Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2018

Course: Hydraulics & Pneumatics **Semester: 6th**
Program: B.Tech Mechatronics
Subject Code:MEEL313
Time: 03 hrs. **Max. Marks: 100**

SECTION A
Attempt all the questions

S. No.		Marks	CO
Q 1	Draw the graphical symbol of the following hydraulic components (a) counter balanced valve (b)sequence control valve (c)4/3 solenoid operated tandem position direction control valve (d)pilot operated check valve	**4**	**CO1**
Q 2	Draw the graphical symbol of the following pneumatics components (a) Air filter (b) Air pressure regulator (c)Air lubricator (d) Shuttle valves	**4**	**CO4**
Q 3	A hydraulic motor has a 82 cm^3 volumetric displacement . if it has a pressure rating of 70 bars and it receives oil from a 0.0006m^3/s theoretical flow rate pump, find the motor (a)speed (b) theoretical torque (c) theoretical power	**4**	**CO1**
Q 4	A hydraulic motor has a displacement of 164cm^3 and operates with a pressure of 70 bars and a speed of 2000rpm. If the actual flow rate consumed by the motor is 0.006m^3/s and the actual torque delivered by the motor is 170N.m , find (a)volumetric efficiency (b)mechanical efficiency (c) overall efficiency (d) the actual kW delivered by the motor	**4**	**CO2**
Q 5	Describe the primary functions of hydraulic circuit design and pneumatic circuit design.	**4**	**CO4**

SECTION B **Attempt all the questions**			
Q 6	Describe the constructional features of unloading valve and counter balance valve.	**10**	**CO3**
Q 7	Describe the construction and operation of hydraulic cylinder sequencing circuit.	**10**	**CO2**
Q 8	Describe the constructional features of air filter and air pressure regulator.	**10**	**CO4**
Q 9	Draw the pneumatic circuit of air pilot control of double acting cylinder OR Explain the pneumatic vacuum systems.	**10**	**CO4**
SECTION-C **Attempt all the questions**			
Q 10	Design a relay logic diagram for the electrical control of the regenerative circuit as follows; (a) A manually actuated electric switch is placed into one of its three positions to cause the cylinder to rapidly extend until 1-LS is actuated (b) Then the cylinder continues to extend at a slower rate until it is fully extended (c) Then the manually actuated electric switch is placed into a second position to cause the cylinder to fully retract (d) When the manually actuated electric switch is placed into its third position, the cylinder is hydraulically locked.	**20**	**CO3**
Q 11	Explain the constructional features of the hydraulic shock absorber and hydraulic fuses. OR Explain the constructional features of pneumatic boosters.	**20**	**CO4** **CO4**