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ASSIGNMENT FOR BTECH IN MECHANICAL 3nd SEM.

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

List Of Suggested Questions

The list of suggested questions is 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.

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SUBJECT CODE	SUBJECT NAME
BME 1	Engg Mathematics-III
BME 2	Fluid Mechanics
BME 3	Mechanics of Solids
BME 4	Material Science
BME 5	Thermodynamics
BME6	Industrial Psychology

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Cover page of Assignment

ID NUMBER ……

NAME …… ……

COURSE BTECH……

STREAM MECHANICAL……

SEM 3rd ……

SUBJECT CODE ……

SUBJECT NAME ……

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

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Engg Mathematics-III

PART-A

Q.1 Find the maximum and minimum value of **2 sinω-3cosω.**

Q.2 Define even and odd function with example.

Q.3 Prove that $\sec^2\omega - \operatorname{cosec}^2\omega >= 4$

Q.4 If **tan(A+B) =P , tan(A-B)=Q** than show that **tan2A=(p+q)/(1-pq)**

Q.5 If $\cos(\alpha+\beta) = \frac{4}{5}$ and $\sin(\alpha-\beta) = \frac{5}{13}$ and **α,β** lie between **0** and **π/4** , prove that

$\tan 2\alpha = \frac{56}{33}$.

PART-B

Q.1 If the equation of the two diameter of a circle are x-y=5 and 2x+y=4 ,the radius of the circle is 5 , find the equation of circle.

Q.2 Prove that $\frac{\sec 8\omega - 1}{\sec 4\omega - 1} = \frac{\tan 8\omega}{\tan 2\omega}$

Fluid Mechanics

PART-A

Q.1 When do you call a section as hydraulically efficient?

Q.2 What are alternate depths?

Q.3 List out various channel bottom slopes.

Q.4 Define 'Length of Jump'.

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Q.5 Find the force exerted by a jet of water of diameter 50 mm on a stationary flat plate when the jet strikes the plate normally with a velocity of 18 m/s.

PART-B

Q.1 Give the various characteristics of the critical state of flow through a channel section.

Q.2 For a constant specific energy of 2.1 N.m/N, calculate the maximum discharge that may occur in a rectangular channel 6.0 m wide.

Mechanics of Solids

PART-A

Q.1 Derive the relation between Shear Force, Bending Moment and rate of loading at a section of a beam.

Q.2 The shear force diagram for a cantilever beam of length 3 m is varying linearly from a value of 12 N at the fixed end to a value of zero at the free end. Determine the loading on the cantilever beam.

Q.3 The tension flange of a cast iron I section beam is 240 mm wide and 50 mm deep, the compression flange is 100 mm wide and 20 mm deep where as the web is 300 mm deep and 30 mm thick. Find the load per unit run which can be carried over a 4 m span of a simply supported beam if the maximum permissible stresses are 90 MPa in compression and 24 MPa in tension.

Q.4 A hollow shaft having an internal diameter 50% of its external diameter transmits 600 kW of power a 200 rpm. Determine the external diameter of the shaft if the shear stress is not to exceed 65 MPa and the twist in the length of 3 m shaft should not exceed 1.5 degrees. Take modulus of rigidity = 100 GPa.

Q.5 A cylindrical vessel is 1.5 m diameter and 4 m long is closed at ends by rigid plates. It is subjected to an internal pressure of 3 MPa. If the maximum principal stress is not to exceed 150 MPa, find the thickness of the shell. Also find the changes in diameter, length and volume of the shell. Take Young's modulus = 200 GPa and Poisson's ratio = 0.25.

PART-B

Q.1 A bolt is subjected to an axial pull of 9 kN and a transverse shear of 4.5 kN. Determine the diameter of the bolt if the elastic limit in tension is 225 MPa using maximum principal stress theory and the maximum shear stress theory. Assume a factor of safety of 3.

Q.2 Explain the terms: Polar Sectional Modulus, Torsional Rigidity and Torsional Stiffness.

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Material Science

PART-A

Q.1 What is crystallization of metals?

Q.2 What is a solid solution? Give an example.

Q.3What is Gibb's phase rule?

Q.4 For a binary eutectic alloy, how does a typical cooling curve looks like?

Q.5 Which cast iron is called as temper carbon? Why?

PART-B

Q.1 What are cermets? Give examples.

Q.2 Give the applications of metal ceramic mixtures

Thermodynamics

PART-A

Q.1 Give the Clausius' statement of the second law. What is a PMM2 ? Why is it impossible ? Explain.

Q.2 Write short notes on any four of the following :

(a) Point function 2. (b) Quasi-static process (c) Specific heat at constant pressure (Cp) (d) Irreversibility

(e) Availability (0 Heat engine

Q.3 What is entropy ? What is the principle of Increase of Entropy ? Explain.

Q.4 Explain first law of thermodynamics with jules experiments.

PART-B

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Q.1 What is ideal gas? Derive the expression for gas constant and what is the numeric value of gas constant.

Q.2 State whether the following statements are true or false : (a) Energy can flow in and out of a dosed system, but mass cannot. (b) Mixture of ice and water is a heterogeneous system. (c) Amount of work done is a point function (d) The cyclic integral of a thermodynornic property is always zero. (e) It is not possible to construct a PMM1.

Industrial Psychology

PART-A

Q.1 What is industrial psychology?Give examples of two roles that an industrial psychologist is likely to play in an organisation.

Q.2 Explain the following terms.

i. Central attitudes

ii. Peripheral attitudes

iii. Job satisfaction

iv. Job involvement

v. Organisation commitment

Q.3 work and working, and the characteristics involved can either be psychologically good or bad for for the employees. Explain the physical, and psychological problems associated with unemployment or “bad” employment.

Q.4 Discuss the various fields of industrial psychology.

PART-B

Q.1 Discuss the various occupational oriented personality theories.

Q.2 Highlight six of the things employees most wish to experience in their jobs and the work place in general..