

TED (10)–3056

(REVISION—2010)

Reg. No.

Signature

THIRD SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND
ELECTRONICS ENGINEERING—OCTOBER, 2011

MECHANICAL ENGINEERING

[Time : 3 hours

(Maximum marks : 100)

Marks

PART—A

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Express atmospheric pressure in water head.
2. How flow is classified according to Reynold's number ?
3. Mention the causes of water hammer in pipe.
4. Mention the maximum possible depth at which water lifts using mono block pump. Give reason.
5. Working pressure of impulse turbine is constant. Justify. (5x2=10)

PART—B

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

1. State Bernoulli's Theorem and list out its limitations.
2. A pipe contains an oil of Sp. gr. 0.85. A differential manometer connected at the two points of pipe shows a difference in mercury level as 13 cm. Find the pressure difference at two points.
3. A rectangular plane surface 2m wide and 3 m deep lies in water in such a way that its plane makes an angle 30° with the free surface of water. Determine total pressure acting on plate when the upper edge is 2 m below the free surface.
4. Calculate the rate of flow of water through a pipe of diameter 200 mm. When the difference of pressure head between the two ends of a pipe 300 m apart is 5m of water, take "f" = 0.009.
5. Why super heated steam is preferred for steam turbines ? Explain any one method of converting saturated steam into super heated steam.
6. Explain selection criterion of water turbine according to (i) available head (ii) Discharge.
7. Air vessel is an integral part of reciprocating pump. Give reason. (5x6=30)

PART—C

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

UNIT – I

- III (a) An inverted differential manometer containing an oil of Sp. gr. 0.8 is connected to find the difference of pressure at two points of pipe containing water. If the manometer reading is 40 cm, find the difference of pressure. 8
- (b) Determine the total pressure on a circular plate of diameter 50 cm which is placed vertically in water in such a way that the centre of plate is 1.5 m below the free surface of water. 7

OR

- IV (a) Define centre of pressure. 2
- (b) Distinguish between :
- (i) Laminar and turbulent flow 6
- (ii) Steady and unsteady flow 7
- (c) A differential manometer is used to measure, the difference of pressure of oil of sp. gr. 0.9 contained in two pipes at the same level. If the deflection of the manometric liquid which is mercury be 40 mm, determine the difference of pressure of oil in the two pipes in KPa. 7

UNIT – II

- V (a) A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is used to measure the flow of oil sp. gr. 0.8. The reading of differential manometer connected to the inlet and the throat is 20 cm of mercury. Determine the rate of flow. Take $C_d = 0.98$ 8
- (b) An oil of sp. gr. 0.7 is flowing through a pipe of diameter 300 mm at a rate of 500 lit/sec. Find the velocity of flow and the head loss due to friction, if length of pipe is 1000 m. Take " f " = 0.008. 7

OR

- VI (a) Distinguish between datum head and velocity head. 3
- (b) Find the head loss due to friction in a pipe of diameter 300 mm and length 60 m through which water is flowing at a velocity of 3m/sec, using chezy's formula. Take " c " = 60. 6
- (c) A pipe of 200 mm diameter is suddenly enlarged to 400 mm in diameter. Determine the loss of head when the discharge is 300 lit/sec. 6

UNIT – III

- VII (a) Define Boiler accessories. 2
- (b) Explain working of steam separator. 5
- (c) Describe working of La-mont Boiler with neat sketch. 8

OR

- | | Marks |
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| VIII (a) Compare fire tube and water tube. | 7 |
| (b) Explain constructional details of water tube boiler. | 8 |

UNIT - IV

- IX (a) State and explain :
- (i) Positive slip
 - (ii) Percentage slip
 - (iii) Negative slip
- (b) Explain concept of multi stage pump.

OR

- X (a) Priming is necessary for a centrifugal pump. Give reason. 4
- (b) Draft tube helps to improve the efficiency of reaction turbine. Justify. 6
- (c) Illustrate how jet pump overcome the limitation of monoblock pump. 5

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