KUMARAGURU
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B.E DEGREE EXAMINATIONS: MAY 2017

(Regulation 2014)

Sixth Semester

MECHANICAL ENGINEERING

U14METE63: Fluid Power Systems

COURSE OUTCOMES

CO1: Understand and explain the fundamentals of fluid power systems
CO2: Explain the working of hydraulic control devices
CO3: Construct hydraulic circuits for industrial applications
CO4: Explain the working of pneumatic components
CO5: Construct pneumatic circuits

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 1 = 10 Marks)

1. Matching type item with multiple choice code   CO1 [K_1]

List I	List II
A. Radial motor	i. Swash plate
B. Axial motor	ii. Crank shaft motor
C. Orbit	iii. Vane motor
D. Low torque motor	iv. Geroller motor

	A	B	C	D
a)	ii	i	iv	iii
b)	iii	iv	ii	i
c)	ii	iv	iii	i
d)	iii	i	ii	iv

2.   Low-torque high-speed motors are used in   CO1   [K_2]

  a)   cranes   b)   winches

  c)   fans   d)   Pumps

3. Identify the reasons for causing pressure drop in hydraulic systems:

1. Size of pipe

2. Friction

3. Velocity

4. Losses in valves and bends

a)	1,3	b)	1,4
c)	1,2	d)	2,4

4. Pressure reducing valve is used: CO2 [K₁]

a)	when higher pressure than system pressure is required	b)	when lower pressure than system pressure is required
c)	when absolutely zero pressure is required	d)	all of the above

5. Assertion (A): When comparing first cost of hydraulic systems to pneumatic systems, generally they are more expensive to purchase.   CO3 [K₂]

Reason (R): If the machine life is longer than two years, the higher initial cost is often offset by lower operating cost due to the much higher efficiency of hydraulics.

a)	Both A and R are Individually true and R is the correct explanation of A	b)	Both A and R are Individually true but R is not the correct explanation of A
c)	A is true but R is false	d)	A is false but R is true

6. The most common hydraulic fluid is: CO3 [K₁]

a)	mineral oil	b)	synthetic fluid
c)	water	d)	crude oil

7. ISO cleanliness level numbers: CO4 [K₁]

a)	16/14/11	b)	11/14/16
c)	16/11/14	d)	14/16/11

8. The lubricator in a pneumatic circuit is the: CO4 [K₄]

a)	first element in line	b)	second element in line
c)	third element in line	d)	last element in line

9. Assertion (A): A pneumatic symbol is the same as a hydraulic part used for the same function.

Reason (R): Hydraulic and pneumatic circuits are performing the same with some exceptions.

CO5 [K₄]

a) Both A and R are Individually true and R is the correct explanation of A

b) Both A and R are Individually true but R is not the correct explanation of A

c) A is true but R is false

d) A is false but R is true

10. Pneumatic systems usually do not exceed:

CO5 [K₂]

a) 2 to 3 hp

b) 1 to 2 hp

c) 1 hp

d) 0.5 hp

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

11.	Define the term 'Fluid power'.	CO1	[K₁]
12.	List any four application of fluid power system.	CO1	[K₁]
13.	State the reason for 'pressure override' in pressure controls valves.	CO2	[K₂]
14.	Differentiate between pilot operated and direct operated pressure relief valve.	CO2	[K₂]
15.	Highlight the need of using an accumulator in hydraulic circuits.	CO3	[K₄]
16.	Predict the reason for using end cushions in cylinders.	CO3	[K₄]
17.	Draw the standard graphical symbol for FRL unit.	CO4	[K₁]
18.	Identify the need of lubricator unit in pneumatic system.	CO4	[K₄]
19.	Write down the advantage of hydro pneumatic circuits.	CO5	[K₁]
20.	Define the term 'Coanda effect'.	CO5	[K₁]

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. With a neat sketch explain the principle, construction and working of an external gear pump.

CO1 [K₁]

22. With suitable example, describe the working principle of counter balance valve and mention its application.

CO2 [K₁]

23. (i) Draw and explain the significance of regenerative circuit in detail. (7) CO3 [K_2]

(ii) Explain air over oil intensifier with suitable example. (7) CO3 [K_1]

24. (i) Discuss the working principle of a reciprocating type air compressor. (7) CO4 [K_2]

(ii) Exemplify the working principle of a pneumatic speed control circuit. (7) CO4 [K_2]

25. (i) Construct the block diagram of PLC and explain the various parts. (8) CO5 [K_1]

(ii) Discuss the method to convert the relay ladder diagram to a PLC ladder diagram. (6) CO5

26. With suitable example, design a pneumatic circuit using cascade method and explain in detail. CO5 [K_3]

27. Discuss the various problems encountered in hydraulic system and its troubleshooting. CO5 [K_4]

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