TED (10)–3052

(REVISION—2010)

Reg. No. .....

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THIRD SEMESTER DIPLOMA EXAMINATION IN AUTOMOBILE ENGINEERING—OCTOBER, 2014

FLUID MECHANICS AND MACHINERY

[*Time* : 3 hours

(Maximum marks : 100)

Marks

PART—A

(Maximum marks : 10)

I Answer the following questions in one or two sentences. Each question carries 2 marks.

1. Define specific gravity.
2. State Pascal's law.
3. Write notes on Vena-contracta.
4. Name three types of centrifugal pump casing.
5. Write notes on Demulsibility of fluids. (5×2=10)

PART—B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. Describe Mewton's law of viscosity.
2. Explain the venturimeter with a neat sketch.
3. List various minor energy losses related to flow through pipes.
4. Define cavitation. Give the necessary precautions against cavitation.
5. Briefly explain the classification of reciprocating pump.
6. Explain a non-return valve used in hydraulic system.
7. List the types of air cylinders. (5×6=30)

Marks

PART—C

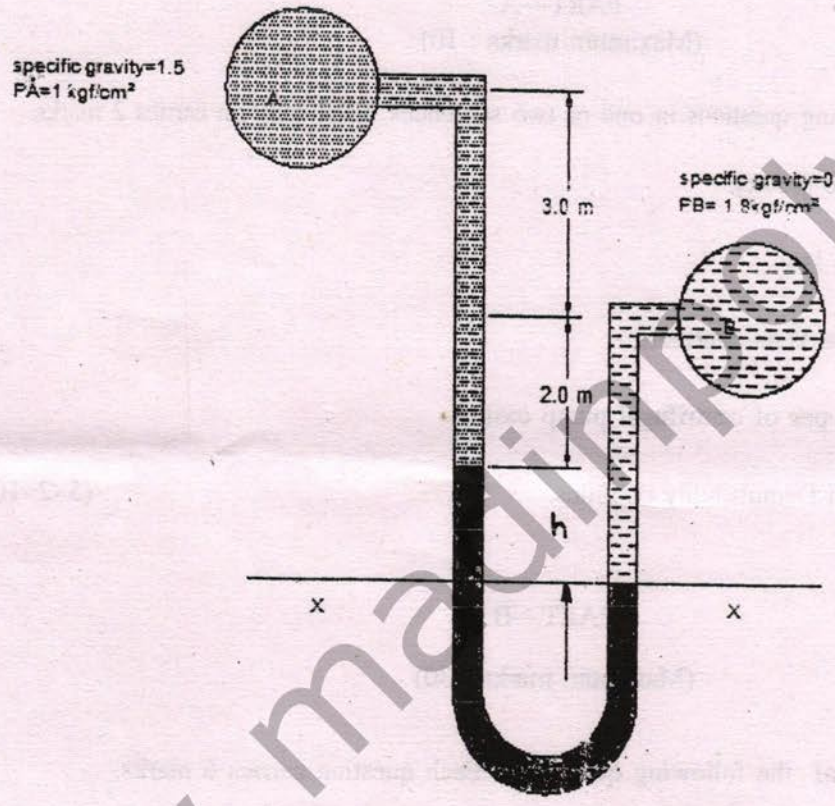
(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT—I

III (a) Describe the working of a bourdon's tube pressure gauge with a neat sketch. 7

(b) A differential manometer is connected at the two points A and B of two pipes as shown below. The pipe A contains a liquid of specific gravity 1.5 while pipe B contains a liquid of specific gravity 0.9. The pressure at A and B are 1kgf/cm² and 1.8 kgf/cm² respectively. Find the difference in mercury level in the differential manometer.



8

OR

IV (a) Derive an expression for the force exerted on a sub-merged horizontal plane surface by the static liquid. 7

(b) A circular plate 3 meter diameter is immersed in water in such a way that its greatest and least depth below the free surface are 4m and 1.5m respectively. Determine the total pressure on one face of the plate. 8

UNIT—II

V (a) Explain the continuity equation. 7

(b) Water flows down through an inclined tapering pipe 45m long at a slope of 1 in 10. The areas of the pipe at the upper and lower ends are 8m² and 3m² respectively. If the velocity at lower end is 4.5m/s and the pressure at the upper end is 100kPa, calculate the pressure at the lower end and the rate of flow through the pipe. 8

OR

Marks

VI (a) The head of water over a circular orifice of 50mm diameter is 12m. Taking Cv = 0.98 and Cd = 0.62, find the actual discharge and actual velocity of jet at vena contracta. 7

(b) Find the head lost due to friction in a pipe of diameter 300mm and length 50m, through which water is flowing at a velocity of 3 m/s using Darcy formula. Take kinematic viscosity of water as 0.01 stroke. 8

UNIT—III

VII (a) A centrifugal pump is required to lift $0.05m^3/s$ of water from a well with a depth 40m. If rating of the pump motor is 32kW, find the overall efficiency of the pump. 7

(b) Explain a two stage centrifugal pump for high head with a neat sketch. 8

OR

VIII (a) A single acting reciprocating pump, running at 50 r.p.m. discharges $0.00736m^3/s$ of water. The diameter of the piston is 200mm and stroke length is 300mm. The suction and delivery heads are 3.5m and 11.5m respectively. Determine :

(i) Theoretical discharge (iii) Slip

(ii) Coefficient of discharge (iv) Power required to run the pump. 7

(b) Explain vane pump with a neat sketch. 8

UNIT—IV

IX (a) Describe the basic components of a hydraulic circuit with a neat diagram. 7

(b) Describe the working of a 3-way sliding spool type direction control valve with a neat sketch. 8

OR

X (a) Describe the working of a 2-way solenoid valve used in pneumatic circuit with a neat sketch. 7

(b) Describe the working of a pneumatically operated mandrel with a neat sketch. 8