

Enrollment No.

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**B.Tech (ME)**  
**III YEAR, VI SEMESTER EXAMINATION**  
**Design of Machine Elements**

[Time : 03:00 Hours]

[Max. Marks : 70]

**NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS.****DESIGN DATA BOOK AND SCIENTIFIC CALCULATOR IS ALLOWED IN EXAMINATION HALL****QUESTION NO.-1: ATTEMPT ANY FOUR PARTS.****(4\*3=12)**

- Define the fits and classified it based on the limits of the shaft and hole.
- Define the all grades of tolerance.
- Write about various theories of failure.
- Write the types of load and modes of failure.
- What are the causes of stress concentration? And explain the methods used for reducing the stress concentration.

**QUESTION NO.-2: ATTEMPT ANY THREE PARTS.****(3\*4=12)**

- Discuss about the Gerber lines, Goodman lines, and Soderberg lines with neat sketch diagram.
- Write short note on the following: a) S-N curve b) Low cycle fatigue
- A line shaft rotating at 200 r.p.m. is to transmit 20 kW. The shaft may be assumed to be made of mild steel with an allowable shear stress of 42 MPa. Determine the diameter of the shaft, neglecting the bending moment on the shaft.
- Write short notes on Caulking and Fullering.
- A double riveted lap joint is to be used to carry a load of 350 KN. If the rivets are of 20mm in diameter. Design the joint using following allowable stresses:  $\sigma_1=150\text{MN/m}^2$ ;  $\sigma_c=246\text{MN/m}^2$ ;  $\tau=100\text{MN/m}^2$

**QUESTION NO.-3: ATTEMPT ANY THREE PARTS.****(3\*6=18)**

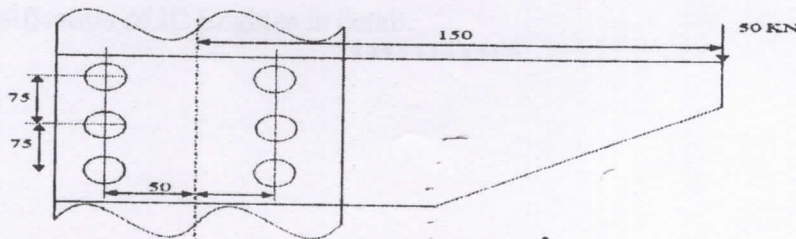
- A double riveted lap joint with chain riveting, is to be made for joining two plates of 6mm thickness. The permissible tensile stress for the plate is  $120\text{N/mm}^2$ . The permissible shear and crushing stress for rivets are  $100\text{N/mm}^2$  and  $150\text{N/mm}^2$  respectively. Determine: a) The diameter of rivets; b) the pitch of rivets; c) The efficiency of rivet joint
- A manufacturer is interested to start the business with six different models of machines ranging from 5.5KW to 55KW. Specify the power capacities of the six models.
- The stresses at a point in a body are  $\sigma_x=91\text{MN/m}^2$ ,  $\sigma_y=21\text{MN/m}^2$  and  $\tau_{xy}=40\text{MN/m}^2$ . If the yield strength of material is  $280\text{MN/m}^2$ , determine the factor of safety using distortion energy theory.
- A shaft made of mild steel is required to transmit 100 kW at 300 r. p. m. The supported length of the shaft is 3 meters. It carries two pulleys each weighing 1500N supported at a distance of 1 meter from the ends respectively. Assuming the safe value of stress, determine the diameter of the shaft.

**QUESTION NO.-4: ATTEMPT ANY TWO PARTS.****(2\*7=14)**

- The stresses developed at a critical point in a machine component, made of steel 45C8 ( $S_y=380\text{MPa}$ ) are as follows:  $\sigma_x=100\text{MPa}$ ,  $\sigma_y=40\text{MPa}$  and  $\tau_{xy}=80\text{MPa}$ . Calculate the factor of safety by (i) Maximum principal stress theory, (ii) Minimum shear stress theory, and (iii) Distortion energy Theory.
- Define standard and code. Classify the standard and its advantages.
- A cylindrical shaft, made of steel having yield strength of  $760\text{MPa}$ , is subjected to a static load consisting of bending moment of  $15\text{KN-m}$  and a torsional moment of  $25\text{KN-m}$ . If the required factor of safety is 2.5. Determine the diameter of shaft using: (i) The maximum shear stress theory (ii) The maximum strain energy theory.

**QUESTION NO.-5: ATTEMPT ANY TWO PARTS.****(2\*7=14)**

- Write the basic terminology used in riveted joints i) Pitch, ii) Back Pitch, iii) Diagonal pitch, and iv) margin
- Write the procedure of design of circumferential lap joint for boiler.
- Write the assumptions of the SRTIBECK's Equation for basic static capacity of bearings and prove it.
- A bracket plate of 12.5 mm thickness is riveted to a column by 6 rivets of equal sizes are shown in Figure. It carries a load of 50KN at the distance of 150mm from the centre of column. The distance between the rivet and centre of material is 50mm. If the permissible shear stress and crushing stress for the rivet are  $75\text{N/mm}^2$  and  $140\text{N/mm}^2$  respectively, determine the diameter of the rivet.



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08/05/24

Printing Pages : 1

Paper Code : - BME -611

(B) (SVSU) : 2023-2024/R

Enrollment No.

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**B.Tech (ME)**  
**III YEAR, VI SEMESTER EXAMINATION**  
**I.C Engine**

[Time : 03:00 Hours ]

[Max. Marks : 70]

**NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS.****1. Attempt any TWO parts of the following.****7x2=14**

- a) Draw and explain the valve timing diagram for 4-stroke petrol engine.
- b) Explain the working and construction of simple carburetor.
- c) What is turbocharging? Also explain different methods of turbocharging for CI engine?

**2. Attempt any TWO parts of the following.****7x2=14**

- a) Evaluate the working of MPFI and its different types with the help of neat and clean diagrams.
- b) Summarize the requirements of a good cooling System and compare air and liquid cooling system in brief.
- c) Discuss an expression for thermal efficiency of air standard Otto Cycle.

**3. Attempt any TWO parts of the following:****7x2=14**

- a) Demonstrate the combustion process and its phases in CI engine with neat sketch.
- b) Describe the main components and working of battery ignition system with neat sketch.
- c) Discuss the alternative fuels for IC engines also discuss the rating for SI engine fuel.

**4. Attempt any TWO parts of the following:****7x2=14**

- a) Explain the function of lubricants in I.C. Engines. Explain different wet lubricating system with neat sketch.
- b) What is difference between reciprocating and centrifugal compressor?
- c) Explain the construction and working principal of evaporative cooling with advantages and disadvantages.

**5. Attempt any TWO parts of the following:****7x2=14**

- a) What are the major sources of air pollutants? Classify the pollution control devices used in C. I. engine?
- b) Explain the effect of compression ratio, engine speed, and spark advance on the knocking in SI engine.
- c) Discuss the classification of IC Engines in detail.

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10/05/24

Printing Pages : 1

Paper Code : - BME -623

(C) (SVSU) : 2023-2024/R

Enrollment No.

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**B.Tech (ME)**  
**III YEAR, VI SEMESTER EXAMINATION**  
**COMPUTER AIDED DESIGN**

[Time : 03:00 Hours ]

[Max. Marks : 70]

**NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS.****QUESTION NO.-1: ATTEMPT ANY FOUR PARTS.**

(4\*3=12)

|    |                                                                                                      |
|----|------------------------------------------------------------------------------------------------------|
| a) | Give brief descriptions of each of the following common terms in CAD environment: CAD, CAM, CAE,     |
| b) | Give brief descriptions of each of the following common terms in CAD environment: CIMS, and CAD/CAM. |
| c) | What is mechanical design? & steps of design.                                                        |
| d) | Discuss major elements of Computer Aided Design                                                      |
| e) | Enlist CAD software & hardware                                                                       |
| f) | Explain image scanners. also Explain the working principle of Cathode Ray Tube.                      |

**QUESTION NO.-2: ATTEMPT ANY THREE PARTS.**

(3\*4=12)

|    |                                                              |
|----|--------------------------------------------------------------|
| a) | What is graphics transformation why it is required?          |
| b) | Explain Product Life Cycle, Product Life Cycle With CAD/CAM. |
| c) | Illustrate the software configuration of CAD.                |
| d) | What is CIM? What are the benefits of CIM?                   |

**QUESTION NO.-3: ATTEMPT ANY THREE PARTS.**

(3\*6=18)

|    |                                                                                      |
|----|--------------------------------------------------------------------------------------|
| a) | What are coordinate systems? Explain with Diagram.                                   |
| b) | Write short notes on followings<br>i) Constructive solid geometry ii) Solid Modeling |
| c) | What is the necessity and importance for CAD software?                               |
| d) | Briefly describe various Types of storage devices used in Computer.                  |

**QUESTION NO.-4: ATTEMPT ANY TWO PARTS.**

(2\*7=14)

|    |                                                                                      |
|----|--------------------------------------------------------------------------------------|
| a) | Explain the role of primitives and Boolean operations in CSG with suitable examples. |
| b) | What are the activities of CAD? Enlist various auto – cad commands.                  |
| c) | What are the Quadratic & super Quadratic Surfaces, Blobby Objects.                   |

**QUESTION NO.-5: ATTEMPT ANY TWO PARTS.**

(2\*7=14)

|    |                                                                                          |
|----|------------------------------------------------------------------------------------------|
| a) | Explain the Digitizer, Scanner, and Joystick. Light pen, storage devices.                |
| b) | Explain the Raster Scan Display, Printers, and Plotters.                                 |
| c) | Explain the Curve, types of Curve, importance of curve in Design.                        |
| d) | Differentiate between sequential engineering Vs Concurrent and engineering with Diagram. |

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**Enrollment No.**

**B.Tech (ME)**

**III YEAR, VI SEMESTER EXAMINATION**  
**LANGUAGE AND LINGUISTICS**

[Time : 03:00 Hours ]

**[Max. Marks : 70]**

**NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS.**

### 1. Multiple Choice Questions (MCQs)

[01×15=15]

- I Which symbol represents phonetic transcription?  
(a) // (b) ( ) (c) [] (d) {}
- II Which among the following statements is not true?  
(a) Language is a means of communication (b) Language is symbolic  
(c) Language is structural (d) Language is the only means of communication
- III The set of rules that determine the arrangement of words in a sentence is called.....  
(a) Phonetics (b) Phonology (c) Semantics (d) Syntax
- IV The study of the smallest grammatical units of language, and of their formation into words is called...  
(a) Phonetics (b) Phonology (c) Semantics (d) Morphology
- V A person who can use more than two languages is called.....  
(a) Bilingual (b) Bioligual (c) Duo-Lingual (d) Multilingual
- VI The relation of oppositeness in pairs of lexical items where the assertion of one implies the denial of the other is known as ....  
(a) Antonymy (b) Semantic (c) Synonymy (d) Syntax
- VII IPA stands for  
(a) International Phonetic Alphabet (b) International Political Association  
(c) International Phonology Association (d) All of the above
- VIII The plural of the word fish can be transcribed as:  
(a) /fɪfɪz/ (b) /fɪfɪs/ (c) /fɪfɪz/ (d) /fɪfəz/
- IX The features that affect speech sounds, tone and juncture are called:  
(a) Grammatical features (b) Lexical features (c) Supra-segmental features (d) Syntactic features
- X What is lexicography?  
(a) The process of making a dictionary (b) The process of making a phrase (c) Semantics (d) Syntax
- XI The form 'hat' is a -----morpheme.  
(a) Free Morpheme (b) Free Variation (c) Bound Morpheme (d) None of the above
- XII Identify a subordinating conjunction among the following (a) But (b) Or (c) Since (d) Yet
- XIII Words with more than three syllables are called -----words  
(a) Multisyllabic (b) Disyllabic (c) Trisyllabic (d) All of the above
- XIV -----is the scientific study of language  
(a) Philology (b) Semiotics (c) Semantics (d) Linguistics
- XV Which among the following is an example for portmanteau  
(a) Malware (b) UNESCO (c) Buzz (d) Edit

2. Answer in long (any three)

[ 10×3=30]

- I Enumerate the salient features of a language.
- II Explain the organs responsible for Speech with a neat diagram.
- III Identify Parts of speech and their importance in sentences. Elaborate your answer with necessary examples.
- IV What is called semantics? Detail upon the types of meaning in semantics.

3. Answer in short (any five)

[5x5=25 ]

- I Discuss the scope and nature of morphology in English.
- II Write a short note on diphthongs. Give examples from English.
- III How would you classify the speech sounds in English?
- IV List some important prefixes and suffixes along with suitable examples.
- V Write the meaning of the following terms-  
Morpheme, Phoneme, Phonetics, Semantics, Syntax
- VI Elaborate the functions of a language with appropriate examples.
- VII Differentiate between derivational and inflectional morpheme.

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