V.S.B. ENGINEERING COLLEGE, KARUR

Department of Mechanical Engineering

Academic Year: 2018-2019 (ODD Semester)

Assignment Topics

Class: II Year / III Semester B.E. Mechanical Engineering
Name of Subject: ME8391-Engineering Thermodynamics

Sl. No	Assignment Topics
1.	Describe in detail various types of automotive pistons
2.	Discuss in detail various types of piston failure
3.	Explain the operation of the typical turbocharger
4.	Explain the principle of operation of a four stroke cycle S.I. Engine
5.	Explain the principle of operation of a four stroke cycle C.I. Engine
6.	Describe the functions of Carburetor
7.	Describe the functions of Spark plug
8.	List out the main functions of a battery
9.	Discuss the functions of Variable Jet Carburetor
10.	Discuss the function of ORC in a starting motor
11.	Discuss the significance of gasoline injection system
12.	Explain the functions of common rail direct injection system
13.	Discuss the functions of three way catalytic converter system
14.	Explain the functions of Electronic ignition system
15.	Discuss the function of capacitive discharge ignition system
16.	Explain the functions of Turbo chargers
17.	Explain the functions of Fuel Injectors
18.	Explain the working of friction clutches
19.	Discuss the emission of automobile
20.	Explain the principle of operation of a two stroke cycle S.I. Engine
21.	Explain the principle of operation of a two stroke cycle C.I. Engine
22.	Functions of a cooling system
23.	Different types of lubrication systems used in automotive engines
24.	Explain front and rear wheel drive
25.	Explain in details about Variable Valve Timing
26.	Discuss the frame type construction chassis construction
27.	Discuss various methods to reduce the level of pollutants in the exhaust gases.
28.	Explain in details about port timing
29.	Explain in details about Vacuum clutches
30.	.Discuss different types of front axles

Sl. No	Assignment Topics
31.	Explain in details about mechanical clutches
32.	Explain in details about electrical clutches
33.	Explain in details about hydraulic clutches
34.	Explain the element types and stages of a suspension system.
35.	Explain the four parameters of wheel alignment
36.	Explain the function of Anti lock braking system
37.	Describe in detail various types of gear selector mechanisms used in automobiles
38.	Explain the construction and working principle of fuel cells
39.	Types of suspension systems
40.	Different types of steering gear system
41.	Explain the element types and stages of a suspension system.
42.	Explain the function of hydraulic braking systems
43.	Explain the function of pneumatic braking systems
44.	Explain the function of LPG fuelled engines
45.	Explain the types of electrolyte
46.	Explain the function of hybrid vehicle
47.	Explain the function of alternate fuels in IC engines
48.	Explain the applications of petrol engine
49.	Explain the applications of Diesel engine
50.	Explain the types of Compressor
51.	Explain the applications of Dual Cycle
52.	Explain the applications of Joule Cycle
53.	Explain the applications of Otto Cycle
54.	Explain the applications of diesel Cycle
55.	Explain the function of Thermal Power plant
56.	Explain the function of Hydel Power Plant
57.	Explain the types of Turbine

V.S.B. ENGINEERING COLLEGE, KARUR

Department of Mechanical Engineering

Academic Year: 2018-2019 (ODD Semester)

ASSIGNMENT -I

FLUID MECHANICS AND MACHINERY

Class/Semester : II Year / III Semester B.E. Mechanical Engineering

ASSIGNMENT QUESTIONS

922517114002

01. Find the height through which water rises by capillary action in a 2mm bore, if surface tension at the prevailing temp is 0.075g/cm

922517114003

02. Calculate the capillary rise in glass tube of 3mm dia when immersed in mercury take the surface tension and angle of contact of mercury as 0.52N/m and 130^0 respectively .Also determine the minimum size of the glass tube, if it is immersed in water, given that the surface tension of water is 0.0725N/m and the capillary rise in the tube is not to exceed 0.5mm

922517114004

03. Calculate the capillary effect in the glass tube 5mm dia, when immersed in 1)WATER 2)MERCURY .The surface tension of water and the mercury in contact with air are 0.0725N/m and 0.51N/m respectively. The angle of contact of mercury is 130^0 .

922517114005

04. A 1.9mm dia tube is inserted in to an unknown liquid whose density is 960 kg/m^3 and it is observed that the liquid is rises 5mm in the tube, making a contact angle of 15^0 . Determine the surface tension of the liquid.

922517114006

05. A capillary tube having inside dia 6mm is dipped in CCl4 at 20^0 c. Find the rise of CCl4 in the tube, if surface tension is 2.67N/m and the specific gravity is 1.594 and contact angle $\theta=60^0$ and specific weight of water at 20^0 c is 9981N/m^3

922517114007

06. An oil film of thickness 10mm is used for lubrication between the two square parallel plates of size 0.9m×0.9m each, in which the upper plate moves at 2m/s required a force of 100N to maintain this speed. Determine, 1. Dynamic viscosity of oil 2. Kinematic viscosity of oil If the specific gravity of the oil is 0.95

922517114008

07. The space between two square parallel plate is filled with oil. Each side of the plate is 75cm. The thickness of the oil film is 10mm. The upper plate which moves at 3M/s requires a force of 100N to maintain the speed. Determine 1. Dynamic viscosity of oil, 2. Kinematic viscosity of oil. If the specific gravity of oil is 0.9

922517114009

08. If the velocity distribution of over a plate is given by u = (2/3)Y – Y2 in which 'U' is the velocity in meter per second at a distance 'Y' meter above the plate , determine the shear stress at Y=0 and Y=0.15m the dynamic viscosity of fluid is 8.63 poises.

922517114010

09. The velocity distribution over a plate is given by U = (3/4) Y – Y2 where U is the velocity in M/S and at the depth Y in m above the plate. Determine the shear stress at a distance of 0.3m from the top of plate. Assume dynamic viscosity of the fluid is taken as 0.95Ns/m^2.

922517114012

10. A fluid of specific velocity 0.9 flows along the surface with a velocity U=4Y-8Y^3 M/s where Y is in m, what is the velocity gradient at the boundary? If the kinematic viscosity is 0.36 S^. What is the shear stress at the boundary?

922517114013

11. A 200mm dia shaft slides through a sleeve 200.5mm dia and 400mm long, at a velocity of 30cm/s. The viscosity of the oil filling the annular space is = 0.1125Ns/m2 . Find the resistance to the motion

922517114014

12. The maximum blood pressure in the upper arm of a healthy person is about 120mm of Hg if a vertical tube open to the atmosphere is connected to the vein in the arm of the person. Determine how high the blood will rise in the tube. Take the density of blood to be 1050Kg/m3 .

922517114015

13. When a pressure of 20.7MN/M^2 is applied to 1000 lit of a liquid its volume decrease by one lit. Find the bulk modulus of the liquid and identify this liquid.

922517114016

14. Assuming the bulk modulus of elasticity of water 2.07 × 10^6 KN/M^2 at standard atmospheric condition, determine the increase in pressure necessary to produce one percent reduction in the volume at the same temp.

922517114017

15. Calculate the pressure exerted by 5Kg of nitrogen gas at a temperature of 10^0 c When the volume is 0.4m^3. Also find the volume when the pressure is 3×10^5 N/M^2 and the temp is 10^0 c. Assume Ideal gas law is applicable.

922517114018

16. A pipe containing water at 180KN/m^2 pressure is connected by a differential gauge to another pipe 1.6m lower than the first pipe and containing water at high pressure . If the difference in height of 2 mercury columns of the gauge is equal to 90mm, what is the pressure is the lower pipe?

922517114019

17. An orifice meter with orifice dia 15cm is inserted in a pipe of 30cm dia the pressure on the upstream and downstream of orifice meter is 14.7N/cm^2 and 9.81N/cm^2 respectively. Find discharge (Take cd= 0.6)

922517114020

18. Oil of specific gravity 0.85 issues from a 5cm dia orifice under a pressure 12N/cm^2 .The dia of jet at vena contract is 4cm and the discharge is 12.5lit/sec. What is co-efficient of velocity?

922517114021

19. Oil flow through of 25mm dia orifice under a head of 5.5cm at a rate of 3lit/s. The jet strikes 1.5m away and 120mm vertically below the centre line of jet. Calculate the co-efficient of velocity, discharge, contraction.

922517114022

20. An orifice meter consisting of 10cm orifice in a 25cm dia of pipe has a co-efficient 0.65. The pipe delivers oil of Specific gravity 0.8. The pressure difference between two sides of the orifice meter is 80cm of mercury column. Calculate flow rate in lit/sec.

922517114023

21. Find the quantity of water flowing through a Venturimeter size 15cm x 15cm when the differential manometer connected between the inlet and throat of Venturimeter gives 6cm.

922517114024

22. A 250mm pipe carries oil (specific gravity= 0.8) at a velocity of 20m/s. At point A and B of measurement of pressure and elevation were respectively 100KN/m^2 and 60KN/m^2 , 5m and 8m respectively for steady flow .Find the loss of head between A and B and the direction of flow.

922517114025

23. A Venturimeter with 200mm inlet dia and 100mm throat is laid with axis horizontal and is used for measuring the flow of oil of specific gravity 0.8 the difference of level in U-tube manometer reads 180mm of mercury, Whist 11520kg of oil is collected through meter is 4min. Calculate the discharge and Co-efficient of meter.

922517114026

24. A 30cm x 15cm Venturimeter is provided in a provided in a vertical pipe line carrying oil of specific gravity 0.9, the flow being upward. The difference in elevation of the throat section and entrance section of Venturimeter is 30cm. The pressure difference in manometer is 25cm of Hg. Take Cd= 0.98. Calculate discharge of oil and pressure difference between entrance and throat.

922517114027

25. The diameter of awater pipe is suddenly enlarged from 350mm to 700mm. The rate of flow through it is 0.25m^3/s. Calculate the loss of head in enlargement.

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26. a) Derives Euler's Equation of Motion and proves the Bernoulli's equation.

b) Define the terms: i) Steady and unsteady flows ii) Specific weight

922517114029

27. a) Define the terms: i) Kinematics of flow ii) Uniform and non-uniform flows iii) Rotational and irrotational flows

b) The Velocity Distribution for flow over a flat plate is given by u=(2/3)y-y2, Where u is the point velocity in metre per second at a distance y metre above the plate. Determine the shear stress aty=0 and y=15 cm. Assume dynamic viscosity as 8.63 poises

922517114030

28. a) A pipe 200mm long has a slope of 1in100 and tapers from 1.2m diameter at thehigh end to 0.6m diameter at the low end and carries 100litres/sec of oil (Sp.gr.=0.8). If the pressure gauge at the high end reads 60kN/m², determine i)Velocities at the two ends and ii) pressure at the lower end.

b) One litre of crude oil weighs 9.6 N. Calculate its Specific weight and density

922517114031

29. Two large plane surfaces are 150mm apart. The space between the surfaces is filled with oil of viscosity 0.972Ns/m². A flat thin plate of o.5m² area moves through the oil at velocity of 0.3m/sec. Calculate the drgg force i) When the plate is in the middle of the two plane surfaces and ii)When the thinplate is at a distance of 30mm from one of the planes

922517114032

30. a) Derive the three dimensional Continuity equation.

922517114033

31 Define the following i) Compressibility ii) Vapour pressureiii) Capillarity

922517114034

32.Two plates are placed at a distance of 0.15mm apart. The lower plate is fixed while the upper plate having surface area 1.0 m2 is pulled at 0.3nm/s. Find the force and power required to maintain this speed, if the fluid separating them is having viscosity 1.5 poise.

922517114035

33 An oil film of thickness 1.5 mm is used for lubrication between a square plate of size 0.9m ×0.9m and an inclined plane having an angle of inclination 200. . The weight of square plate is 392.4 N and its slides down the plane with a uniform velocity of 0.2 m/s. find the dynamic viscosity of the oil.

922517114036

34. A pipe 300m long has a slope of 1 in100 and tapers from 1m diameter at the high end to 0.5m at the low end. The quantity of water flowing is 5400 m3/min. If the pressure at the high end is 49033 N/m², find the pressure at the low end. What is the change in pressure if the head loss between the two sections is 0.45m of water?

922517114037

35. 250 liters/sec of water is flowing in a pipe having a diameter of 300mm. If the pipe is bent by 135° (that is change from initial to final direction is 135°), find the magnitude and direction of the resultant force on the bend. The pressure of water flowing is 39.24N/cm².

922517114038

36. The diameter of a pipe gradually reduces from 1m to 0.7m. The pressure intensity at centerline of 1m section 7.848kN/m² and the rate of flow of water through the pipe is 600liters/sec. Find the intensity of pressure at the centerline of 0.7m section. Also determine the force exerted by flowing water on transition of the pipe.

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37. State the momentum equation. How will you apply momentum equation for determining the force exerted by a flowing fluid on a pipe bend?

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38. Define Moment of Momentum equation. Where this equation is used?

922517114041

39. Calculate the capillary effect in millimeters a glass tube of 4mm diameter, when immersed in (a) water (b) mercury. The temperature of the liquid is 200 C and the values of the surface tension of water and mercury at 200 C in contact with air are 0.073575 and 0.51 N/m respectively. The angle of contact for water is zero that for mercury 1300 . Take specific weight of water as 9790 N / m3.

922517114043

40. If the velocity profile of a fluid over a plate is a parabolic with the vertex 202 cm from the plate, where the velocity is 120 cm/sec. Calculate the velocity gradients and shear stress at a distance of 0,10 and 20 cm from the plate, if the viscosity of the fluid is 8.5 poise.

922517114044

41. A 15 cm diameter vertical cylinder rotates concentrically inside another cylinder of diameter 15.10 cm. Both cylinders are 25 cm high. The space between the cylinders is filled with a liquid whose viscosity is unknown. If a torque of 12.0 Nm is required to rotate the inner cylinder at 100 rpm determine the viscosity of the fluid.

922517114045

42. The dynamic viscosity of oil, used for lubrication between a shaft and sleeve is 6 poise. The shaft is of diameter 0.4 m and rotates at 190 rpm. Calculate the power lost in the bearing for a sleeve length of 90 mm. The thickness of the oil film is 1.5 mm.

922517114046

43. If the velocity distribution over a plate is given by 2 3 2 $y - y = u$ in which U is the velocity in m/s at a distance y meter above the plate, determine the shear stress at y = 0 and y = 0.15 m. Take dynamic viscosity of fluid as 8.63 poise.

922517114047

44. The diameters of a small piston and a large piston of a hydraulic jack at3cm and 10 cm respectively. A force of 80 N is applied on the small piston Find the load lifted by the large piston when: a. The pistons are at the same level b. Small piston in 40 cm above the large piston. The density of the liquid in the jack in given as 1000 kg/m3

922517114048

45. The diameters of a pipe at the sections 1 and 2 are 10 cm and 15 cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe section 1 is 5 m/s. determine also the velocity at section 2.

922517114049

46. The water is flowing through a pipe having diameters 20 cm and 10 cm at sections 1 and 2 respectively. The rate of flow through pipe is 35 lit/sec. the section 1 is 6m above datum. If the pressure at section 2 is 4m above the datum. If the pressure at section 1 is 39.24 N/cm2 , find the intensity of pressure at section 2.

922517114050

47. In a vertical pipe conveying oil of specific gravity 0.8, two pressure gauges have been installed at A and B where the diameters are 16 cm and 8 cm respectively. A is 2 m above B. the pressure gauge readings have shown that the pressure at B is greater than at A by 0.981 N/cm2 . Neglecting all losses, calculate the flow rate. If the gauges at A and B are replaced by tubes filled with the same liquid and connected to a U – tube containing mercury, calculate the difference of level of mercury in the two limbs of the U-tube.

922517114051

48. A horizontal Venturimeter with inlet and throat diameters 30 cm and 15 cm respectively is used to measure the flow of water. The reading of differential manometer connected to the inlet and the throat is 20 cm of mercury. Determine the rate of flow. Take Cd = 0.98.

922517114052

49. A crude of oil of kinematic viscosity of 0.4 stoke is flowing through a pipe of diameter 300mm at the rate of 300 litres/sec. find the head lost due to friction for a length of 50m of the pipe.

922517114053

50. Find the type of flow of an oil of relative density 0.9 and dynamic viscosity 20 poise, flowing through a pipe of diameter 20 cm and giving a discharge of 10 lps.

922517114054

51. A main pipe divides into two parallel pipes, which again forms one pipe as shown. The length and diameter for the first parallel pipe are 2000m and 1.0m respectively, while the length and diameter of 2nd parallel pipe are 2000m and 0.8m. Find the rate of flow in each parallel pipe, if total flow in main is 3.0 m3 /s. the co-efficient of friction for each parallel pipe is same and equal to 0.005.

922517114055

52. A Pipe line of length 2000 m is used for power transmission. If 110.365 kW power is to be transmitted through the pipe in which water having pressure of 490.5 N/cm2 at inlet is flowing. Find the diameter of the pipe and efficiency 16 www.Vidyarthiplus.com www.Vidyarthiplus.com of transmission if the pressure drop over the length of pipe is 98.1 N/cm2 . Take f = 0.0065.

922517114056

53. Three reservoirs A, B, C are connected by a pipe system shown in fig. Find the discharge into or from the reservoirs B and C if the rate of flow from reservoirs A is 60 litres / s. find the height of water level in the reservoir C. take f = 0.006 for all pipes.

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54. A sub-marine moves horizontally in a sea and has its axis 15 m below the surface of water. A pitot tube properly placed just in front of the sub-marine and along its axis connected to the two limbs of a U – tube containing mercury. The difference of mercury level is found to be 170 mm. find the speed of the sub-marine knowing that the sp.gr. of mercury is 13.6 and that of sea-water is 1.026 with respect fresh water.

922517114060

55. Water is flowing through a pipe of 5 cm diameter under a pressure of 29.43 N/cm2 (gauge) and with mean velocity of 2.0 m/s. find the total head or total energy per unit weight of the water at cross – section, which is 5 cm above the datum line.

922517114062

56. A cylinder of 0.6 m3 in volume contains air at 500C and 0.3 N/ mm2 absolute pressure. The air is compressed to 0.3 m3 . Find (i) pressure inside the cylinder assuming isothermal process (ii) pressure and temperature assuming adiabatic process. Take K = 1.4

Ajith kumar

57. Calculate the capillary effect in millimeters a glass tube of 4mm diameter, when immersed in (a) water (b) mercury. The temperature of the liquid is 200 C and the values of the surface tension of water and mercury at 200 C in contact with air are 0.073575 and 0.51 N/m respectively. The angle of contact for water is zero that for mercury 1300 . Take specific weight of water as 9790 N / m3

Manikandan

An orifice meter with orifice dia 15cm is inserted in a pipe of 30cm dia the pressure on the upstream and downstream of orifice meter is 14.7N/cm^2 and 9.81N/cm^2 respectively. Find discharge (Take cd= 0.6)

V.S.B. ENGINEERING COLLEGE, KARUR
DEPARTMENT OF MECHANICAL ENGINEERING
ASSIGNMENT QUESTION

CLASS / SEM / SECTION: II / III C Section

Sl.No	Assignment Title
1.	Define Manufacturing Process And Classify The Types Of Manufacturing Process.
2.	Give Details About Materials Properties And Modification Process.
3.	Explain In Detail About Types Of Production Layout
4.	Explain About Manufacturing Productivity, Interchangeability, and JIT Management Process.
5.	Give Details about Industrial Safety and Importance's.
6.	Explain In Detail About Fundamentals Of Metals And Alloys
7.	Discuss Recovery, Re- crystallization And Grain Growth For Metals.
8.	Properties And Testing And Inspection Of Metals
9.	Explain In Detail Types Of Non-Destructive Testing Methods.
10.	What Is Mean By Non-Ferrous Metals And Give Metals Comes Under The No n Ferrous Metals.
11.	What Is Mean By Ferrous Metals And Give Metals Comes Under The Ferrous Metals.
12.	Explain In Detail How To Make A Cast Iron (Raw Material, Manufacturing Process, Composition Of Chemical Content, Application Of Material)
13.	Explain In Detail How To Make A Steel (Raw Material, Manufacturing Process, Composition Of Chemical Content, Application Of Material)
14.	Explain In Detail How To Make Magnesium (Raw Material, Manufacturing Process, Composition Of Chemical Content, Application Of Material)
15.	Explain In Detail How To Make A Aluminum (Raw Material, Manufacturing Process, Composition Of Chemical Content, Application Of Material)
16.	Explain In Detail How To Make A Bronze (Raw Material, Manufacturing Process, Composition Of Chemical Content, Application Of Material)
17.	Explain In Detail How To Make A Brass (Raw Material, Manufacturing Process, Composition Of Chemical Content, Application Of Material)
18.	Explain In Detail How To Make A Copper (Raw Material, Manufacturing Process, Composition Of Chemical Content, Application Of Material)
19.	Explain In Detail How To Make A Zinc Alloys (Raw Material, Manufacturing Process, Composition Of Chemical Content, Application Of Material)
20.	Explain In Detail How To Make A Carbon Steels (Raw Material, Manufacturing Process, Composition Of Chemical Content, Application Of Material
21.	Explain In Detail How To Make A Grey Iron (Raw Material, Manufacturing Process, Composition Of Chemical Content, Application Of Material
22.	Explain In Detail How To Make A Graphite Iron(Raw Material, Manufacturing Process, Composition Of Chemical Content, Application Of Material
23.	Explain In Detail How To Make A Galvanized Steels (Raw Material, Manufacturing Process, Composition Of Chemical Content, Application Of Material

24.	Give Details About Classification Of Steels By SAE And AISI.
25.	Basic Tools Used For Casting And Moulding Process.
26.	Explain In Detail Casting Process And Application.
27.	Recent Advancement In Casting Process And Explain Any One Application In Detail Manner.
28.	Recent Advancement In Pattern Making Process And Explain Any One Application In Detail Manner.
29.	Recent Advancement In Moulding Process And Explain Any One Application In Detail Manner.
30.	Recent Advancement In Two Different Material Joining Process explains Any One Application In Detail Manner.
31.	Recent Advancement In Submerged Welding Process And Explain Any One Application In Detail Manner.
32.	Recent Advancement In Making The Tiles And Explain Any One Application In Detail Manner.
33.	Detail Explain About Furnace Stones(Properties, Purpose, Need Of Stones In Furnace)
34.	Explain In Detail About Railway Track Changing Methods (Recent Techniques Used For That)
35.	Give Some Recent Techniques Used For Making Ships Materials.
36.	Explain In Detail Powder Metallurgy And Its Types.
37.	Define Alloy? Need Of Alloy Materials And Its Applications
38.	Different Types Of Alloy Materials And Explain In Detail Any One Types Of Alloy Material Making Procedure.
39.	Explain In Detail Different Types Of Heat Treatment Process for Metals And Alloys
40.	Give Details About Forging Process And Its Tools With Neat Sketch.
41.	Give Types Of Forging Method And Explain Any One Type Of Forging Method Related To Production Of Rivets, Screws And Nuts.
42.	What Are All The Types Of Measurement And Inspection Methods Used For Metals?
43.	Explain in detail about ceramic moulding process and give manufacturing process.
44.	Explain in detail about ceramic glass making process and give manufacturing process.
45.	Define quality control and how to measure the quality in materials(choose any one material and explain in detail how to measure quality in product)
46.	Explain in details how to make a PVC pipes(raw materials, machining process, application)
47.	Explain in details how to make a UPVC pipes(raw materials, machining process, application)
48.	Explain in details how to make a plastic materials (raw materials, machining process, application)
49.	Explain in details how to make polymer materials (raw materials, machining process, application)
50.	Explain in details about surface coating materials(raw materials, machining process, purpose)
51.	Explain in details laminating and reinforcing process in plastic(raw materials, machining process, purpose)
52.	Explain physical and chemical properties of Acetylene gas
53.	Explain physical and chemical properties of ethane gas

54.	General equipment used for gas welding process.
55.	Differentiate and give more example for an TIG and MIG welding
56.	Discuss Advanced welding process and Explain about ultrasonic welding