

# **Sai Nath University**

## **Assignment For Diploma in Mechanical Engineering 4<sup>th</sup> Sem.**

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The Assignment will consist of two parts, A and B. Part A will have 5 short answer questions(40-60 words) of 4 marks each. Part B will have 2 long answer questions of 10 marks each

### **All questions are compulsory.**

These Assignments should be completed and submitted in written form by the student to his/her respective Faculty/ Examiners. Assignment Submission Dates are:

➤ Session-2019

### **List Of Suggested Questions**

The list of suggested questions are for students to practice. Although optional, we recommend that students solve these questions, as they will help them in preparing for exams as well as in clearing the important concepts of the subject.

### **List of Practical and suggested practical's**

The list of practical's should be done by the students in their Lab Sessions. These are the basic practical's, which each student should be able to do himself independently. While the list of suggested practicals are optional, but it is recommended that students should perform those practical so as to have a thorough knowledge of the subject

### **Education Delivery Schedule (EDS)**

As per University Semester scheme, the minimum contact hours of each paper has been Divided into two hours theory and practical class.

The faculty will maintain this attendance paper wise for his/her batch.

<b>Subject code</b>	<b>Subject name</b>
DME 1	MATERIALS AND METALLURGY
DME 2	HYDRAULICS AND HYDRAULIC MACHINES
DME 3	II.C. ENGINES
DME 4	MACHINE DESIGN AND DRAWING
DME 5	WORKSHOP TECH-2



# **SAI NATH UNIVERSITY**

## **Cover page of Assignment**

ID NUMBER .....

NAME .....

COURSE Diploma Engineering

STREAM MECHANICAL.....

SEM 4<sup>th</sup> .....

SUBJECT CODE .....

SUBJECT NAME .....

**Assignments will be completed by the Student in his/her own handwriting.**

# **MATERIALS AND METALLURGY**

## **Assignment**

### **SEC A**

1. What is strain hardening? How does it affect the properties of a material ?
2. How do you differentiate between elastic and plastic deformation ?
3. Explain the stress rupture with neat diagram.
4. Draw the Iron-Carbon equilibrium design and explain its salient features.
5. What is stainless steel ? Write its composition and applications.

### **Sec B**

Q.1. Write short notes on any two of the following :

- (a) Critical cooling rate
- (b) Contents of low carbon steel
- (c) Composite materials

Q2. List out the various types of furnaces. Explain the working of cupola furnace with the help of a neat sketch. Mention its industrial applications.

## **DIPLOMA 4th SEMESTER**

### **HYDRAULICS AND HYDRAULIC MACHINES**

## **Assignment**

### **SEC A**

1. What do you understand by "Flow in open channel" ? Explain.
2. What is a specific energy curve ? Derive an expression for critical depth and critical velocity.
3. Find an expression for loss of energy head for a hydraulic jump.
4. Describe critical depth, critical velocity, specific energy and specific force.
5. Describe the classification of flow in open channels.

### **Sec B**

- Q.6.** The depth of flow of water, at a certain section of a rectangular channel 4 m wide, is 0.5 m. The discharge through the channel is 16 m<sup>3</sup>/sec. If a hydraulic jump takes place on the downstream side, find the depth of flow after the jump.
- Q.7.** A rectangular channel 9 m wide discharges water at normal depth 3.65 m. The bed slope is 1 in 4000 and Manning's  $n = 0.017$ . A dam placed downstream raises the level to a height of the profile to 6.8 m immediately behind the dam. Determine the length of the profile by single step.

## **DIPLOMA 4th SEMESTER**

### **I.C. ENGINES**

## **Assignment**

### **SEC A**

1. Explain the working of a single cylinder 4-stroke spark ignition (SI) engine, with the help of suitable sketches.
2. A certain engine produces 10 kW indicated power. Its mechanical efficiency is 80%. Calculate the brake power and the friction power.
3. Compare the relative advantages and disadvantages of CI engines over SI engines.
4. Explain the valve timing diagram of a 4-stroke CI engine.
5. Explain the working of Solex Carburetor, with the help of neat sketches.

### **Sec B**

Q.6. How are CI engine combustion chambers classified ? Explain the term 'Swirl' in CI engines and 'Turbulence' in SI engines.

Q.7. Discuss the advantages and disadvantages of induction swirl.

## MACHINE DESIGN AND DRAWING

### Part A

Q.1 (a) Define Dimensioning.

(b) What are the general uses of Enlarging-scale and scale of chord ? Q.2 (a) Write down the name of different conic-sections.

(b) With the help of simple sketches, define the Reference-planes and Reference-line.

Q.3 (a) Write down only the names of methods which are used in the construction of ellipse when both major and minor axes are given.

(b) Name the five types of solids and sketch any two of them.

Q.4 (a) What is the difference between plain scale and diagonal scale ?

(b) Draw ellipse on some suitable scale and show its different parameters.

### Part B

Q1 Draw the conventional symbols for 1<sup>st</sup> angle and 3<sup>rd</sup> angle projections (also indicate the line of sight).

Q2. (a) An area of 160 sq. cm. on a map represents an area of 40 sq. km. on the field. Calculate the value of representative fraction (R.F.) of this scale.

(b) What are the different positions of a "PLANE" with respect to the reference plane i.e. H.P. and V.P. ?

## WORKSHOP TECHNOLOGY-II

### **Part A**

1. Write short note on Taper Turning and Knurling.
2. Differentiate between Drilling and Boring.
3. What are the standard angles of cutting tool? Describe them with neat sketch.
4. Explain briefly Boring Bar and Boring Head.
5. Define Jig and Fixture.

### **Part B**

- Q.6 Write difference between Counter Boring and Counter sinking.
- Q.7 Describe briefly Vertical Broaching Machine.



## **R.C.C DESIGN**

### **Part A**

**Q.1** What is the physical properties of ordinary Portland cement ?

**Q.2** What are the properties of plain cement concrete ?

**Q.3** What are the tensile strength of concrete ?

**Q.4** (a) What are the grades of steel used in R.C.C ?

(b) What are the merits and demerits of R.C.C ?

**Q.5** (a) What is main function of steel in R.C.C ?

(b) Define the bending theory of beam. What assumption are taken into account ?

### **Part B**

**Q1.** In working stress method , What stress are taken for different concrete grades as well as steel grades ?

**Q2.** What are critical and actual neutral axis in R.C.C beams and how do we find  $X_a$  and  $X_c$  ?

## **CIVIL ENGG. DRAWING.-2**

### **PART-A**

1. What is the Izod test of impact ? How is it different from the Charpy impact test ?
2. What is hardness of a material and how can it be measured ?
3. Explain briefly the Portal method.
4. Write the advantages and disadvantages of indeterminate structure analysis through different methods.
5. Explain in detail the stiffness matrix method with the help of a suitable example.

### **PART-B**

1. Three wires of the same material and cross-section support a rigid bar which further supports a weight of 5 kN. The length of the wires is 5 m, 8 m and 6 m in order. The spacing between the wires is 2 m and the weight acts 1.6 m from the first wire. Determine the load carried by each wire.
2. Write down the design steps for the following members of a square steel tank :
  - (a) Vertical side walls
  - (b) Base slab