PSG POLYTECHNIC COLLEGE, COIMBATORE - 641 004

DIPLOMA EVEN SEMESTER EXAMINATIONS – APR 2014

B12404 FLUID MECHANICS AND MACHINERY

MODEL QUESTION PAPER

Time : 3 Hours

Max.Marks: 100

Instructions:

- 1. Group A and Group B questions should be answered in the Main Answer book.
- 2. Answer any <u>TEN</u> questions in Group A. Each question carries two marks.
- 3. Answer <u>ALL</u> questions either (a) subdivision or (b) subdivision in Group B. Each question carries 14 marks.

Group – A

Marks: 10 x 3 = 30

- 1. Define specific gravity and weight density of a fluid.
- 2. State Pascal's law with its application.
- 3. What is a manometer? How are they classified?
- 4. State the difference between laminar and turbulent flow of fluid.
- 5. State Bernoulli's theorem with its application.
- 6. Define the terms: i) Hydraulic gradient line and ii) Total energy line.
- 7. What is priming? Why is it necessary?
- 8. State the difference between centrifugal and reciprocating pumps.
- 9. Define cavitation. What are its effects?
- 10. How does a torque converter differ from fluid coupling?
- 11. What is a hydraulic system? What are the elements of hydraulic system?
- 12. Define the term hydraulic accumulator.
- 13. State the difference between hydraulic and pneumatic systems.
- 14. Draw the symbols of 3/2 DCV and 4/2 DCV.
- 15. List the merits and demerits of hydraulic system.

Group– B

Marks: 5 x 14 = 70

a). i). One litre of crude oil weighs 9.6N. Calculate its specific weight, density and specific gravity. (5)

ii). Expalin briefly the working principle of Bourdon tube pressure gauge with a neat sketch. (9)

(OR)

b).A U-tube differential manometer connects two pressure pipes A and B. Pipe A contains carbon tetrachloride having relative density of 1.594 under a pressure of 11.772 N/cm² and pipe B contains oil of relative density 0.8 under a pressure of 11.772 N/cm². The pipe A lies 2.5m above pipe B. Find the difference of pressure measured by mercury as fluid filling U-tube.

(5)

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- 17. a). i) What are the assumptions made in deriving Bernoulli's theorem?
 - ii) A venturimeter having a throat of 100mm diameter is fitted to a pipe of 250mm diameter. An oil of relative density 0.8 is flowing through the pipe. The mercury manometer reads 250mm. find the velocity and discharge of oil in the pipe if the coefficient of meter is 0.97.

(OR)

b) Water has to be supplied to a town of 4, 25,000 inhabitants. The reservoir is 6km from the town. The head lost in the pipe line due to friction is measured as 12.5m. Find the size of the supply main, if each inhabitant consumes 200 liters of water per day and half the daily supply is pumped in 8 hours. Take f=0.0075.

18 a) What is a reciprocating pump? Describe the principle and working of a reciprocating pump with a neat sketch. Why is a reciprocating pump not coupled directly to the motor? Discuss the reason in detail.

(OR)

- b) What is the difference between single stage and multistage pumps? Describe multistage pump with a) impellers in parallel and b) impellers in series.
- 19. a) Explain with the help of neat sketch, the principle and working of the hydraulic crane and hydraulic press.

(OR)

b) Explain with the help of neat sketch, the principle and working of the direct acting and suspended type hydraulic lifts.

20. a) Explain with the help of neat sketch, the principle and working of the internal gear pump and vane pump.

(OR)

b) i) Explain FRL unit with neat sketch. (5)ii) With neat sketch, explain the working principle of piston pump. (9)