

Roll No. ....

**3607**

**B. Tech. 7th Semester (ME)  
Examination – May, 2026**

**DESIGN OF MACHINE ELEMENTS - II**

**Paper : PCC-ME-401-G**

**Time : Three hours ]**

**[ Maximum Marks : 75**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All question carry equal marks.

1. (a) What do you mean by ergonomics ?  
(b) Discuss fatigue strength.  
(c) What do you mean by rigidity ?  
(d) What is flexural strength ?  
(e) What do you mean by hydrodynamic lubrication ?  
(f) What are the advantages of ball and roller bearing ?

$2.5 \times 6 = 15$

3607- 308-(P-3)(Q-9)(26)

P. T. O.

#### SECTION - A

2. Discuss the significance of processing in the development of products. How are the design decisions influenced by the characteristics and limitations of various manufacturing processes (such as casting, forging, and machining) ? 15
3. Describe Design for Production (DFP) and discuss how it forms the production line. Explain the role of value engineering and ergonomics in the process of product design. 15

#### SECTION - B

4. A rotating shaft, 40 mm in diameter, is made of steel FeE 580 ( $S_{yt} = 580 \text{ N/mm}^2$ ). It is subjected to a steady torsional moment of 250 N-m and bending moment of 1250 N-m. Calculate the factor of safety based on, 15
  - (i) maximum principal stress theory; and
  - (ii) maximum shear stress theory.
5. Explain leaf spring design procedure. What are the primary design factors to consider in terms of static and dynamic stresses while designing a leaf spring ? Analyse the significance of the material selection in the development of a leaf spring structure. 15

#### SECTION - C

6. Describe how pivot bearings and collar bearings are designed. During the process of designing these bearings, What are the most important design factors that need to be taken into consideration ? 15
7. Discuss the selection of ball bearings and roller bearings based on static and dynamic load carrying capacity using the load-life relationship. 15

#### SECTION - D

8. Describe the concepts of wear strength and beam strength in gear design. How does the design of gear teeth have an impact on these strengths, and how can these values be calculated ? 15
9. Explain the importance of gear lubrication in gear design. Discuss the different types of lubrication systems used in gears and how they influence gear performance. 15

Roll No. ....

**3608**

**B. Tech. 7th Semester (ME)  
Examination – May, 2026**

**ENTREPRENEURSHIP DEVELOPMENT**

**Paper : PCC-ME-403-G**

**Time : Three hours ]**

**[ Maximum Marks : 75**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All question carry equal marks.

1. (a) What do you mean by entrepreneurship ?  
 $2.5 \times 6 = 15$
- (b) Discuss traits of entrepreneurs.
- (c) What do you mean by product selection ?
- (d) What is project appraisal ?
- (e) What do you mean by export marketing ?
- (f) What are the enterprise launching formalities ?

3608-252 -(P-3)(Q-9)(26)

P. T. O.

#### SECTION - A

2. What are the different categories of entrepreneurs ? Evaluate their roles and functions in economic growth. 15
3. What differentiates a manager from an entrepreneur ? Evaluate and differentiate their roles, characteristic, and functions. 15

#### SECTION - B

4. Discuss the procedure of entrepreneurial opportunity search and identification. Which criteria should an entrepreneur consider when identifying an opportunity ? 15
5. What are the key elements involved in preparing a project report ? How does a project report assist entrepreneurs in planning their business ? 15

#### SECTION - C

6. What is Small Scale Industries (SSI) ? Explore the rationale, goals, scope, and the significance of SSIs in India's economic growth. 15
7. What are the primary challenges experienced by Small Scale Industries (SSIs) and Micro, Small, and Medium Enterprises (MSMEs) in India ? Examine their importance in the Indian economy. 15

#### SECTION - D

8. Explain the mandates of the Small Industries Development Organization (SIDO), Small Industries Development Bank of India (SIDBI), and Small Industries Development Corporation (SIDC). 15
9. Examine the legal complexities associated with establishing a business entity, including the factors and criteria relevant to the establishment of a Private or Public Limited Company. 15

Roll No. ....

**3614**

**B. Tech. 7th Semester (ME) (PEC-III)  
Examination – May, 2026**

**SOLAR ENERGY ENGINEERING**

**Paper : PEC-ME-411-G**

***Time : Three hours ]***

***[ Maximum Marks : 75***

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All question carry equal marks.

1. (a) What do you mean by solar cookers ?  $6 \times 2.5 = 15$   
(b) Explain heliostats.  
(c) What do you mean by thermal storages ?  
(d) What are absorbent refrigerants ?  
(e) What do you mean by periodic heat transfer ?  
(f) What are the applications of solar energy ?

3614-150 -(P-3)(Q-9)(26)

P. T. O.

#### SECTION - A

2. Define solar radiation and explain its significance in the context of Earth's energy balance. 15
3. Explain pyrheliometer and its working principle. Discuss in details the types and key features of pyrheliometer. 15

#### SECTION - B

4. Determine the design and performance of solar air heating systems. What are the advantages and drawbacks of these systems in various climatic conditions? 15
5. Explain the working principles, components and applications of solar water heating systems. 15

#### SECTION - C

6. Discuss the working principles of continuous vapour absorption systems. Explain the key components and design considerations of continuous vapour absorption system. 15
7. Evaluate the similarities and differences between continuous and intermittent vapor absorption systems utilized in sun cooling applications. Determine their operating principles and advantages. 15

#### SECTION - D

8. Discuss the remedial measures proposed by international bodies to address environmental issues such as ozone layer depletion and global warming. 15
9. Explain the following : 15
  - (a) Satellite solar power systems
  - (b) Green house effect