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Question Paper Code : 80652

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

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. List out any four important advantages of fluid power system.
2. What are the primary functions of hydraulic fluids?
3. Distinguish between positive and non-positive displacement pumps.
4. Draw the ANSI symbol for a pilot – operated check valve and a shuttle valve.
5. State the need of accumulators in hydraulic circuits.
6. What is the purpose of fail-safe circuit?
7. When is pneumatics preferred over hydraulics?
8. Write the significance of the 'Conda Effect' in developing fludic elements.
9. What is the function of a sequence valve? Draw its graphic symbol.
10. What is the advantage of using micro-electronic control for fluid power compared to electro-mechanical control?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the basic components required for a hydraulic system? Explain their functions. (8)

(ii) Describe the essential properties of hydraulic fluids. (8)

Or

(b) (i) Write Pascal's law. Explain any one applications of Pascal's law with neat diagram. (8)

(ii) List out the applications of fluid power employed in different industries. (8)

12. (a) (i) With a neat sketch, explain the working principle of an external gear pump. (8)

(ii) Explain the construction and working of the 4/3 DCV. (8)

Or

(b) (i) Explain the working of a vane type motor with neat diagram. (8)

(ii) With a neat sketch, explain 'cushioning' provided in hydraulic cylinders. (8)

13. (a) Explain the working principle of pressure intensifier, with neat diagram. Also draw the Air-over oil circuit and explain. (16)

Or

(b) Draw and explain the hydraulic circuits for

- synchronizing two cylinders
- regenerative system. (16)

14. (a) (i) Explain the construction and working principal of a quick exhaust valve and a silencer. (8)

(ii) With a neat sketch explain the air-pilot control circuit for a double acting cylinder. (8)

Or

(b) (i) Using a neat sketch explain the construction and working of a pneumatic regulator. Also give its graphical symbol. (8)

(ii) With a neat sketch explain the working of semi – automatic control of double acting pneumatic cylinder. (8)

15. (a) In an automotive industry, a fluid power circuit consists of three double acting cylinders A, B and C which are used for clamping, drilling and punching respectively. The component is placed in the clamping cylinder. For drilling, fast extension till the mid stroke, slow extension till the end of stroke, rapid return takes place. After drilling, punching operation is carried out and an intensifier is used for this. The clamp opens after completing the drilling and punching operation.

Develop a pneumatic circuit employing sequence valve and other suitable valves and components. (16)

Or

(b) Develop an electro pneumatic circuit using cascade method for the following sequence: A+, B+, B–, C+, A–, C– where A, B and C stands for the cylinders, (+) indicates extension and (–) indicates retraction of the cylinders. Also, discuss the major steps of designing procedure. (16)
