

**FOURTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION  
DECEMBER 2006**

**EE 2K 403—MECHANICAL ENGINEERING—II**

Time : Three Hours

Maximum : 100 Marks

1. Explain the following :—

- (a) Compressibility.
- (b) Capillarity.
- (c) Surface tension.

2. Define and explain friction factor.

3. Write a short note on dimension—less numbers.

4. Explain the Raleigh's method.

5. Write a short note on conduction heat transfer.

6. Explain the law of radiation.

7. Write a short note on load curve.

8. Explain the concept of tariff rate calculation.

(8 × 5 = 40 marks)

II. (a) (i) Determine the total force and position of center of pressure for annular ring of outside diameter 2 m. and inside diameter 1 m. when placed vertically in water at 1 m. from the water free surface.

(10 Marks)

(ii) Explain any *three* fluid properties.

(5 Marks)

Or

(b) (i) A smooth pipeline of 100 mm. diameter carries 2.27 meter cube per minute of water at 20° C with kinetic viscosity of 0.009 stokes, calculate :

(a) Friction factor.

(b) Maximum velocity.

(c) Shear stress at the boundry.

(10 marks)

(ii) Explain ideal and real fluids.

(5 marks)

III. (a) (i) explain the principles of reciprocating pump with a neat diagram.

(10 marks)

(ii) Explain the Raleigh's method of dimensional analysis.

(5 marks)

Or

(b) (i) Explain the principles of centrifugal pump with a neat diagram.

(10 marks)

(ii) Explain the Buckingham's PI method of dimensional analysis.

(5 marks)

Turn over

IV. (a) (i) Derive the equation for one dimensional steady state heat conduction with internal heat generation for a cylinder.

(10 marks)

(ii) Explain Stefan - Boltzman law.

(5 marks)

Or

(b) (i) Explain in details about the basic ideas of solar radiation.

(10 marks)

(ii) Explain radiation type of heat transfer.

(5 marks)

V. (a) (i) Explain selection of units and schedule of operation.

(5 marks)

(ii) How are the air-conditioning units classified ? In what way package units differ from central units ?

(10 marks)

Or

(b) (i) Explain depreciation and replacement.

(10 marks)

(ii) Describe the cooling and dehumidification process.

(5 marks)

[4 × 15 = 60 marks]