity equation?
4. What is the value of datum head when the pipe is in horizontal position?
5. What is slip and negative slip?
6. Draw the ISO symbol of quick exhaust valve.
7. What is meant by 3/2 DCV?
8. What are the basic elements of hydraulic systems?

PART – B

9. A gauge records a pressure of 20 kN/m^2 . Calculate the corresponding absolute pressure in kN/m^2 and metre of water.
10. Compare laminar flow and turbulent flow.
11. List out the minor losses occurred in the pipe line flow.
12. What is an indicator diagram?
13. Derive an expression for the force exerted and work done by the jet on a series of moving blades.
14. Define flash point and fire point of liquid.

15. Explain the working of 4/2 DCV used in hydraulic systems.
16. Describe the working of shuttle valve.

PART – C

17. (a) (i) Write short notes on hydraulic jack.
(ii) An U tube monometer containing mercury has its right limb open to atmosphere. The left limb is connected to a pipe containing water under pressure, the centre of which is in level with the free surface of mercury. The difference in levels of mercury is 50mm. Calculate the pressure of water in the pipe in (i) kN/m^2 and (ii) 'm' of water.

(Or)

- (b) A differential manometer connected to two pipes reads 0.25m of mercury. Water flows through one pipe and through the other. Find the pressure difference between two pipes, if the level of pipes is same. The pressure of water is greater than the pressure of oil and the height of water column from the centre of the pipe is 0.45m. Take relative density of oil is 0.8.

18. (a) (i) What are the hydraulic co-efficient? Explain.
(ii) The ratio between length and diameter of the pipe is 500. Determine the head lost due to friction, if the velocity of water is 4m/s. Take Chezy's constant as 96.

(Or)

- (b) A hydraulic machine is supplied with 300 lps of water through a horizontal pipe of 250 m long and 300 mm diameter. Find the power supplied to the machine, if the pressure at the entrance is 0.5 N/mm^2 . Take $f=0.01$.

19. (a) (i) Explain the construction and working of Kaplan turbine with neat sketch.
(ii) Differentiate impulse and reaction turbines.

(Or)

- (b) Describe multi stage pump with (i) Impellers in parallel and (ii) Impellers in series.

20. (a) What is pneumatic system? Explain the main elements of the system with a sketch.

(Or)

- (b) Draw and explain the circuit diagram for the operation of a double acting cylinder with metering-out-control.

21. (a) (i) What is hydraulic motor? Explain.
(ii) Explain the working of radial piston pump with neat sketch.

(Or)

- (b) (i) Describe viscosity and lubricity of fluids.
(ii) Draw the hydraulic circuit with ISO symbols for the table movement of a surface grinder.
