|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Roll No. |  |  |  |  |  |  |  |  |  |  |  |  |



**PRESIDENCY UNIVERSITY**

**Bengaluru**

|  |
| --- |
| **End - Term Examinations – JANUARY 2025** |
| **Date:** 09 – 01- 2025 **Time:** 09:30 am – 12:30 pm |

|  |  |  |
| --- | --- | --- |
| **School:** SOE | **Program:** B. Tech (MCM) | |
| **Course Code :**MEC3062 | **Course Name :** Hydraulics and Pneumatics | |
| **Semester**: VII | **Max Marks**:100 | **Weightage**:50% |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **17** | **21** | **31** | **31** | **0** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** | | | | |
| **1** | Define fluid power. | **2 Marks** | **L1** | **CO1** |
| **2** | Pascal’s law states that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **2 Marks** | **L1** | **CO2** |
| **3** | Pumps are classified mainly as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **2 Marks** | **L1** | **CO2** |
| **4** | Mechanical efficiency of a pump is the ratio of \_\_\_\_\_ to \_\_\_\_\_\_ | **2 Marks** | **L1** | **CO2** |
| **5** | Sketch the symbol of Single acting cylinder spring return | **2 Marks** | **L1** | **CO3** |
| **6** | A hydraulic motor is a device which converts \_\_\_ energy into \_\_\_\_\_ energy | **2 Marks** | **L1** | **CO3** |
| **7** | The performance of hydraulic motors depends on \_\_\_ & \_\_\_\_ | **2 Marks** | **L1** | **CO3** |
| **8** | Recognize the symbol for Dual pressure valve and a shuttle valve | **2 Marks** | **L1** | **CO4** |
| **9** | List two functions of pressure relief valve in a hydraulic system | **2 Marks** | **L1** | **CO4** |
| **10** | Recognize the symbol for 4/3 Poppet valve | **2 Marks** | **L1** | **CO4** |

**Part B**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Answer the Questions. Total Marks 80** | | | | | |
| **11.** |  | ii) Explain with a neat sketch the working of a single acting cylinder.  ii) Sketch and explain the working of a double acting cylinder | **25 Marks** | **L3** | **CO4** |
| **or** | | | | | |
| **12.** |  | i) Explain with a neat diagram working principle of quick exhaust valve  ii) Explain with a schematic diagram the production of compressed air for pneumatic systems. | **25 Marks** | **L3** | **CO4** |
|  |  |  |  |  |  |
| **13.** |  | i) Discuss a regenerative circuit and explain how it helps to get equal extension and retraction forces.  ii) Explain with suitable circuits, how the cylinder speed can be controlled by using flow control valves | **25 Marks** | **L3** | **CO3** |
| **or** | | | | | |
| **14.** |  | i) What is a filter and how they are classified?  ii) Develop an industrial application circuit of a counter balance valve application | **25 Marks** | **L3** | **CO3** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **15.** |  | i) With a neat sketch explain the working of a pilot operated check valve.  ii) Write a short note on flow control valves. | **15**  **Marks** | **L2** | **CO2** |
| **Or** | | | | | |
| **16.** |  | Explain the actuation of single and double acting cylinder using appropriate direction control valves (DCV). Sketch necessary diagram. | **15 Marks** | **L2** | **CO2** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **17.** |  | A gear pump has 75mm outside diameter, 50mm inside diameter and 25mm width. If the volumetric efficiencies is 90%. The pump speed is 1000rpm. What is the corresponding actual flow rate? | **15**  **Marks** | **L2** | **CO1** |
| **Or** | | | | | |
| **18.** |  | In the hydraulic press, a force of 400 N exerted on the small piston. Determine the upward force on the large piston. The diameter of smaller piston is 50 mm and the diameter of the large piston is 155 mm. Also find the distance moved by the large piston if the small piston moves by 100 mm. Also show sketch diagram for hydraulic press showing force. | **15**  **Marks** | **L2** | **CO1** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***