

Sai Nath University

Assignment For B.TECH in Mechanical Engineering 6th Sem.

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-2018

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.

Subject Code**Subject Name****BTME-601****Strength of Materials****BTME -602****Industrial Engg. & Production Management****BTME-603****Design of Machine Elements****BTME -604****Hydraulic Machines****BTME- 605****Industrial Economics & Management****BTME- 606****Practical Strength of Materials**



SAI NATH UNIVERSITY

Cover page of Assignment

ID NUMBER

NAME

COURSE B. Tech

STREAM Mechanical.....

SEM 6th

SUBJECT CODE

SUBJECT NAME

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

BTME-601

[Strength of Materials]

Part A

1. Define bulk modulus, modulus of elasticity and modulus of rigidity. Derive the relationship between these three moduli.
2. A rectangular section, 200 mm wide and 400 mm deep, is used as a beam. Find the maximum moment carrying capacity of this beam so that the permissible stress of 50 MPa is not exceeded in the material.
3. Define any two of the following : (i) Limit of proportionality and Elastic limit (ii) Brittle material and Ductile material (iii) Principal plane and Principal stress
4. solid circular shaft is 4 m long and has a diameter of 80 mm. Find the torsional strain energy stored in it when it is subjected to a torque of 200 Nm. Take modulus of rigidity, G 80 GPa.
5. Define the terms Principal Stress and Principal Strain.

Part B

1. A steel rod of 60 mm diameter and 1 m long is encased by a cast iron sleeve 8 mm thick and of internal diameter 60 mm. This assembly of composite section is under a load of 40 kN (tensile). Find the stresses in two materials and elongation of the composite assembly. Take E for steel = 200 GPa and E for cast-iron = 100 GPa. Give a neat sketch of the assembly.
2. A circular rod of diameter varying from 100 mm at one end to 200 mm at the other end, is fixed between two supports. Determine the stress induced, if the temperature of the rod is raised by 70°C . Take $E = 200 \text{ kN/mm}^2$ $\alpha = 1.2 \times 10^{-5}/^{\circ}\text{C}$ Length of rod = 1000 mm.

BTME-602
[Industrial Engg. & Production Management]

Part A

1. What are the objectives of communication and Describe the communication flow in an organization.
2. What is the difference between closed system and open system ? Explain with the help of an example .
3. Define organisational structure. In what way are organisation chart and manual useful to understand the organization and its functioning ?
4. What do you mean by productivity ? Briefly discuss the various ways of improving productivity.
5. Explain the meaning of various symbols used for recording in Method Study. Explain the Man-Machine chart with an example of your choice.

Part B

1. Write about rules, methods, standard programme and project budget. And What is the present value of 5,000 receivable after 3 years at an interest rate of 10%?.
2. Write short note on any two of the following : (a) Productivity Measures (b) Product Life Cycle (c) Predetermined Motion Time Standards

BTME-603

[Design of Machine Elements]

Part A

1. What is the basic procedure in machine design ? Explain in brief.
2. Write short notes on the following : (a) Types, functions and applications of springs
(b) End styles of springs.
3. The cylinder of a 4-stroke diesel engine has the following specifications : Brake power = 3.75 kW, Speed = 1000 rpm Indicated mean effective pressure = 0.35 MPa and Mechanical efficiency = 80%. Determine the diameter and length of the cylinder liner..
4. Explain the modified Goodman diagram for Axial and Bending stresses.
5. Explain the term "Damping" and give the characteristics of different types of damping.

Part B

1. Describe with sketches the equation of deflections for uniform straight beams on elastic foundation.
2. Write short notes on any four of the following : (a) Design Synthesis and Creativity in Design (b) Limits, Fits and Tolerances (c) Types of Keys (d) Rankine Buckling Load (e) Morgan's Colour Code ASME Code for Shaft Design.

BTME-604
[Hydraulic Machines]

Part A

1. Differentiate between Francis and Kaplan turbines, using relevant sketches.
2. What do you understand by characteristic curves ? Explain, briefly, any two types of characteristic curves.
3. Describe, in detail, the classification of channels based on channel characteristics.
4. Find the bed slope in channels of rectangular and triangular sections having top width 5 m and uniform depth of 2 m, if the discharge is $0.03 \text{ m}^3/\text{s}$. Take the value of Chezy's constant as 60.
5. Write short notes on the following :
 - (a) Cavitation
 - (b) Celerity of the gravity wave.

Part B

1. A Kaplan turbine working under a head of 56 m develops 10 MW. The hub diameter of the runner is 0.35 times the outer diameter. The speed ratio and flow ratio is 21 and 0.67, respectively. If the overall efficiency is 85%, find out the diameter of the runner and the speed of the turbine.
2. A rectangular section of width 5 m conveys water at the rate of $15 \text{ m}^3/\text{s}$. State whether hydraulic jump occurs, if the flow velocity is 5 m/s. If hydraulic jump occurs, what is its height and strength ? Estimate the flow velocity and Froude number after the jump and the loss of energy in the jump per kg of water. Also calculate the power dissipated in the jump.

BTME-605**[Industrial Economics & Management]****Part A**

1. What are the objectives of communication and Describe the communication flow in an organisation .
2. What is the difference between closed system and open system ? Explain with the help of an example.
3. Define safety management. Describe the objectives of safety management.
4. What is the present value of 5,000 receivable after 3 years at an interest rate of 10% ?
5. What strategies would you devise to manage the negative responses of employees to organisational change.

Part B

1. Write short notes on the following :
 - (a) Acceptance Sampling
 - (b) Performance Rating
 - (c) Environmental Condition of Fatigue
 - (d) Predetermined Motion Time Study
3. Discuss the role of an Industrial Engineer. What are the application areas of Industrial Engineering.

BTME-606

[Practical Strength of Materials]

Part A

1. Describe the assumptions used for the analysis of Thin shells.
2. Describe the "springs in series" and "springs in parallel".
3. Differentiate the term section modulus and flexural rigidity.
4. Draw the stress-strain curve for a mild steel bar and label the salient points on the curve.
5. Define the terms Principal Stress and Principal Strain.

Part B

1. Discuss the advantages and limitations of an optical strain gauge. How do you define the magnification of an optical gauge ?
2. A uniform beam ($I = 7.8 \times 10^7 \text{ mm}^4$) is 6 m long and carries a central point load of 50 kN. Taking $E = 210 \text{ kN/mm}^2$, calculate the deflection under the load, if (a) the beam is simply supported at its ends, and (b) the beam is built-in at one end.