Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 41383

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh Semester
Mechanical Engineering
ME 6021 – HYDRAULICS AND PNEUMATICS
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. With proper SI unit, define the term 'work' and 'power'.
2. Why is hydraulic power especially useful with heavy work ?
3. Name the different designs of gear pump.
4. How is single acting cylinder retracted ?
5. Why pressure relief valve is required for hydraulic circuit ?
6. What is flow dividers and how are they classified ?
7. Draw a graphic symbol of 'uni-directional' and 'bidirectional' pneumatic motor.
8. What is the main advantage of hydro-pneumatics ?
9. What is the meaning of the term 'troubleshooting' ?
10. Why interfacing is necessary in a microprocessor control of fluid power ?

PART – B (5×16=80 Marks)

11. a) i) Differentiate oil hydraulic and pneumatic system. (8)

ii) Explain the statement of 'Gas laws' and 'Pascal law'. (8)

(OR)

b) i) Oil with a kinematic viscosity of 0.32×10^{-4} m^2/s is flowing through a 25 mm hydraulic pipe circuit at the rate of 375 lpm. Is this flow laminar or turbulent ? Made your comment. (8)

ii) List the various factors that influence the selection of a hydraulic fluid. (8)

12. a) i) List the advantages of positive displacement pumps over non-positive displacement pumps. (8)

ii) A gear pump has an outside diameter of 80 mm, inside diameter of 55 mm and a width of 25 mm. If the actual pump flow is 95 lpm and speed is 1600 RPM what is the volumetric displacement and theoretical discharge. Also find volumetric efficiency. (8)

(OR)

b) Write short notes on need and function of :

i) Telescopic cylinder (8)

ii) Cushioned cylinder. (8)

13. a) A double acting vertically oriented cylinder is used to raise or lower the load without cylinder creep. Develop and discuss the hydraulic circuit for this purpose.

(OR)

b) Discuss the application of cross-over pressure relief valve by using a suitable circuit.

14. a) What do you mean by air preparation ? Discuss the various stages involved in it.

(OR)

b) What is pilot-operated Directional Control Valve (DCV) ? Develop and discuss a hydraulic circuit to reveal the significance of pilot-operated DCV.

15. a) What is PLC ? What are the basic elements involved in PLC and discuss their function in detail.

(OR)

b) i) List the important considerations that to be followed in the installation of hose assemblies. (10)

ii) A small single acting cylinder is to extend and clamp a work piece when a push button is pressed. As long as the push button is activated, the cylinder should remain in the clamped position. If the push button is released, the clamp is to retract. Use additional start button. Schematic diagram of the setup is shown in Figure. (6)