Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Mechanical Engineering) (Sem.-7,8)

# AUTOMATION IN MANUFACTURING

Subject Code : BTME702-18

M.Code : 90475

Date of Examination : 02-05-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

## SECTION-A

1. Write briefly :

   a. Discuss basic elements of CNC technologies.

   b. Write a short note on automatic tool changer.

   c. What is the principle of automated system?

   d. Write functions of three G and three M codes for CNC.

   e. Define hydraulic circuit with sketch.

   f. Discuss common problems in mechanical and electrical components of CNC machine.

   g. Define adaptive control.

   h. What are open and closed loop control systems in CNC? Explain with block diagram.

   i. Define plant layout.

   j. How electronic cams are used in industry?

## SECTION-B

2. What do you understand by pneumatic/ hydraulic actuators? Draw and explain the control of double acting cylinder with solenoid.

3. Explain working of AC motor. Detail about the types of AC motor.

4. Why are brushless DC motors more frequently used in industry? Write advantages of brushless DC motor over brushed DC motor.

5. With help of a block diagram explain hydraulic control system.

6. Explain briefly various components of indexing mechanism.

## SECTION- C

7. Explain various types of plant layout comparing advantages and disadvantages of one over other.

8. Explain in brief :

   a. Linear motion bearing with sketch.

   b. Material handling.

9. Write short notes on **any two** :

   a) Use of design-data book and catalogue.

   b) Feed and spindle drive used in CMC machine.

   c) Difference between NC, CNC and DNC machines.

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Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (Sem.–7,8)

# MECHANICAL VIBRATIONS

Subject Code : BTME701-18

M.Code : 90474

Date of Examination : 28-04-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

## SECTION-A

1. **Write briefly:**

a) What are three elementary parts of a vibrating system?

b) What is logarithmic decrement?

c) Define the term magnification factor.

d) How can we make a system to vibrate in one of its natural mode?

e) What is the basic assumption in deriving Dunkerley's formula?

f) How does a continuous system differ from a discrete system?

g) What are the various methods available for vibration control?

h) What are vibrometers?

i) What is a generalized mass matrix?

j) What are the common types of damping?

## SECTION - B

2. A simply supported beam of square cross section $5mm \times 5mm$ and length $1m$, carrying a mass of 2.3kg at the middle, is found to have a natural frequency of transverse vibrations of 30 rad/s. Determine the Young's modulus of elasticity of the beam.

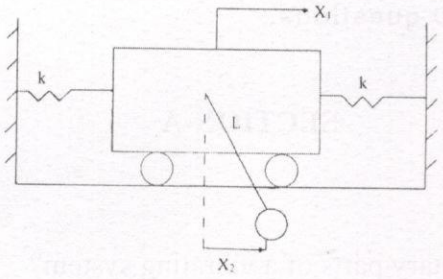
3. A system of beams supports a motor of mass 1220 kg. The motor has an unbalance mass of 1 kg located at 6.0 cm radius. It is known that resonance occurs at 2210 rpm. What amplitude can be expected at the motor's operating speed of 1440 rpm, if the damping factor is assumed to be less than 0.1?

4. A body is subjected to two harmonic motions as given below :a

   $x_1 = 15 sin\left(\omega t + \frac{\pi}{4}\right)$ $x_2 = 8 sin\left(\omega t + \frac{\pi}{3}\right)$

   What harmonic motion should be given to the body to bring it to equilibrium?

5. Derive the equation of motion of the system shown in figure below and find its frequencies




6. Draw a neat sketch of dry friction damper and explain its working.

## SECTION - C

7. Write the equation of motion for a damped free vibration system; derive expressions for amplitude in case of :
   a) Over-damped system
   b) Under damped system
   c) Critically damped system

8. Explain matrix iteration method by taking suitable example of three masses connected by springs in series.

9. **Explain following :**
   a) Vibration pickups
   b) Holzer's method

S

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Roll No. | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (CSE / EE / ME) (Sem.–7,8)

# PRODUCT DESIGN AND DEVELOPMENT

Subject Code : BTME-614-18

M.Code : 90482

Date of Examination : 26-05-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

## SECTION-A

1. **Write briefly :**

a) Describe 'color as an element of design'.

b) Write objectives of product development.

c) What are the objectives of product graphics?

d) Discuss significance of forms in design.

e) What do you understand by Form transition?

f) What are manufacturing aspects of product development?

g) What are characteristics of successful product development?

h) What is the role of aesthetics in product design?

i) Sketch design of three basic types of dynamic displays.

j) Describe interrelation of colors.

## SECTION-B

2. *"A designer plays an important role in product development"*. Justify this statement with your answer.

3. What do you understand by product promotions? What is its necessity?

4. Discuss different elementary forms, their characteristics and significance in design.

5. Differentiate between design by evolution and design by innovation.

6. What are essential features of Product Design?

## SECTION-C

7. What role does a designer play in product development? Explain aesthetics and ergonomics with reference to product design and development.

8. What is the meaning of product details? What details are required for a product to be fabricated from sheet metal?

9. a) What are basic elements of Visual design? Explain.

   b) What do you mean by 'product graphics'? Describe graphics of display and Control panels.

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Roll No. | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-7,8)

# FUNDAMENTALS OF MANAGEMENT FOR ENGINEERS

Subject Code : BTME703-18

M.Code : 90476

Date of Examination : 31-05-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

## SECTION - A

1. **Write briefly :**

a) What are the different levels of management? Briefly explain.

b) State the benefits of Total Quality Management (TQM).

c) What is digital marketing? Name a few examples.

d) Write down different functions of marketing.

e) What is the need and scope of work analysis?

f) Define the term - Method Study.

g) What is SIMO chart?

h) Enlist different ways to improve productivity.

i) What are the objectives of personnel management?

j) Briefly explain about safety engineering.

## SECTION - B

2. Define the term Management. Also, briefly discuss the various functions of management.

3. What are the objectives of plant layout? Discuss in detail the process layout with its advantages, disadvantages and applications.

4. What is product life cycle? Explain the various phases of product life cycle with a neat diagram.

5. Discuss in detail the principles of motion economy in context of (a) Rules concerning human body and (b) Rules concerning tools and equipment design.

6. What is value engineering? Briefly explain the different phases of value engineering.

## SECTION - C

7. a) Discuss in detail the principles of good personnel policy.

   b) Why education and is training of employees important? What are its benefits? Discuss briefly.

8. a) What is multiple activity chart? What is its significance? Explain one man - one machine chart with a suitable example.

   b) What are the key features of Total Quality Management (TQM)? Also, briefly discuss any one TQM model.

9. **Discuss in detail the following :**

   a) Lean Manufacturing

   b) Marketing Mix

   c) Analytical Estimating

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Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (EE/ECE/EEE/IT/ME) (Sem.–7, 8)

# ARTIFICIAL INTELLIGENCE

Subject Code : BTEC-908A-18

M.Code : 90678

Date of Examination : 29-05-2025

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

## SECTION - A

1. **Write briefly :**

a) What is the role of intelligence agents in solving AI problems?

b) What is McCulloch Neural Model?

c) What is a search tree?

d) Name some fuzzy set operations.

e) Differentiate fuzzy set and crisp set.

f) What is the advantage of Genetic Algorithm over conventional algorithm?

g) Define heuristic search.

h) What is Mamdani Fuzzy Inference Systems?

i) Give the list of MATLAB Toolboxes.

j) What is a biological Neuron?

## SECTION - B

2. Discuss knowledge representation in Artificial Intelligence.

3. **Write short notes on :** a) Recurrent Networks b) Associative Memories

4. Consider two fuzzy subsets of the set X, X = {a, b, c, d, e} referred to as A and B.

   A = {1/a, 0.3/b, 0.2/c 0.8/d, 0/e) and B = {0.6/a, 0.9/b, 0.1/c, 0.3/d, 0.2/e}

   Find a) Complement b) Union c) Intersection d) Difference

5. Discuss the various selection and crossover operators used in Genetic Algorithms. List the applications of GA.

6. Explain the process of time series forecasting using ANN.

## SECTION - C

7. a) Discuss different learning mechanisms used in artificial neural Networks.

   b) Discuss the application of ANN.

8. **Write short notes on :**

   a) Defuzzification Methods.

   b) Hopfield Neural Networks.

9. **Explain :**

   a) FLS for Antilock Breaking System.

   b) String encoding of chromosomes.

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