

Sai Nath University

Assignment For B.TECH in Mechanical Engineering 4th 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-401	Society ,Environment ,Engg.
BTME -402	Dynamics
BTME-403	Solid Mechanics
BTME -404	Heat Transfer-I
BTME- 405	Theory of Machine
BTME-406	Practical Mechanics



SAI NATH UNIVERSITY

Cover page of Assignment

ID NUMBER

NAME

COURSE B. Tech

STREAM Mechanical.....

SEM 4th

SUBJECT CODE

SUBJECT NAME

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

BTME-401

[Society Environment Engineering]

Part A

1. How can public awareness help in conservation of environment ? Explain with the help of suitable examples.
2. Discuss the environmental impacts of river valley projects.
3. Discuss the global nuclear energy scenario. Explain its environmental impact.
4. What do you understand by productivity of the ecosystem ? Discuss its types.
5. Explain in detail any two of the following with detailed sketches :
(a) Nitrogen Cycle (b) Ecological Pyramid

Part B

1. What are the Government of India's policies related to the conservation, protection and recycling of natural resources and reserves ? Describe any one such policy/act in detail.
2. What are the effects of environmental pollution on urban areas ? Discuss some necessary actions required to overcome and tackle this issue.

BTME-402

[Dynamics]

Part A

1. Describe rope brake dynamometer with a neat sketch.
2. Give the classification of cams according to the follower movement, with neat sketches.
3. Derive an expression for equivalent dynamic system.
4. What do you understand by 'angle of repose' ? Prove that the angle of repose is equal to the friction angle.
5. Write short notes:
 - (a) Friction circle in journal bearing
 - (b) Circular cam with flat faced follower

Part B

1. An open belt drive connects two pulleys 120 cm and 50 cm diameters on parallel shafts 4 m apart. The maximum tension in the belt is 1855.3 N. The coefficient of friction is 0.3. The driver pulley of diameter 120 cm runs at 200 rpm. Calculate (a) the power transmitted, and (b) the torque on each of the two shafts.
2. Write short notes on any two of the following :
 - (a) Vibration Control
 - (b) Types of Belts and Pulleys
 - (c) Hooke's Joint.

BTME-403

[Solid Mechanics]

Part A

1. Explain the stress -- strain diagram for the ductile material with a suitable sketch.
2. Write a brief note on maximum shear stress theory and distortion energy theory.
3. A square of 8 cm x 8 cm cross-section is 6 m long. It is subjected to a tensile load of 250 'kN. If $E = 210 \text{ GPa}$ and Poisson's ratio = 0.25, determine the change in volume and Bulk modulus.
4. Derive the relation between Young's modulus and modulus of rigidity.
5. Derive the equation for strain energy due to impact loading.

Part B

1. A beam of I-section 50 cm deep and 19 cm wide, has flanges 2.5 cm thick and web 1.5 cm thick. It carries a shearing force of 400 kN at a section. Calculate the maximum intensity of shear stress in the section if the moment of inertia is $64,500 \text{ cm}^4$.
2. Explain Euler's theory of Buckling of columns.

BTME-404
[Heat Transfer-I]

Part A

1. State and explain about Laplace equation and Poisson's equation.
2. Explain about "Heat Transfer" at the interface of two solids.
3. Explain about the analogy between heat flow and electricity with a suitable example.
4. Brief about overall heat transfer coefficient, concept of thermal resistance and conductance.
5. What do you understand by thermal radiation ? Also briefly write about Black Body radiation.

Part B

1. State and explain about Planck's distribution law.and Explain briefly the different types of heat exchangers.
2. Write short notes on the following :
 - (a) Solar Radiation
 - (b) Heisler Charts
 - (c) Logarithmic Mean Temperature Difference (LMTD)
 - (d) Transient Heat Conduction.

BTME-405
[Theory of Machine]
Part A

1. Explain the working of an automobile steering gear mechanism with a neat sketch.
2. Derive an equation for the length of belt in case of open belt drive.
3. Explain the following types of bearing :
 - (i) Roller Bearing
 - (ii) Radial Ball Bearing
4. State the parallelogram law of forces.
5. Explain the turning moment diagram of a single cylinder four-stroke IC engine with sketches.

Part B

1. Define the following terms
 - (a) Binary link and Ternary link
 - (b) Spherical Pair
 - (c) Double Crank Mechanism
2. Describe the working of Watt governor with a neat sketch.

BTME-406

[Practical Mechanics]

Part A

1. State the parallelogram law of forces.
2. A rod AB carries three loads of 30 N, 90 N and 100 N at distances of 20 mm, 90 mm and 150 mm respectively from A. Neglecting the weight of the rod, determine the point at which the rod will balance.
3. A wooden block of weight 50 N rests on a horizontal plane. Determine the force required to just (i) pull it, (ii) push it. Take coefficient of friction $\mu = 0.4$ between the mating surfaces.
4. A sphere is having a radius R and mass ' m '. Determine the moment of inertia about its diameter.
5. Write down the laws of friction. Also derive the Eytelwein's formula for the friction (Belt and Rope).

Part B

1. What do you understand by a couple ? Explain its properties in detail. Also discuss the replacement of a force by a force and couple.
2. Define the following :
 - (i) Work
 - (ii) Power
 - (iii) Energy

Also explain the principle of conservation of energy