DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE –
Semester Examination – December - 2018

Branch: Electrical Engineering　　　　　　　　　　　　　　　　　　**Sem.:- III**
Subject with Subject Code: Fluid Mechanics & Thermal Engineering **(BTEEC303)**　　**Max. Marks: 60**
Date: - 05-12-2018　　　　　　　　　　　　　　　　　　　　　　　**Time:- 3Hr.**

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Instructions to the Students
　　　1. Each question carries 12 marks.
　　　2. Attempt **any five** questions of the following.
　　　3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
　　　4. If some part or parameter is noticed to be missing, you may appropriately
　　　　 assume it and should mention it clearly

　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　(Marks)

Q.1. a) A circular opening, 4m diameter in a vertical side of a tank is closed by a disc of 4m diameter, which can rotate about horizontal diameter. Calculate 1. The force on disc and 2. The torque required to maintain the disc in equilibrium in vertical position, when the head of water above the horizontal diameter is 5m. (6)

b) Explain methods of describing fluid motions used in fluid kinematics (6)

Q.2. a) Water flows through a pipe AB 1.2m diameter at 3 m/s and then passes through a pipe BC 1.5 m diameter. At C, the pipe branches. Branch CD is 0.8 m in diameter and carries one third of the flow in AB. The flow velocity in branch CE is 2.5 m/s. Find the volume rate of flow in AB, the velocity in BC, the velocity in CD and the diameter of CE (6)

b) Explain working of centrifugal pump and define manometric, mechanical and overall efficiencies (6)

Q.3. a) Explain working of four stroke petrol engine with neat sketches (6)

b) Explain fuel supply system of diesel engine with neat sketch (6)

Q.4. a) Explain construction and working principle of reciprocating air compressor (6)

b) Elaborate applications of compressed air (6)

Q.5. a) Explain working of vapour absorption refrigeration system in detail (6)

b) Explain desirable and undesirable properties of refrigerant (6)

Q.6. a) Explain centralized air conditioning plant with its applications (6)

b) Explain significance of various lines and curves on Psychrometric chart (6)

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Summer 2019

Course: B. Tech in Electrical Engineering   **Sem: III**

Subject Name: Fluid Mechanics and Thermal Engineering   **Subject Code: BTEEC303**
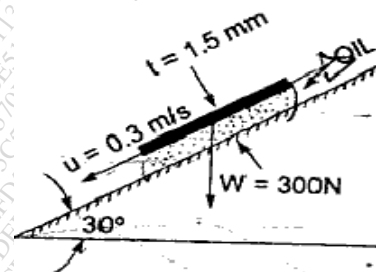
Max Marks:60   **Date:** 30/05/2019   **Duration: 3 Hr.**

Instructions to the Students:
   *1. Solve **ANY FIVE** questions out of the following..*
   2. Use of non-programmable scientific calculators is allowed.
   3. Assume suitable data wherever necessary and mention it clearly.   Marks

Q. 1 Solve Any Two of the following.

A) State the Pascal's law of static pressure and prove that pressure at a point is same in all directions in a static fluid.   **6**

B) Calculate the dynamic viscosity of oil, which is used for lubrication between a square plate of size 0.8 m x 0.8 m and an inclined plane with angle of inclination **30⁰** as shown in Fig. The weight of the square plate is 300 N and it slides down the inclined plane with a uniform velocity of 0.3 m/s. The thickness of oil film is 1.5 mm.   **6**

C) Define and explain the following fluid properties.
Viscosity, specific gravity, specific volume, specific weight, surface tension, compressibilty   **1×6=6**

Q.2 Solve the following.

A) Explain the Reynolds's experiment for visualization of types of fluid flow with suitable neat sketch.   **6**

B) Explain the major and various minor losses in flow through the pipes with their respective mathematical equations.   **6**

Q. 3 Solve Any Two of the following.

A) Explain the first and second law of thermodynamics with suitable example.   **3+3=6**

B) Differentiate between enthalpy and entropy.   **3+3=6**

C) List out and explain the various performance parameters of the internal combustion engines   **6**

Q.4 Solve Any Two of the following.

A) Classify the various types of air compressor.   **6**

B) Explain the working of multistage compressor using the p-v diagram with perfect/imperfect inter cooling.   **6**

C) Mention the important application of compressed air and advantage of multistage compression process over single stage compression process for the same pressure ratio.   **6**

Q. 5 Solve the following.

A) Differentiate between the COP' and efficiency of a system as well as between vapour compression refrigeration system and   apour absorption refrigeration system.   **3+3**

B) Explain the working of a domestic refrigerator with neat sketch.   **6**

Q. 6 Solve the following.

A) Explain the various psychrometric processes involved in air conditioning using Psychrometric chart.   **6**

B) With the help of a suitable sketch explain the working of a split air conditioner; also mention the advantages over window air conditioning system.   **6**

END

Branch: Electrical Engineering   Sem.:- III
Subject with Subject Code:- Fluid Mechanics and Thermal Engineering(BTEEC303) Marks: 60
Date:- 14/12/2019   Time:- 3 Hr.

Instructions to the Students
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3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
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(Marks)

Q.1. a) Define viscosity and deduce the units of viscosity. Explain the effect of temperature on viscosity for liquids and gases. (06)

b) The space between two square flat parallel plates is filled with oil. Each side of the plate is 60cm. The thickness of the oil film is 12.5mm. The upper plate, which moves at 2.5 m/sec requires a force of 98.1 N to maintain the speed. Determine: i) the dynamic viscosity of the oil in poise, and ii) the kinematic viscosity of the oil in stokes if the specific gravity of oil is 0.95. (06)

Q.2. a) Derive Darcy-Weisbach equation. (06)

b) A main pipe divides into two parallel pipes which again forms one pipe. The length and diameter for the first parallel pipe are 2000m and 1m respectively, while the length and diameter of second parallel pipe are 2000m and 0.8m. Find the rate of flow in each parallel pipe, if total flow in the main is 3 m³/s. The coefficient of friction for each parallel pipe is same and equal to 0.005. (06)

Q.3. a) Explain with help of suitable sketches, the working of two stroke cycle petrol engine. (06)

b) Explain construction and working of closed cycle gas turbine. (06)

Q.4. a) Explain construction and working of multistage air compressor (06)

b) What is the difference between rotary and reciprocating compressor? Describe with neat sketch vane blower compressor. (06)

Q.5. a) Explain working of vapour compression refrigeration system.

b) State the properties of good refrigerant. What are the normal refrigerants used. (06)

Q.6. a) Define specific humidity, relative humidity and due point temperature. Draw psychrometric chart. (06)

b) Explain the following psychrometric processes.

i) Sensible cooling ii) Sensible heating iii) Humidification and Dehumidification (06)