SET-A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS 1501 **Time: 2 Hours**

Course Name: Production Management **Max. Marks: 50**

Instructions:

1. Attempt all questions.
2. Section A contains 10 Questions. Each question carries 1 Mark.
3. Section B contains 04 Questions. Each question carries 4 Marks.
4. Section C contains 04 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. Macroeconomics is concerned with
   (i) Aggregate of entire economy (ii) Small part of entire economy
   (iii) None of the above (iv) All of the above
2. Application of Ergonomics are in
   (i) Aerospace (ii) Product design (iii) Health care
   (iv) All three
3. If $e_p < 1$, the elasticity of demand will be
   (i) Perfectly elastic (ii) Unity elasticity (iii) Relatively elastic
   (iv) Relatively inelastic
4. In Method Study, Transport is represented by
   (i) O (ii) Arrow (iii) Square (iv) Inverted Triangle
5. If $e_p > 1$, the elasticity of demand will be
   (i) Perfectly elastic (ii) Unity elasticity (iii) Relatively elastic
   (iv) Relatively inelastic
6. Direct Cost in a Manufacturing Industry includes:
   (i) Only direct labor cost (ii) Only direct material cost (iii) Summation of direct material and labor cost (iv) None of the above
7. Under ABC Analysis, the Class-A materials represent
   (i) 50 % material & 5 % value (ii) 20 % material & 75 % value
   (iii) 30 % material & 20 % value (iv) 50 % material & 50 % value
8. Under M-T-M, the motion REACH is represented by
   (i) M (ii) T&P (iii) P (iv) R
9. Under M-T-M, the motion POSITION is represented by
   (ii) M (ii) T&P (iii) P (iv) R
10. In Method Study, Storage is represented by
    (ii) O (ii) Arrow (iii) Square (iv) Inverted Triangle

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Section – B

04X04 = 16 Marks

11. Yesterday, the price of envelops was $3 a box and Ram was willing to by 10 boxes. Today, the price has gone up to $3.75 a box and Ram is now willing to buy 8 boxes. Is Ram's demand for elastic or inelastic. What is Ram's elasticity of demand?
12. What do you mean by EOD? Show various types of elasticity of demand with graphical presentation.
13. Define Kanban System. Discuss the functions of Kanban System with figure in Manufacturing Industry.
14. Define JIT System. Write down the benefits of JIT System.

Section – C

04X06 = 24 Marks

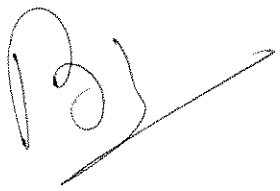
15. Describe the steps for doing a method study of job process. Illustrate one of the recording techniques used in the method improvement with a case example.
16. A manufacturer has shown the following expenses:

Agents commission-- Rs. 5750 • Warehouse wages-- Rs. 1800 • Warehouse repairs-- Rs. 510
• Lighting of office-- Rs. 70 • Office salaries-- Rs. 1130 • Director's remuneration-- Rs. 1400
• Traveling expenses-- Rs. 760 • Rent, rates and insurance of warehouse-- Rs. 310
• Rent, rates and insurance of office-- Rs. 230 • Lighting of warehouse-- Rs. 270
• Printing and stationery-- Rs. 1500 • Trade magazines-- Rs. 70

From the above information, calculate the followings :

• Selling expenses • Distribution expenses • Administration expenses

17. Write down the steps for Time Study.
18. What are benefits of breaking the operations into small elements.



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School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS 1501 **Time: 2 Hours**

Course Name: Production Management **Max. Marks: 50**

Answer Key

Section – A

10X01 = 10 Marks

1. Macroeconomics is concerned with
   (i) Aggregate of entire economy (ii) Small part of entire economy
   (iii) None of the above (iv) All of the above
   Ans. (i)
2. Application of Ergonomics are in
   (i) Aerospace (ii) Product design (iii) Health care
   (iv) All three
   Ans. (iv)
3. If $e_p < 1$, the elasticity of demand will be
   (i) Perfectly elastic (ii) Unity elasticity (iii) Relatively elastic
   (iv) Relatively inelastic
   Ans. (iv)
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6. Direct Cost in a Manufacturing Industry includes:
   (i) Only direct labour cost (ii) Only direct material cost (iii) Summation of direct material and labour cost (iv) None of the above
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7. Under ABC Analysis, the Class-A materials represent
   (i) 50 % material & 5 % value (ii) 20 % material & 75 % value
   (iii) 30 % material & 20 % value (iv) 50 % material & 50 % value
   Ans. (ii)
8. Under M-T-M, the motion REACH is represented by
   (i) M (ii) T&P (iii) P (iv) R
   Ans. (iv)
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   (ii) M (ii) T&P (iii) P (iv) R
   Ans. (iii)

10. In Method Study, Storage is represented by

(ii) O (ii) Arrow (iii) Square (iv) Inverted Triangle

Ans. (iv)

Section – B

04X04 = 16 Marks

11. Yesterday, the price of envelops was $3 a box and Ram was willing to by 10 boxes. Today, the price has gone up to $3.75 a box and Ram is now willing to buy 8 boxes. Is Ram's demand for elastic or inelastic. What is Ram's elasticity of demand?

Soln.: EOD = {(8-10)/10} / {(3.75-3.00)/3.00} = [-0.8] = 0.8

EOD is < 1. Hence inelastic.

12. What do you mean by EOD? Show various types of elasticity of demand with graphical presentation?

Ans.: EOD- The law of demand tells us that as the price of a commodity falls, the quantity demanded increases, and *vice versa. (Eg. Gold)*

In other words, it only tells us only direction of change but not the rate of change.

- ☐ Perfectly elastic demand – horizontal graph
- ☐ Perfectly inelastic demand - vertical
- ☐ Demand with unity elasticity (Equally proportionate demand for proportionate change)
- ☐ Relatively elastic demand (More than proportionate demand due to price change)
- ☐ Relatively inelastic demand (less than proportionate demand due to price change)

13. Define Kanban System. Discuss the functions of Kanban System with figure in Manufacturing Industry?

Ans. **System of planning and controlling production**
Kanban means *card*
Signaling to the upstream workstation that the downstream workstation is ready for the upstream station to produce another batch of parts
Two types of kanban cards: Conveyance card (C-Kanban) and Production card (P-Kanban)

14. Define JIT System. Write down the benefits of JIT System.

Ans.

A philosophy of manufacturing based on planned elimination of all waste and continuous improvement of productivity. It encompasses the successful execution of all manufacturing activities required to produce a final product, from design engineering to delivery and including all states of conversion from raw material onward"-APICS

Drastic reduction in inventory levels
Time-based completition
Improved product quality and reduced cost of scrap
Promotes teamwork among workers and flexibility in work assignments
Manufacturing operations are streamlines and problem free
Economies of reduced setup times
Job securing programs for their workers
Subcontractor networks built on trust relationships (long-term) between customers and suppliers
Participative management styles

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Section – C

04X06 = 24 Marks

15. Describe the steps for doing a method study of job process. Illustrate one of the recording techniques used in the method improvement with a case example.

Ans.: This involves systematic, orderly and scientific approach to problems and decisions must be taken after listing out all possible alternatives and evaluating them critically

1. ***Select*** the work to be studied
2. ***Record*** all relevant facts by direct observation
3. ***Examine*** the facts critically in sequence using special critical examination sheet
4. ***Develop*** the best method which is practical, economical and effective
5. ***Install*** the method as a standard practice

   Maintain the method installed as a standard

16. A manufacturer has shown the following expenses:

Agents commission-- Rs. 5750 • Warehouse wages-- Rs. 1800 • Warehouse repairs-- Rs. 510 • Lighting of office-- Rs. 70 • Office salaries-- Rs. 1130 • Director's remuneration-- Rs. 1400 • Traveling expenses-- Rs. 760 • Rent, rates and insurance of warehouse-- Rs. 310 • Rent, rates and insurance of office-- Rs. 230 • Lighting of warehouse-- Rs. 270 • Printing and stationery-- Rs. 1500 • Trade magazines-- Rs. 70

From the above information, calculate the followings :

• Selling expenses • Distribution expenses • Administration expenses

Ans. Selling expenses = 5750 + 760 + 70 = 6580

Distribution expenses = 1800 + 510 + 310 + 270 = 2890

Administration expenses = 70 + 1130 + 1400 + 230 + 1500 = 4330

17. Write down the steps for Time Study?

□ Ans.: The steps for time study are as follows

- **Select the job to be studied**
- **Breakdown the job into smallest possible elements**
- **Inform the worker and define the best method**
- **Observe the time for appropriate number of cycles**
- **Determine the average cycle time**
- **Determine the normal time**
- **Determine the standard time using average cycle and normal time**

18. What are benefits of breaking the operations into small elements?

◎ Ans.: The objectives of breaking down to elements are

- **To Separate the productive and unproductive activities**
- **To get clear, complete and accurate information**
- **To calculate operator performance accurately**
- **To get detailed work specification**
- **To select the best method**
- **To collect information to compile standard data**

SET-B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS 1501 **Time: 2 Hours**

Course Name: Production Management **Max. Marks: 50**

Answer Key

Section – A

10X01 = 10 Marks

1. Loading in Production System means
   (i) Where it shall be done (ii) When it shall be done (iii) Who will do the work (iv) None of the above

   Ans. (iii)

2. Scheduling in Production System means
   (i) Where it shall be done (ii) When it shall be done (iii) Who will do the work (iv) None of the above

   Ans. (ii)

3. MRP means
   (i) Material Resource Planning (ii) Mean Resource Planning
   (iii) Machine Resource Planning (iv) All

   Ans. (i)

4. Prime Cost in a Manufacturing Industry includes:
   (i)All direct cost (ii) Factory overhead cost (iii) Summation of direct and factory overhead cost

   Ans. (i)

5. Under M-T-M, the motion REACH is represented by
   (i) M (ii) T&P (iii) P (iv) R

   Ans. (iv)

6. Under M-T-M, the motion POSITION is represented by
   (ii) M (ii) T&P (iii) P (iv) R

   Ans. (iii)

7. The benefits of Method Study is
   (i) Removes Non Value Activities (ii) Adds Non Value Activities
   (ii) Both of the above (iv) None of the above

   Ans. (i)

8. Ergonomics is related
   (i) Well-being of employees (ii) Benefits of industry
   (iii) Benefits of Government (iv) None of the above

   Ans. (i)

9. Application of Ergonomics are in
   (i) Aerospace (ii) Product design (iii) Health care
   (iv) All three

   Ans. (iv)

10. Ergo of Ergonomics word means

(i) Natural laws (ii) Work (iii) Both (iv) None

Ans. (ii)

Section – B

04X04 = 16 Marks

11. An operator manufactures 50 jobs in 6 hours and 30 minutes. If this time includes the time for setting his machine. Calculate the operator's efficiency. Standard time allowed for the job was:

Setting time = 35 minutes

Production time per piece = 8 minutes

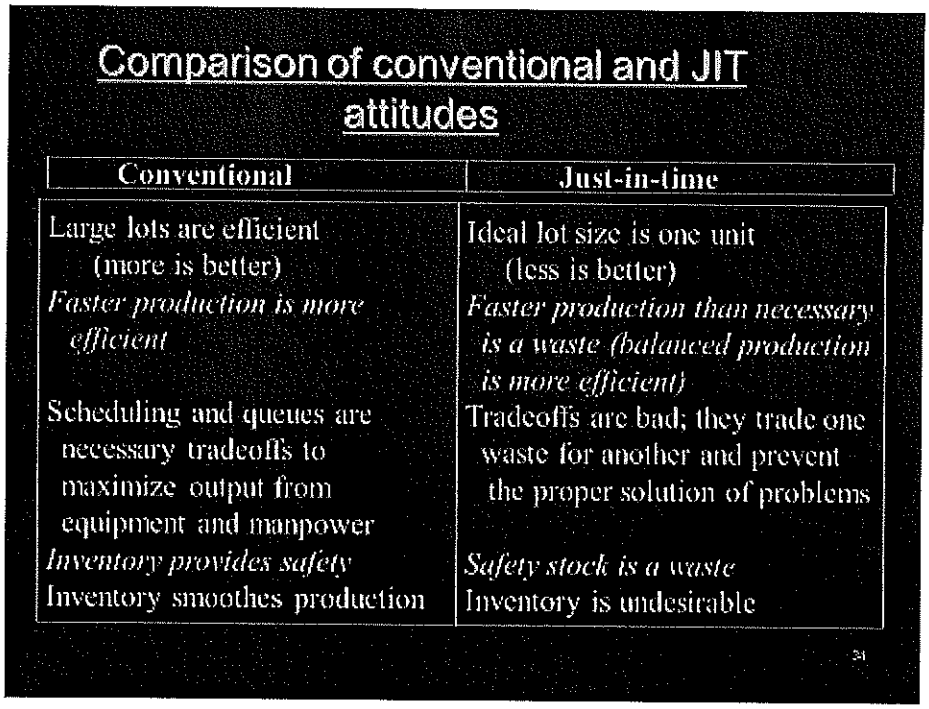
Soln:

Standard time for manufacturing 50 jobs = 35 + 8 X 50 = 435 minutes

Efficiency = (435 X 100) / 390 = 111.5%

12. Write down the comparison between Conventional and JIT attitudes in Manufacturing Industry?

Ans.

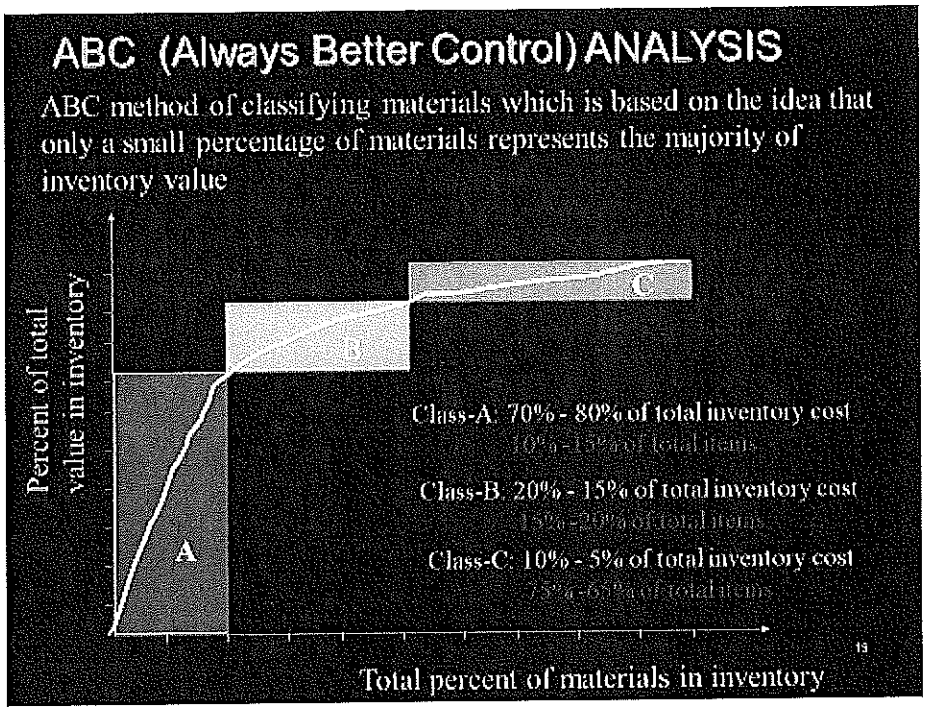


13. What do you mean by Macro and Micro Economics? Explain with example?

Ans.: **Micro economics: Microeconomics is the study of the small part or component of the whole economy that we are analyzing. For example we may be studying an individual firm or in any particular industry. In Microeconomics we study the price of a particular product or particular factor of the production.**

14. What do you mean by ABC Analysis? Describe the industrial utilization with graph?

Ans.

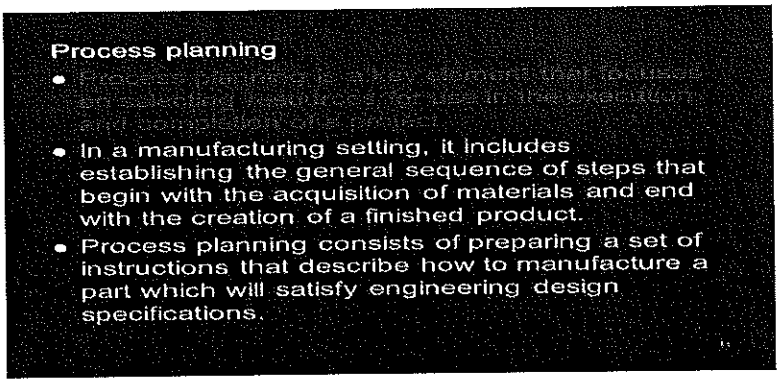


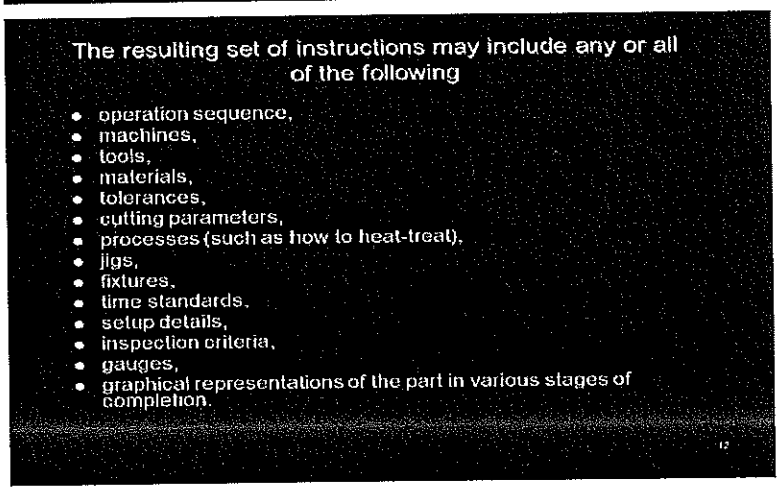
Section – C

04X06 = 24 Marks

15. Define Process Planning? Write down the set of instructions included in Process Planning?

Ans.





16. An industry is producing 100 motorcycle. The various costs involved are given below:
Direct labour : Rs. 50,000
Contract labour : Rs. 30,000
Material cost : Rs. 70,000
Coolant cost : Rs. 10,000
Cutting tool : Rs. 5,000
Selling overhead : Rs. 10,000
Profit : 10% of total cost
Calculate (1) Prime cost (2) Work cost (3) Cost per unit

Ans. Prime cost = 50000 + 70000 = 120000

Work cost = 120000 + 30000 + 10000 + 5000 = 165000

Total cost = 165000 + 10000 = 175000

Profit = 175000 X 0.01 = 17500

Cost per unit = (175000 + 17500) / 100 = 1925

17. Define Standard time. Discuss the steps involved in developing Standard Time.

Ans.:

Standard Time: It's a catalogue of "normal time" values for different elements of jobs or for minute movements involved in different jobs.

This catalogue is prepared by compiling the timings of a number of standard elements

The necessity of preparing such a catalogue arose because, generally, similar elements or motions are involved in many jobs. Eg.: Drilling holes is a common feature in many machine shop jobs.

If time study is to be conducted every time it would consume a lot of time. Hence it is economical to use previously timed and compiled data known as standard data.

Steps:

Decide the range of applicability of standard data
Break the job into elements as constant and variable elements
Conduct time study for wide variety of jobs or family of jobs under different set of parameters and conditions
Summarize the data using a summary form
Classify data into constant and variable elements
Calculate average standard time for constant elements
Explore the job characteristics leading to variability in elements
A graph between normal time dimension of variable is plotted to obtain a smooth curve
Test the data for correctness and accuracy
Compile the standard data obtained

18. What are benefits of breaking the operations into small elements?

- Ans.: The objectives of breaking down to elements are
  - To Separate the productive and unproductive activities
  - To get clear , complete and accurate information
  - To calculate operator performance accurately
  - To get detailed work specification
  - To select the best method
  - To collect information to compile standard data

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SET-A

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1502 **Time: 2 Hour**

Course Name: Integrated CAD-CAM-CNC **Max. Marks: 50**

Instructions:

1. Attempt all questions.
2. Section A contains 10 Questions. Each question carries 1 Mark.
3. Section B contains 04 Questions. Each question carries 4 Marks.
4. Section C contains 04 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. Which of the following drive system is not used in Robotics?
   A. Hydraulic
   B. Pneumatic
   C. Electrical
   D. Manual

2.The use of computers to control the operation of production process is known as
   A. CAD
   B. CAE
   C. CAM
   D. CAPP

3. _____ is not a stage of PLM
   A. Design
   B. Introduction
   C. Decline
   D. Growth

4.Which of the following is the built in CAE software?
   A. Fanuc
   B. Siemens
   C. NASTRAN
   D. None of the above

5. Computer Integrated Manufacturing is_____
   A. Extension of CAM
   B. management philosophy
   C. a type of automation
   D. link between CAD and CAM

6. CNC drilling machine is considered to be a:
   A. Point to point controlled machine
   B. Straight line controlled machine
   C. Continuous line controlled machine
   D. Servo controlled machine
7. MasterCAM is a ----------
   A. Standalone CAM software
   B. Integrated CAM software
   C. Built In CAM software
   D. All of the above
8. In CNC programming, cutter radius compensation to left and right are specified by.
   A. G41 and G42 respectively
   B. G42 and G41 respectively
   C. G40 and G41 respectively
   D. G40 and G42 respectively
9. The number of moveable joints in the base, the arm, and the end effectors of the robot determines?
   A. Degrees of freedom
   B. Payload capacity
   C. Operational limits
   D. Flexibility
10. For generating a coons patch we require:
   A. A set of grid points on surface
   B. A set of control points
   C. Four bounding curves defining surface
   D. Two bounding curves and a set of grid control points

Section – B

04X04 = 16 Marks

11. Write down the full form of CAM and name the softwares which is used to achieve this in industry?
12. Define what are geometric primitives and also give 5 different examples of solid geometric primitives.
13. Write down any four differences between MATLAB and Python.
14. Explain how Excel is used to achieve CAPP in industries?

Section – C

04X06 = 24 Marks

15. Explain what you mean by CNC control system and give four examples of CNC control systems with their country of origin?
16. Explain the steps of FEM technique used for Computer Simulations of physical systems
17. Differentiate between modeling and drafting softwares with suitable examples.
18. Differentiate between DNC and CNC.

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Answer Key
Section – A

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   - A. Hydraulic
   - B. Pneumatic
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   - **D. Manual**

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B. G42 and G41 respectively

C. G40 and G41 respectively

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D. Two bounding curves and a set of grid control points

Section – B

04X04 = 16 Marks

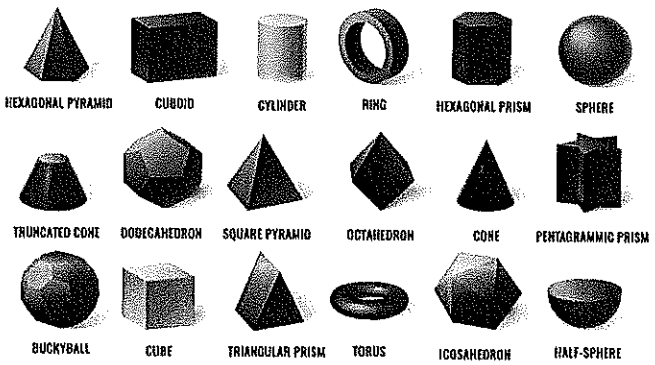
11.Write down the full form of CAM and name the softwares which are used to achieve this in industry?

Ans. Computer Aided Manufacturing (CAM) is the use of software and computer-controlled machinery to automate a manufacturing process.

MasterCAM is an example of one of this types of software.

12.Define what are geometric primitives and also give 5 different examples of solid geometric primitives?

Ans:geometric primitive (or prim) is the simplest (i.e. 'atomic' or irreducible) geometric shape that the system can handle (draw, store).All other graphic elements are built up from these primitives.



13.Write down any four differences between MATLAB and Python?

Ans: Two popular examples of CAE tools are

1. MATLAB
2. PYTHON

Python	MATLAB
1. It is a general purpose programming language	1. It is a commercial purpose programming language
2. It is mainly used for developing computer softwares and applications	2. It is mainly used for numerical computing and programming
3. Open source	3. owned by Mathswork.inc

14.Explain how Excel is used to achieve CAPP in industries?

Ans: CAPP is a linkage between the CAD and CAM module.Process planning is concerned with determining the sequence of individual manufacturing operations needed to produce a given part or product.The resulting operation sequence is documented on a form typically referred to as a "Route Sheet" (also called as process sheet/method sheet) containing a listing of the production operations and associated machine tools for a work part or assembly.

Section – C

04X06 = 24 Marks

15. Explain what you mean by CNC control system and give four examples of CNC control systems with their country of origin?

Ans: A CNC machine is run by a CNC control system. The control system consists of controller, servo motors, drives and feedback devices. The controller, servomotors and their drives come as a package called CNC control system, from one manufacturer only. Some of the leading global manufacturers of CNC control systems are:-

Fanuc (Japan)

Siemens (Germany)

Heidenhain (germany)

Mitsubishi (japan)

16. Explain the steps of FEM technique used for Computer Simulations of physical systems.

Ans: FEM stands for Finite Element analysis used for calculating forces and stresses on physical systems replicated virtually inside computers

Modeling of physical systems exactly in CAD

Dividing whole body into smaller parts known as meshing

Applying boundary conditions like forces,torques and pressure

Post Processing of results includes generating contours and graphs

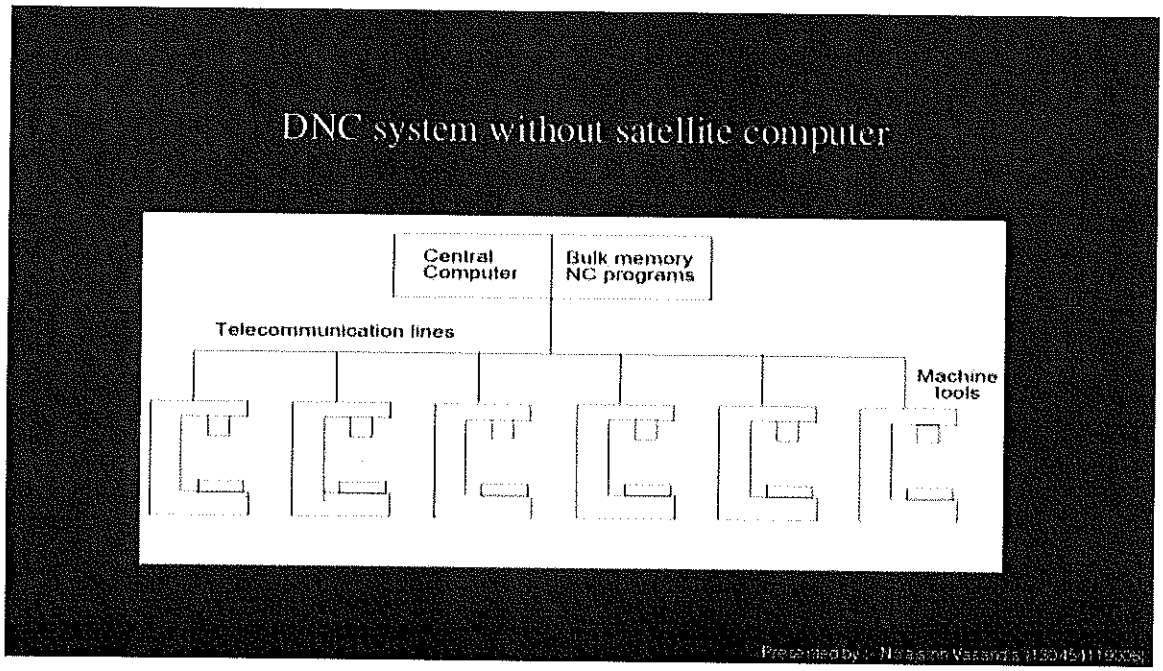
17. Differentiate between modeling and drafting softwares with suitable examples?

Ans: Modeling softwares: Used for generating 3D models e.g.: solidworks

Drafting softwares: used to generate 2D drawings.A popular example include AutoCAD from AutoDesk company

18. Differentiate between DNC and CNC?

Ans: CNC stands for computer numerical control, DNC stands for direct numerical control. In CNC, far off control of the operation is not possible, while in DNC facilitates far-flung control. CNC is transferring machine instruction, DNC controls the information distribution to a wide variety of machines.



SET-B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1502 **Time: 2 Hour**

Course Name: Integrated CAD-CAM-CNC **Max. Marks: 50**

Answer Key
Section – A

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A. CAD

B. CAE

C. CAM

D. CAPP

3. _____ is not a stage of PLM

A. Design

B. Introduction

C. Decline

D. Growth

4.Meshing is a process

A. of reducing infinite to finite degree of freedom

B. of increasing finite to infinite degree of freedom

C. which is dependent on the material

D. cutting the object into small parts

5. Computer Integrated Manufacturing is_____

A. Extension of CAM

B. management philosophy

C. a type of automation

D. link between CAD and CAM

6. Typical canned drilling cycle is specified by

A. G74

B. G78

C. G83

D. G85

7. MasterCAM is a ----------

A. Standalone CAM software

B. Integrated CAM software

C. Built In CAM software

D. All of the above

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Section – B

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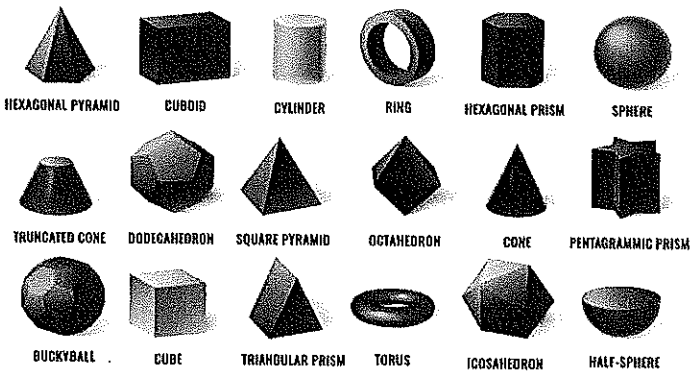
12.Define what are geometric primitives and also give 5 different examples of solid geometric primitives?

Ans:geometric primitive (or prim) is the simplest (i.e. 'atomic' or irreducible) geometric shape that the system can handle (draw, store).All other graphic elements are built up from these primitives.



13.Write down any four differences between MATLAB and Python?

Ans: Two popular examples of CAE tools are

1. MATLAB
2. PYTHON

Python	MATLAB
1. It is a general purpose programming language	1. It is a commercial purpose programming language
2. It is mainly used for developing computer softwares and applications	2. It is mainly used for numerical computing and programming
3. Open source	3. owned by Mathswork.inc

14.Explain how Excel is used to achieve CAPP in industries?

Ans: CAPP is a linkage between the CAD and CAM module.Process planning is concerned with determining the sequence of individual manufacturing operations needed to produce a given part or product.The resulting operation sequence is documented on a form typically referred to as a "Route Sheet" (also called as process sheet/method sheet) containing a listing of the production operations and associated machine tools for a work part or assembly.

Section – C

04X06 = 24 Marks

15. Explain what you mean by CNC control system and give four examples of CNC control systems with their country of origin ?

Ans: A CNC machine is run by a CNC control system. The control system consists of controller, servo motors, drives and feedback devices. The controller, servomotors and their drives come as a package called CNC control system, from one manufacturer only. Some of the leading global manufacturers of CNC control systems are:-

Fanuc (Japan)
Siemens (Germany)
Heidenhain (germany)
Mitsubishi (japan)

16. Explain the steps of FEM technique used for Computer Simulations of physical systems

Ans: FEM stands for Finite Element analysis used for calculating forces and stresses on physical systems replicated virtually inside computers

Modeling of physical systems exactly in CAD

Dividing whole body into smaller parts known as meshing

Applying boundary conditions like forces,torques and pressure

Post Processing of results includes generating contours and graphs

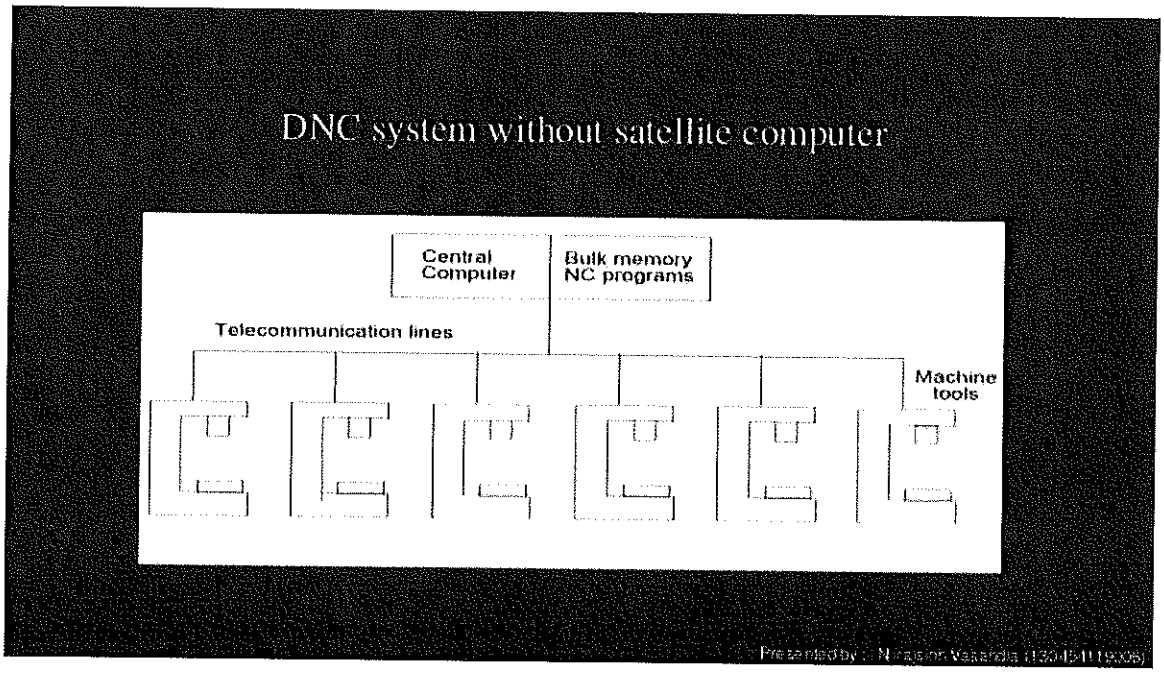
17. Differentiate between modeling and drafting softwares with suitable examples?

Ans: Modeling softwares: Used for generating 3D models e.g.: solidworks

Drafting softwares: used to generate 2D drawings.A popular example include AutoCAD from AutoDesk company

18. Differentiate between DNC and CNC?

Ans: CNC stands for computer numerical control, DNC stands for direct numerical control. In CNC, far off control of the operation is not possible, while in DNC facilitates far-flung control. CNC is transferring machine instruction, DNC controls the information distribution to a wide variety of machines.



BHARTIYA SKILL DEVELOPMENT UNIVERSITY

SET-A

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1504 **Time: 2 Hour**

Course Name: Project work **Max. Marks: 50**

Instructions:

1. Attempt all questions.
2. Section A contains 10 Questions. Each question carries 1 Mark.
3. Section B contains 04 Questions. Each question carries 4 Marks.
4. Section C contains 04 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. In Pert/CPM, the burst event represents _____two or more events.
   a) Splitting
   b) Joining
   c) Beginning
   d) Completion
2. What is the particular task performance in CPM known as?
   a) Dummy
   b) Event
   c) Activity
   d) Contract
3. The critical path
   a) Is a path that operates from the starting node to the end node
   b) Is a mixture of all paths
   c) Is the longest path
   d) Is the shortest path
4. What happens when a project is scheduled by CPM?
   a) A project is divided into various activities
   b) Required time for each activity is established
   c) A sequence of various activities is made according to their importance
   d) All of the above
5. "Risk" is usually _____ as the project progresses.
   a) Increased
   b) Reduced
   c) Remained Same
   d) Become Negligible
6. In the initial stage of the project the probability of completing the project is ___.
   a) Zero

b) High
c) Low
d) Medium

7. Feasibility study determines ----------
   a) Whether the project is possible with resources
   b) Comparing the project with world class manufacturing norms
   c) Calculate the cost crashing each unit
   d) Add duration to each unit
8. Risk in project management is defined as
   a) An uncertain event that, if it occurs, has a positive effect on project objectives
   b) An uncertain event that, if it occurs, has a negative effect on project objectives
   c) An uncertain event that, if it occurs, has a positive or negative effect on project objectives
   d) An uncertain event that do not have any effect on project objectives
9. The basic nature of a project is a _____ one.
   a) Permanent
   b) temporary
   c) a) or b)
   d) Both a) and b)
10. The project phase model was introduced. Which of the following phases is typically not part of project execution? (Mark only one answer)
    a) Conception & Initiation
    b) Performance & Control
    c) Launch or Execution
    d) Project Close

Section – B

04X04 = 16 Marks

11. Who is project manager and what are the roles and responsibilities?
12. Define what project contract is.
13. What are the Project planning referring to defining fundamentals?
14. What is project management and explain 6 P's?

Section – C

04X06 = 24 Marks

15. What are the different tools that simplify project planning and explain any one with example?
16. Discuss the curve propagation of large project via different phase timings with proper diagram?
17. Explain about the project organization structure with help of diagram.
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Activity	Predecessor	Duration (Days)
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B	A	4
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BHARTIYA SKILL DEVELOPMENT UNIVERSITY

SET-A

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1504 **Time: 2 Hour**

Course Name: Project work **Max. Marks: 50**

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Section – B

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11. Who is project manager and what are the roles and responsibilities?

- Project manager are the one who ensure that the entire process of project management flows in controlled.
- Manager in other words they are majorly responsible for driving a project through various phases of project management in an effective yet organized manner.
- Project manager also shoulder the
  - ✓ responsibility of the entire project scope
  - ✓ project team management
  - ✓ risk estimation
  - ✓ Also with the various resources needed in the project.
- As a project manager you will have a number of roles and responsibilities to perform.

Roles and responsibilities of a project manager

- Planning
- Leadership
- Time management
- Budget planning
- Customer Satisfaction
- Handling project risks
- Monitoring development
- Create repot

12. Define what project contract is.

- **Contract** is an agreement between two or more parties, to exchange providing a specific work (Scope of Work) with agreed compensations (mainly cost and/or any

others specified in the contract) include terms and conditions. The Contract terms and conditions including both parties' obligation, liability, payment, and other terms and conditions are legally binded. The Contract dispute settlement process and change management work process are a part of contract. In addition to being a signed document.

13. What are the Project planning refers to defining fundamentals

Determine scope, cost and resources

- The process of determining the scope, cost and resources help in estimating the time required to complete the project, the number of people needed and with what skillset
- Work breakdown structure (WBS) helps in the above process by dividing the whole task into smaller manageable segments

Identification of the problem

- A variety of techniques, such as conduct surveys or meetings are used to collect information to assess problems
- There can be multiple problems; then, the project team works upon to select the issue that requires immediate attention.

Define project objectives

- A plan is made keeping in mind the various expectations of the stakeholder
- The success of the project entirely depends on how much of the expectations can the project meet

14. What is project management and explain 6 P's.

- Application of processes, methods, knowledge, skill and experience to achieve objectives of a unique project is known as project management.
- It helps in properly carrying out all the processes involved, starting from the conception till completion of the project.

Proper Planning Prevents Poor Project Performance

Section – C

04X06 = 24 Marks

15. What are the different tools that simplify project planning and explain any one with example?

Gantt chart

- Gantt chart, today are an industry standard that helps in tracking both time and interdependencies between tasks
- Gantt charts are an essential tool to show different phases, jobs, and resources involved in project management

Critical path method

- Critical path method (CPM) is a crucial tool for determining the progress of the project to ensure that the project is on schedule

- Critical path method helps in determining the essential or critical path by finding out the longest stretch of dependent tasks

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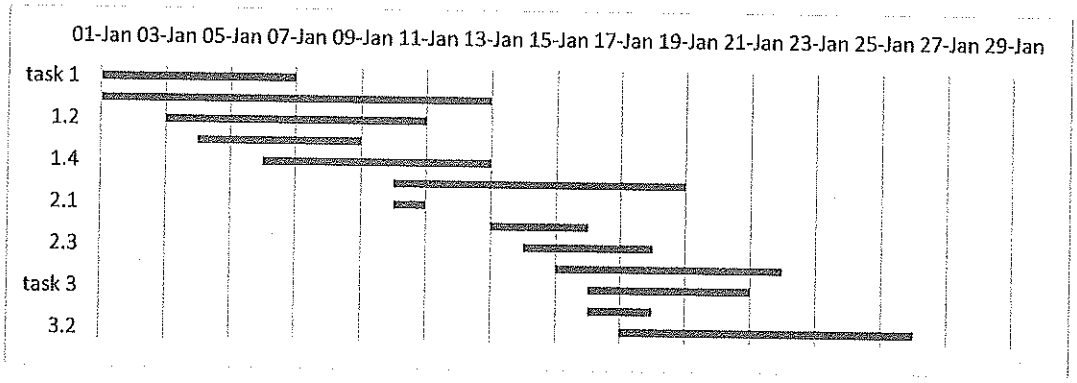
- The program Evaluation and review technique (PERT) helps in analyzing the tasks to complete the project and the time required to complete those tasks
- PERT simplifies the planning and scheduling of large and complex projects

Work Breakdown Structure

- WBS is a process of organizing the Team's work into manageable sections
- WBS is a hierarchal structure of complete the project

Gant chart example:



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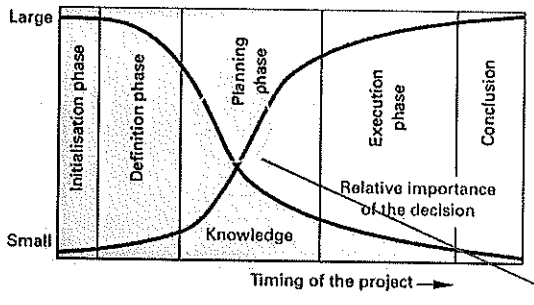


Figure 4: Influence of the decisions and knowledge on the project

Relativ importance of the decision:

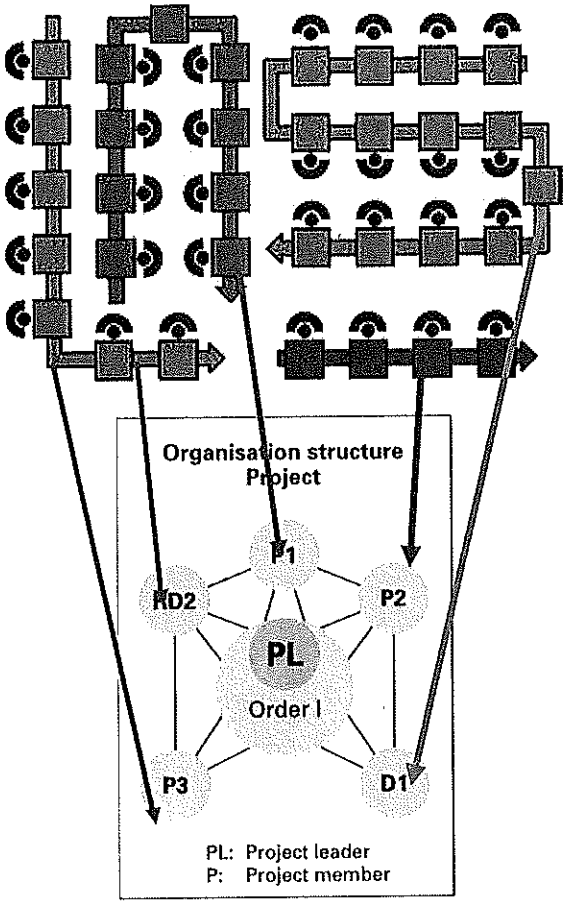
In the start of a project the **importance of decisions is always biggest** with the **least amount of knowledge.**

Gain of knowledge:

The **gain of knowledge** in project comes **with the progress we make in a project.**

Ideal moment for signing the **Project Contract!!**

17. Explain about the project organization structure with help of diagram.

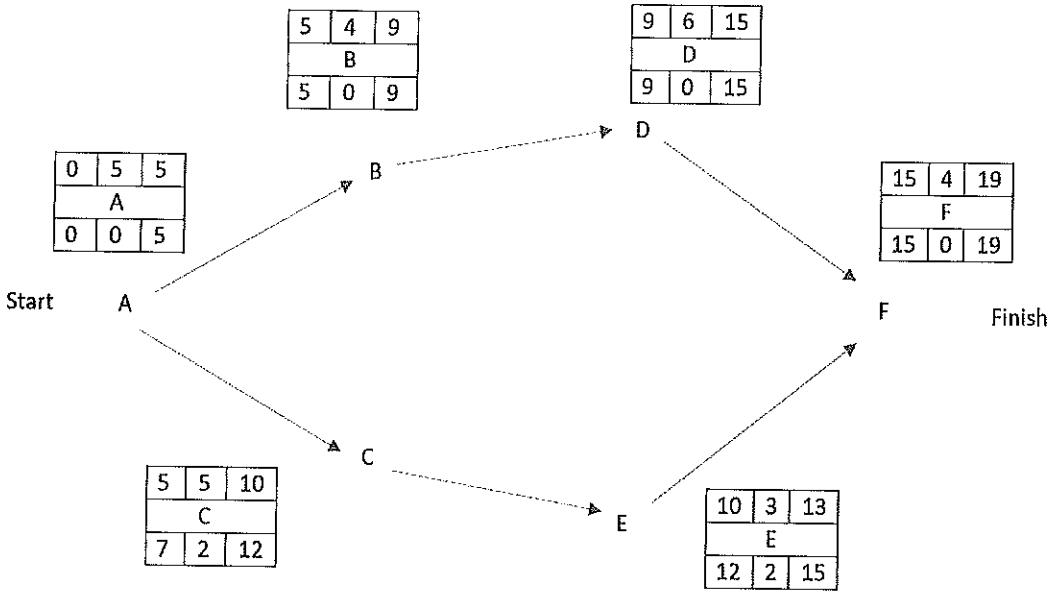


The STAR Model, developed by Gina Rae Foster at Lehman College/CUNY in 2009, presents an approach to project management and the development of essential capacities for personal and professional success.

18. Do CPM (critical path method) analysis and identify the critical path of project.

Activity	Predecessor	Duration (Days)
A	–	5
B	A	4
C	A	5
D	B	6
E	C	3
F	D,E	4

Ans.



The critical path is A-B-D-F

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

SET-B

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1504 **Time: 2 Hour**

Course Name: Project work **Max. Marks: 50**

Instructions:

1. Attempt all questions.
2. Section A contains 10 Questions. Each question carries 1 Mark.
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Section – A

10X01 = 10 Marks

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   a) A project is divided into various activities
   b) Required time for each activity is established
   c) A sequence of various activities is made according to their importance
   d) All of the above
4. People participated in a project or affected by a project activities are known as
   a) Stockholders
   b) Stakeholders
   c) project team
   d) project managers
5. "Risk" is usually _____ as the project progresses.
   a) Increased
   b) Reduced
   c) Remained Same
   d) Become Negligible
6. Which stage of project management life cycle requires the maximum time of completion
   a) Conceptualization

b) Planning
c) Execution
d) Estimation

7. Feasibility study determines ----------
   a) Whether the project is possible with resources
   b) Comparing the project with world class manufacturing norms
   c) Calculate the cost crashing each unit
   d) Add duration to each unit
8. Conflict occurrence in projects is
   a) Unavoidable
   b) Depend on type of project
   c) Avoidable
   d) Depends on culture
9. Assembling project team and assigning their responsibilities are done during which phase of a project management?
   a) Initiation
   b) Planning
   c) Execution
   d) Closure
10. The review of the successes and the mistakes is normally held during _____ phase.
   a) Initiation
   b) planning
   c) execution
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Section – B

04X04 = 16 Marks

11. What is project management and explain 6 P's.
12. Who is project manager and what are the roles and responsibilities?
13. Write Advantages of project management?
14. Write the name of three typical project risks and to take a suitable risk reduction measure for each risk.

Section – C

04X06 = 24 Marks

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18. What are the different tools that simplify project planning and explain any one with example?

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

SET-B

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1504 **Time: 2 Hour**

Course Name: Project work **Max. Marks: 50**

Answer Key

Section – A

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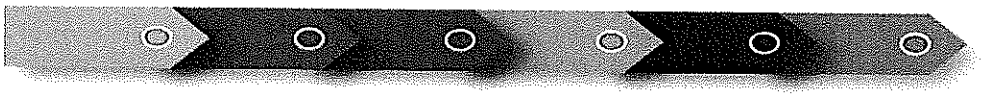

Proper **P**lanning **P**revents **P**oor **P**roject **P**erformance

12. Who is project manager and what are the roles and responsibilities?
    - Project manager are the one who ensure that the entire process of project management flows in controlled.
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    - As a project manager you will have a number of roles and responsibilities to perform.

Roles and responsibilities of a project manager

- Planning

- Leadership
- Time management
- Budget planning
- Customer Satisfaction
- Handling project risks
- Monitoring development
- Create repot

13. Write Advantages of project management?

The following advantages speak for the application of project management in the process of solving complex tasks:

- Good integration of different specialists and thus different competencies in mixed project teams,
- Achieving greater creativity and innovativeness in the problem-solving process,
- Achieve better responsiveness to changing customer needs (compared to line organization),
- Optimal use of available resources to solve problems,
- Achieving a better identification with the objectives for complex projects and so on.

14. Write the name of three typical project risks and to take a suitable risk reduction measure for each risk.

Project risks – typical project risks

- Over-optimistic timing and budget plan Example of risk reduction measure: Planning of reserves/extra resources in the project contract (similar measure to reduce the risk is also valid)
- Loss of key employees due to illness, leaving the company Risk reduction measure: Planning of reserves/extra resources in the project contract (similar measure to reduce the risk is also valid)
- Non-compliance with agreed deadlines Risk reduction measure: Precise reporting and monitoring of the progress of the Project (similar measure to reduce the risk is also valid)
- Conflict between team members Risk reduction measure: Addressing conflicts early and solution-oriented in team Meetings (similar measure to reduce the risk is also valid)
- Lack of support of management Risk reduction measure: Write interim reports, using examples to point out the importance of the project. (similar measure to reduce the risk is also valid)
- Lack of acceptance among potential users of the product Risk reduction measure: Carry out experiments on the customers at an early stage.Design aspects of the product in such a way that the customers want the product. (similar measure to reduce the risk is also valid)
- Technological feasibility such as limited material properties or size Risk reduction measure: Recognize and recommend early termination of the project
- Legal risk such as product liability Risk reduction measure: Know legal aspects of the area of interest. Derive responsibilities for product safety from this, adhere to them in the product and record them in the user manual.

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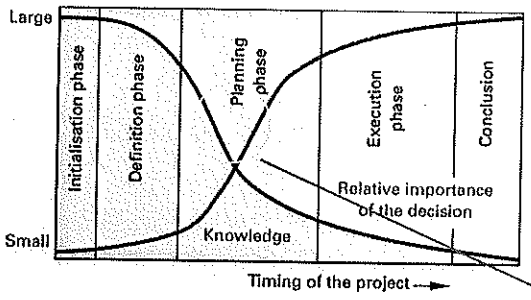
Section – C

04X06 = 24 Marks

15. Discuss the curve propagation of large project via different phase timings with proper diagram?



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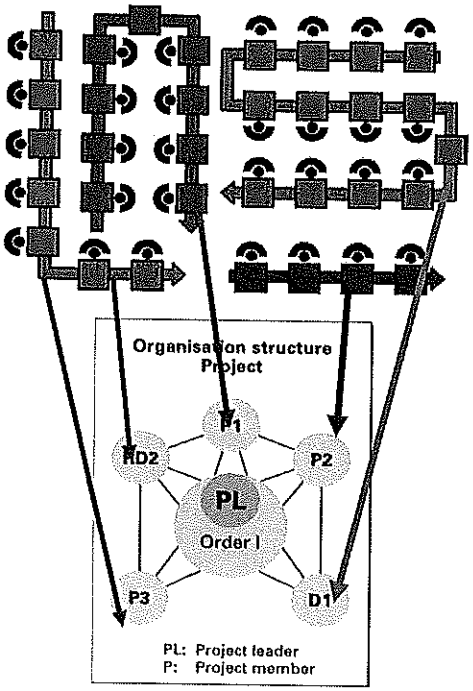

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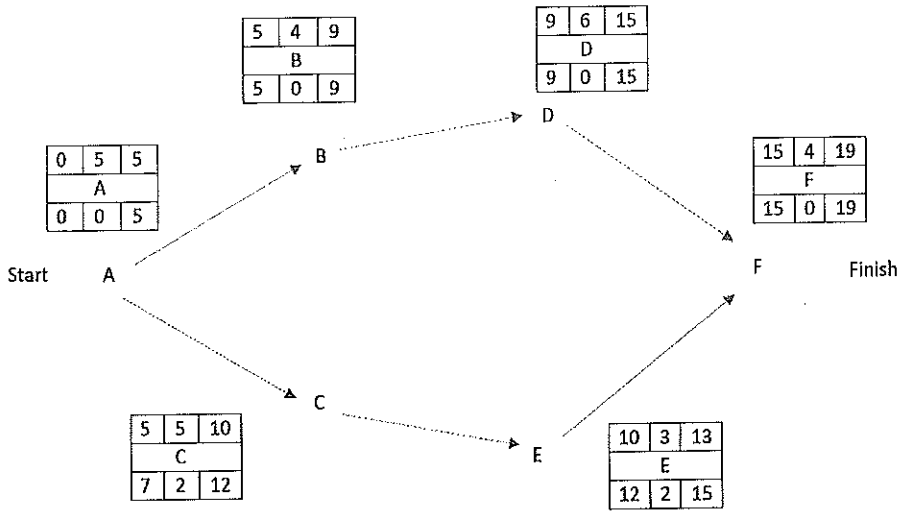

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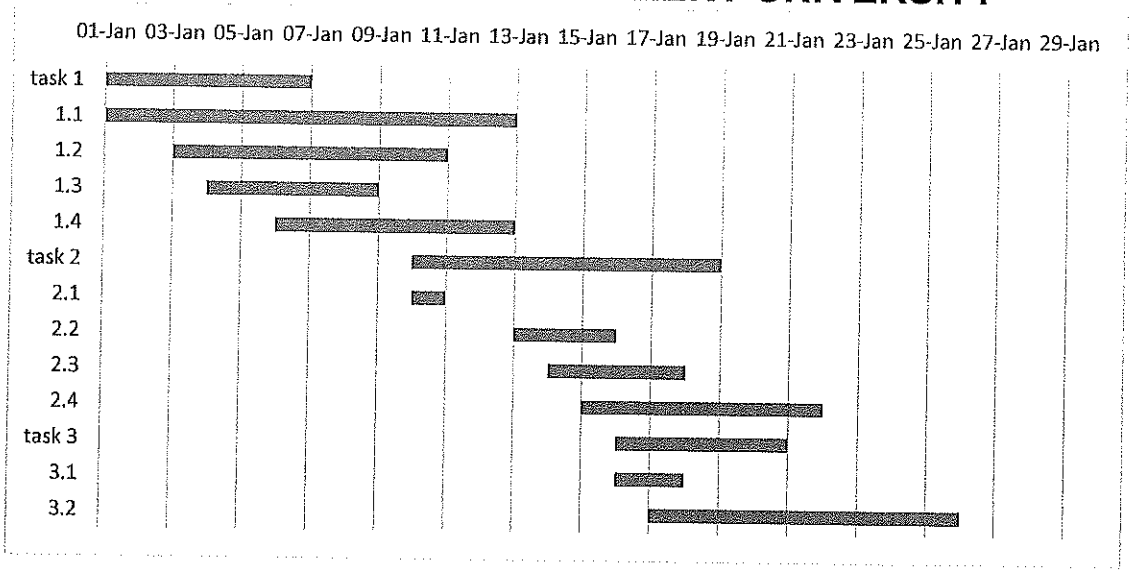
Gant chart example:

BHARTIYA SKILL DEVELOPMENT UNIVERSITY



BHARTIYA SKILL DEVELOPMENT UNIVERSITY

SET-A

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1505 **Time: 2 Hour**

Course Name: Quality Management **Max. Marks: 50**

Instructions:

1. Attempt all questions.
2. Section A contains 10 Questions. Each question carries 1 Mark.
3. Section B contains 04 Questions. Each question carries 4 Marks.
4. Section C contains 04 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. Seven QC tools include
   A. Team meetings & 5-S
   B. Deming 14 points approach
   C. Workers' toolkit
   D. Histogram
2. Dock Inspection is called.
   A. Incoming Inspection
   B. Final Inspection
   C. In process Inspection
   D. BOP Inspection
3. ISO 9000 determines
   A. If the company practices its written procedures
   B. If vendors are performing well
   C. Process capability
   D. The kind of control chart to be used
4. For Attribute data which chart is prepared?
   A. X bar Chart
   B. Range Chart
   C. P chart
   D. None of the above
5. Which of the following is not among 7 QC tools?
   A. Check sheet
   B. Histogram
   C. Kanban
   D. Pareto chart

6. Which generic approach's precursor is the Toyota Production System?
   A. Kaizen
   B. TQM
   C. Lean manufacturing
   D. Six sigma

7. 80/20 Rules is applicable for
   A. Pareto Charts
   B. Fishbone Diagram
   C. To define the OEE
   D. PFMEA

8. A six sigma process has defect level below _____ defects per million opportunities.
   A. 3.4
   B. 4.3
   C. 5.6
   D. 6.0

9. The cause and effect diagram is also called
   A. Stratification analysis
   B. Total quality management
   C. PDCA technique
   D. Fishbone diagram

10. Which of the following is correct in context to Inspection?
    A. It is a way to prevent the production of bad items
    B. Inspection adds to the cost of the product but not for its value
    C. Fatigue and Monotony don't affect any inspection judgment
    D. None of the above

Section – B

04X04 = 16 Marks

11. What is COPQ? Define Appraisal and prevention cost.
12. Write down purpose of inspection.
13. When assignable causes are identified in a process, explain with an example?
14. Differentiate between Quality control & Quality assurance with practical example.

Section – C

04X06 = 24 Marks

15. Explain Pareto chart with appropriate example.
16. Name the 7 QC tool. Explain the fishbone diagram with neat & clean Sketch.
17. What are the different types of waste in Lean manufacturing & define them?
18. Write at least six characteristics of quality circle.

BSDU

SET-A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1505 **Time: 2 Hour**

Course Name: Quality Management **Max. Marks: 50**

Answer Key

Section – A

10X01 = 10 Marks

1. Seven QC tools include
   D. Histogram
2. Dock Inspection is called.
   B. Final Inspection
3. ISO 9000 determines
   A. If the company practices its written procedures
4. For Attribute data which chart is prepared?
   C. P chart
5. Which of the following is not among 7 QC tools?
   C. Kanban
6. Which generic approach's precursor is the Toyota Production System?
   A. Kaizen
7. 80/20 Rules is applicable for
   A. Pareto Charts
8. A six sigma process has a defect level below _____ defects per million opportunities.
   A. 3.4
9. The cause and effect diagram is also called
   D. Fishbone diagram
10. Which of the following is correct in context to Inspection?
    B. Inspection adds to the cost of the product but not for its value

Section – B

04X04 = 16 Marks

11. What is COPQ? Define Appraisal and prevention cost.

Ans.

Those costs that are generated as a result of producing defective material. This cost includes the cost involved in fulfilling the gap between the desired and actual product/service quality. It also includes the cost of lost opportunity due to the loss of resources used in rectifying the defect. This cost includes all the labour cost, rework cost, disposition costs, and material costs that have been added to the unit up to the point of rejection. COPQ does not include detection and prevention cost.

12. Write down purposes of inspection.

Ans.

(1) To distinguish good lots from bad lots

(2) To distinguish good pieces from bad pieces.

(3) To determine if the process is changing.

(4) To determine if the process is approaching the specification limits.

13. When assignable causes are identified in a process? Explain with example.

Ans. When there is some inconsistency in process operation.

For example, a breakfast cereal packaging line may be designed to fill each cereal box with 500 grams of product, but some boxes will have slightly more than 500 grams, and some will have slightly less, in accordance with a distribution of net weights. If the production process, its inputs, or its environment changes (for example, the machines doing the manufacture begin to wear) this distribution can change. For example, as its cams and pulleys wear out, the cereal filling machine may start putting more cereal into each box than specified. If this change is allowed to continue unchecked, more and more product will be produced that fall outside the tolerances of the manufacturer or consumer, resulting in waste. While in this case, the waste is in the form of "free" product for the consumer, typically waste consists of rework or scrap.

14. Differentiate between Quality control & Quality assurance with a practical example.

Ans.

- **Quality Control**: "A part of quality management focused on fulfilling quality requirements".
- **Quality Control** is defined as "The operational techniques and activities used to fulfil requirements for quality".
- **Quality Assurance**: "A part of quality management focused on providing confidence that quality requirements will be fulfilled
- **Quality Assurance** is defined as "All the planned and systematic activities implemented within the quality system that can be demonstrated to provide confidence that a product or service will fulfil requirements for quality".

Section – C

04X06 = 24 Marks

15. Explain the Pareto chart with appropriate example.

Ans.

A Pareto diagram, also called 80/20 rule, is used to graphically abridge and display the relative significance of the differences between clusters of data i.e., separating the vital few causes (20%) that account for a dominant share of quality loss (80%) (Besterfield, 2001). The Pareto diagram is based on the Pareto principle, which states that few of the defects account for most of the effects.

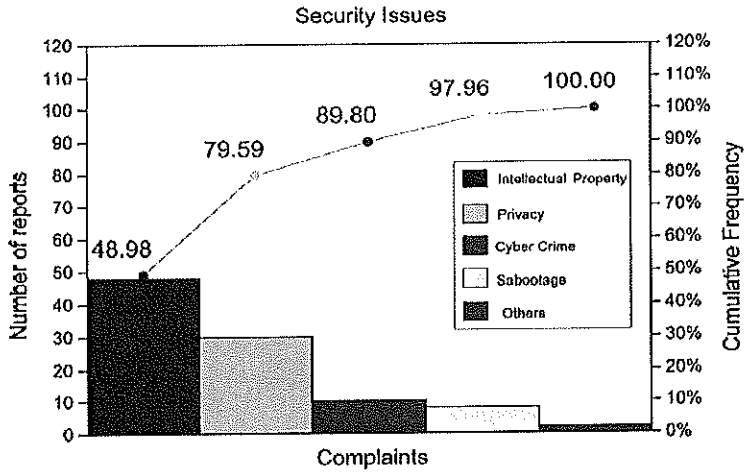


Figure 4 Pareto diagram used to prioritize the security issues

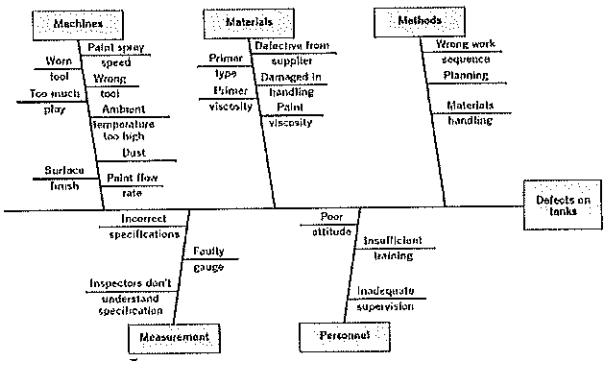
16. Name the 7 QC tool. Explain the fishbone diagram with neat & clean Sketch.

Ans.

- Histogram or stem-and-leaf plot
- Check sheet
- Pareto chart
- Cause-and-effect diagram
- Defect concentration diagram
- Scatter diagram
- Control chart

Fishbone Diagram Steps:

1. Define the problem or effect to be analyzed.
2. Form the team to perform the analysis. Often the team will uncover potential
3. causes through brainstorming.
4. Draw the effect box and the center line.
5. Specify the major potential cause categories and join them as boxes connected to
6. the center line.
7. Identify the possible causes and classify them into the categories in step 4. Create
8. new categories, if necessary.
9. Rank order the causes to identify those that seem most likely to impact the problem.
10. Take corrective action.



17. What are the different types of waste in Lean manufacturing & define them?

Ans.

- unnecessary transportation;
- excess inventory;
- the unnecessary motion of people, equipment or machinery;
- waiting, whether it is people waiting or idle equipment;
- over-production of a product;
- over-processing or putting more time into a product than a customer needs, such as designs that require high-tech machinery for unnecessary features; and
- defects, which require effort and cost for corrections.
- Waste of unused talent and ingenuity.

18. Write at least six characteristics of the quality circle.

Ans.

- Volunteers
- Set Rules and Priorities
- Decision made by consensus
- Members of a circle need to receive training
- Support of senior management required
- Members need to be empowered

SET-A

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1507 | **Time: 2 Hour**

Course Name: MultiAxis Machining | **Max. Marks: 50**

Answer Key

Section – A

10X01 = 10 Marks

1. Power transmission component includes
   a) Belts
   b) Shaft
   c) Couplings
   d) All of the above
2. Joining elements include:
   a) Pins
   b) Snap-fits
   c) Both a & b
   d) None of the above
3. Electric motors are driven by _____ forces.
   a) Ferromagnetic
   b) Electromagnetic
   c) Gamma
   d) External
4. Asynchronous motor is an ___ induction motor.
   a) AC
   b) DC
   c) Water
   d) Gas
5. Basic Components of CNC Controllers are
   a) Power Supply unit
   b) Circuitry protection unit
   c) Motor driver unit
   d) All of the above
6. Rapid Feed rate of STAR SB-20R for X, Y and Z axes is_____
   a) 35000 mm/min
   b) 35000m/min
   c) 35000mm/rev
   d) 20 m/min
7. Maximum machining Diameter of STAR SB-20R is
   a) 20 mm

b) 18 mm
c) 25 mm
d) 30 mm

8. Maximum Drilling Capability of STAR SB-20R for stationary tool is
   a) 20 mm
   b) 18 mm
   c) 25 mm
   d) 35 mm
9. Maximum spindle speed of STAR SB-20R is
   a) 15000 rpm
   b) 20000 rpm
   c) 10000 rpm
   d) 12000 rpm
10. What is operational mode of STAR SB-20R?
   a) Left Handed
   b) Right Handed
   c) Neutral
   d) Both a and b

Section – B

04X04 = 16 Marks

11. Write down the main difference between synchronous and Asynchronous electric motor.

Ans. **Synchronous motor:**

Synchronous motor is a motor that operates at synchronous speed, i.e., speed of the rotor is equal to the stator speed of the motor.

Asynchronous motor:

Asynchronous motor is an AC Induction motor. The rotor of the Asynchronous motor rotates at the speed less than the synchronous speed

12. Write down the various popular controllers in use.

Ans. 1) Fanuc 21M
2) Sinumerik Operate 840D
3) Heidenhain TNC426

13. Name the various functional units of STAR SB-20R.

Ans.
A) Guide Bush
B) Back Attachment
C) Back -4 spindle
D) Head Stock
E) Tool Post

14. Write down the capacity and major specifications of STAR SB-20R.

Ans.

Item		Specifications
Maximum machining diameter		Φ 20 mm
Maximum headstock stroke	Guide bush version	205 mm
	Non-guide bush version	50 mm
Maximum drilling capability	Stationary tool	Φ 20 mm
	Power driven tool	Φ 5 mm Φ 6 mm & Φ 7 mm
Maximum tapping capability	Stationary tool	M 10x P1.5
	Power driven tool	M 5 x P0.5, M6x P1.0
Maximum milling capability		Φ 7 mm, Φ 10 mm

Section – C

04X06 = 24 Marks

15. What do you mean by functional units of a machine tool? Name the various functional units of a CNC lathe.

Ans. 1) Drive Units
2) Power transmission Units
3) Work units
4) Supporting and holding components
5) Joints and fastening units
6) Measuring and control units
7) Units for environmental protection, disposal and safety at work.

16. Describe in brief about various types of five axis machining centers along with their application.

Ans. **1) Rotary table + Pivot Spindle Head**

This machine design is effective for tall workpieces and for cylindrical parts with holes around the periphery.

2) Double rotary table

This is the best machine for the use of long tools or extensions. It is also effective for cylindrical parts with a ring of holes in one face.

3) Double Pivot Spindle Head

This machine is effective for parts that are rectangular instead of round.

4) Rotary Table + Table Trunnion

This machine can take relatively deep cuts for its size.

17. Write down the differences between Five axis machining and (3+2) axis machining?

Ans. **5-Axes Machining**

1. Also called continuous or simultaneous 5-axis machining involves continuous adjustments of the cutting tool along all five axes to keep the tip optimally perpendicular to the part.

2. Machining is faster.
3. Movement at higher speed results in increased wear rate as well as greater need for part crash detection hence it is more difficult from programming point of view.

(3+2) Axes Machining

1. Also called positional 5-axis machining involves executing 3-axis program with cutting tool locked at an angle determined by the two rotational axes. Machining that involves reorienting the tool bit along the rotational axes between cuts is called '5-axis indexed' though it still counts 3+2.
2. Machining is relatively slow due to stopping and starting between each reorientation of the tool.
3. Part programming is relatively simpler.

18. Provide details of various Power transmission units of STAR SB-20R.

Ans.

Item			Specifications	Remarks
Power supply [redacted]	Voltage		3 phase, 200Vac±10%	
	Frequency		50/60Hz ±1Hz	
	Capacity	SB-12R	Load run average power: 4.5KVA	Power supply capacity of the machine body only
		SB-16R/ 20R [redacted]	Load run average power: 3.7KVA [redacted]	
Main circuit breaker	Machine		Rated current: 30A Rated shutdown capacity: Icu/Ics: 2.5/1kA	QF001
	External transformer		Rated current: 20A Rated shutdown capacity: Icu/Ics: 2.5/1kA	Transformer [0G492]
			Rated current: 20A Rated shutdown capacity: Icu/Ics: 7.5/4kA	Transformer CE Marking Version [0T497]
Leakage current			5mA	
Electric circuit diagram No.			10171/**-***	Included with the machine **-*** is an edition number

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

SET-B

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1505 **Time: 2 Hour**

Course Name: Quality Management **Max. Marks: 50**

Instructions:

1. Attempt all questions.
2. Section A contains 10 Questions. Each question carries 1 Mark.
3. Section B contains 04 Questions. Each question carries 4 Marks.
4. Section C contains 04 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. Which of the following statement is correct?
   A. R – charts are to control the central tendency of the process
   B. R – charts are to control the dispersion of the process
   C. R – charts are to control the mean of the process
   D. B & C both
2. HEIJUNKA stands for:
   A. Production stop
   B. Production start
   C. Production leveling
   D. Mass production
3. 80/20 Rules is applicable for
   A. Pareto Charts
   B. Fishbone Diagram
   C. To define the OEE
   D. PFMEA
4. A six sigma process has defect level below _____ defects per million opportunities.
   A. 3.4
   B. 4.3
   C. 5.6
   D. 6.0
5. Which generic approach's precursor is the Toyota Production System?
   A. Kaizen
   B. TQM
   C. Lean manufacturing
   D. Six sigma

6. Which of the following is correct in context to Inspection?
   A. It is a way to prevent the production of bad items
   B. Inspection adds to the cost of the product but not for its value
   C. Fatigue and Monotony don't affect any inspection judgment
   D. None of the above

7. Which of the following is not among 7 QC tools?
   A. Check sheet
   B. Histogram
   C. Kanban
   D. Pareto chart

8. The cause and effect diagram is also called
   A. Stratification analysis
   B. Total quality management
   C. PDCA technique
   D. Fishbone diagram

9. ISO 9000 determines
   A. If the company practices its written procedures
   B. If vendors are performing well
   C. Process capability
   D. The kind of control chart to be used

10. Seven QC tools include
   A. Team meetings & 5-S
   B. Deming 14 points approach
   C. Workers' toolkit
   D. Histogram

Section – B

04X04 = 16 Marks

11. What is TPS? Explain.
12. Write down purpose of inspection.
13. What is COPQ? Define Appraisal and prevention cost.
14. Differentiate between Quality control & Quality assurance with practical example.

Section – C

04X06 = 24 Marks

15. Name the 7 QC tool. Explain the fishbone diagram with neat & clean Sketch.
16. What are the different types of waste in Lean manufacturing & define them?
17. Explain Pareto chart with appropriate example.
18. Write at least six characteristics of quality circle.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

SET-B

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1505 **Time: 2 Hour**

Course Name: Quality Management **Max. Marks: 50**

Answer Key

Section – A

10X01 = 10 Marks

1. Which of the following statement is correct?
   A. R – charts are to control the dispersion of the process
2. HEIJUNKA stands for:
   C. Production leveling
3. 80/20 Rules is applicable for
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8. The cause and effect diagram is also called
   D. Fishbone diagram
9. ISO 9000 determines
   A. If the company practices its written procedures
10. Seven QC tools include
    D. Histogram

Section – B

04X04 = 16 Marks

11. What is TPS? Explain.

Ans.

TPS is based on two concepts: JIDOKA and just-in-time. JIDOKA, a Japanese term that can be translated as "automation with a human touch" is a method for quickly identifying and correcting any issues that could lead to faulty production. Just-in-time is about refining and coordinating each production process so that it only produces what is required by the next process in the sequence. By applying these concepts, we are able to produce vehicles quickly and efficiently, every one meeting our high quality standards and our customers' individual requirements.

12. Write any two purposes of inspection.

Ans.

(1) To distinguish good lots from bad lots

(2) To distinguish good pieces from bad pieces.

(3) To determine if the process is changing.

(4) To determine if the process is approaching the specification limits.

13. What is COPQ? Define Appraisal and prevention cost.

Ans.

Those costs that are generated as a result of producing defective material. This cost includes the cost involved in fulfilling the gap between the desired and actual product/service quality. It also includes the cost of lost opportunity due to the loss of resources used in rectifying the defect. This cost includes all the labour cost, rework cost, disposition costs, and material costs that have been added to the unit up to the point of rejection. COPQ does not include detection and prevention cost.

14. Differentiate between Quality control & Quality assurance with a practical example.

Ans.

- **Quality Control**: "A part of quality management focused on fulfilling quality requirements".
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Section – C

04X06 = 24 Marks

15. Name the 7 QC tool. Explain the fishbone diagram with neat & clean Sketch.

Ans.

- Histogram or stem-and-leaf plot
- Check sheet
- Pareto chart
- Cause-and-effect diagram
- Defect concentration diagram
- Scatter diagram
- Control chart

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Ans.

- unnecessary transportation;
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17. Explain the Pareto chart with appropriate example.

Ans.

A Pareto diagram, also called 80/20 rule, is used to graphically abridge and display the relative significance of the differences between clusters of data i.e., separating the vital few causes (20%) that account for a dominant share of quality loss (80%) (Besterfield, 2001). The Pareto diagram is based on the Pareto principle, which states that few of the defects account for most of the effects.

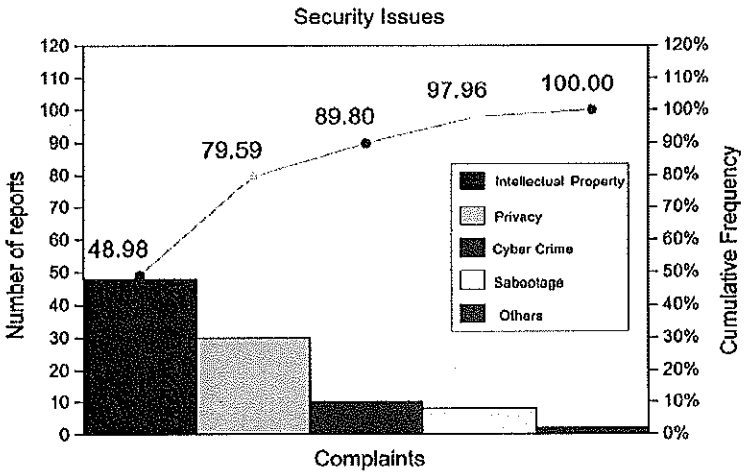

Figure 4 Pareto diagram used to prioritize the security issues

18. Write at least six characteristics of the quality circle.

Ans.

- Volunteers
- Set Rules and Priorities
- Decision made by consensus
- Members of a circle need to receive training
- Support of senior management required
- Members need to be empowered

Fishbone Diagram Steps:

1. Define the problem or effect to be analyzed.
2. Form the team to perform the analysis. Often the team will uncover potential
3. causes through brainstorming.
4. Draw the effect box and the center line.
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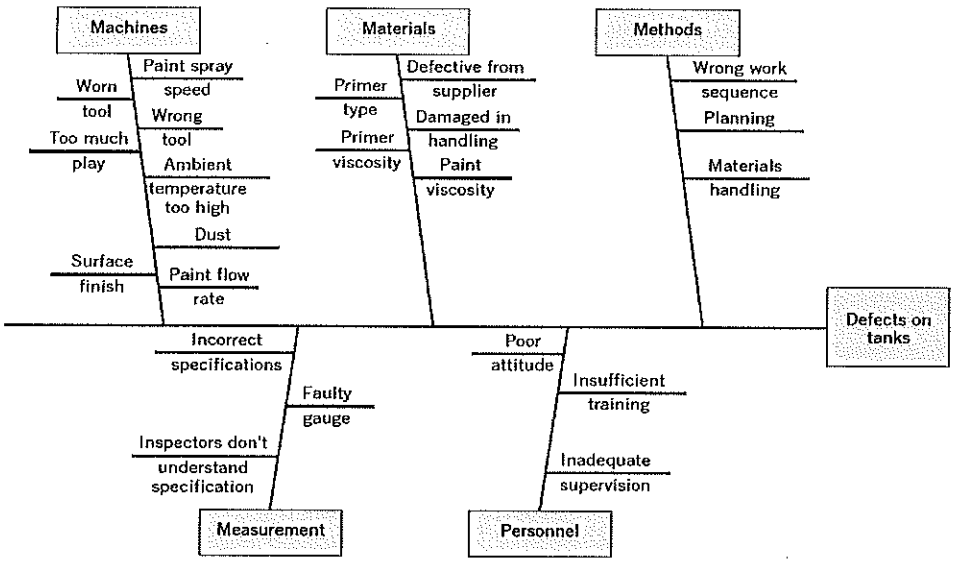


BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1507 **Time: 2 Hour**

Course Name: Multiaxis Machining **Max. Marks: 50**

Instructions:

1. Attempt all questions.
2. Section A contains 10 Questions. Each question carries 1 Mark.
3. Section B contains 04 Questions. Each question carries 4 Marks.
4. Section C contains 04 Questions. Each question carries 6 Marks.

Section - A

10X01 = 10 Marks

1. Power transmission component includes
   a) Belts
   b) Shaft
   c) Couplings
   d) All of the above
2. Joining elements include:
   a) Pins
   b) Snap-fits
   c) Both a & b
   d) None of the above
3. Electric motors are driven by _____ forces.
   a) Ferromagnetic
   b) Electromagnetic
   c) Gamma
   d) External
4. Asynchronous motor is an ___ induction motor.
   a) AC
   b) DC
   c) Water
   d) Gas
5. Basic Components of CNC Controllers are
   a) Power Supply unit
   b) Circuitry protection unit
   c) Motor driver unit
   d) All of the above

6. Rapid Feed rate of STAR SB-20R for X, Y and Z axes is_____
   a) 35000 mm/min
   b) 35000m/min
   c) 35000mm/rev
   d) 20 m/min
7. Maximum machining Diameter of STAR SB-20R is
   a) 20 mm
   b) 18 mm
   c) 25 mm
   d) 30 mm
8. Maximum Drilling Capability of STAR SB-20R for stationary tool is
   a) 20 mm
   b) 18 mm
   c) 25 mm
   d) 35 mm
9. Maximum spindle speed of STAR SB-20R is
   a) 15000 rpm
   b) 20000 rpm
   c) 10000 rpm
   d) 12000 rpm
10. What is operational mode of STAR SB-20R?
    a) Left Handed
    b) Right Handed
    c) Neutral
    d) Both a and b

Section – B

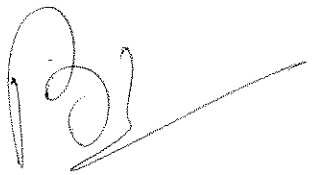
04X04 = 16 Marks

11. Write down the main difference between synchronous and Asynchronous electric motor.
12. Write down the various popular controllers in use.
13. Name the various functional units of STAR SB-20R.
14. Write down the capacity and major specifications of STAR SB-20R.

Section – C

04X06 = 24 Marks

15. What do you mean by functional units of a machine tool? Name the various functional units of a CNC lathe.
16. Describe in brief about various types of five axis machining centers along with their application.
17. Write down the differences between Five axis machining and (3+2) axis machining?
18. Provide details of various Power transmission units of STAR SB-20R.



SET-B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1507 **Time: 2 Hour**

Course Name: MultiAxis Machining **Max. Marks: 50**

Instructions:

1. Attempt all questions.
2. Section A contains 10 Questions. Each question carries 1 Mark.
3. Section B contains 04 Questions. Each question carries 4 Marks.
4. Section C contains 04 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. Rapid Feed rate of STAR SB-20R for X, Y and Z axes is_____
   a) 35000 mm/min
   b) 35000m/min
   c) 35000mm/rev
   d) 20 m/min
2. Maximum machining Diameter of STAR SB-20R is
   a) 20 mm
   b) 18 mm
   c) 25 mm
   d) 30 mm
3. Maximum Drilling Capability of STAR SB-20R for stationary tool is
   a) 20 mm
   b) 18 mm
   c) 25 mm
   d) 35 mm
4. Maximum spindle speed of STAR SB-20R is
   a) 15000 rpm
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   d) 12000 rpm
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   a) Left Handed
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   d) Both a and b
6. Electric motors are driven by _____ forces.
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   d) All of the above
9. Power transmission component includes
   a) Belts
   b) Shaft
   c) Couplings
   d) All of the above
10. Joining elements include:
    a) Pins
    b) Snap-fits
    c) Both a & b
    d) None of the above

Section – B

04X04 = 16 Marks

11. Name the various functional units of STAR SB-20R.
12. Write down the capacity and major specifications of STAR SB-20R.
13. Write down the main difference between synchronous and Asynchronous electric motor.
14. Write down the various popular controllers in use.

Section – C

04X06 = 24 Marks

15. Describe in brief about various types of five axis machining centers along with their application.
16. Provide details of various Power transmission units of STAR SB-20R.
17. What do you mean by functional units of a machine tool? Name the various functional units of a CNC lathe.
18. Write down the differences between Five axis machining and (3+2) axis machining?

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, V Semester,

End-Sem. Examination

Course Code: SMS1507 **Time: 2 Hour**

Course Name: Multiaxis Machining **Max. Marks: 50**

Answer Key

Section – A

10X01 = 10 Marks

1. Rapid Feed rate of STAR SB-20R for X, Y and Z axes is_____
   a) 35000 mm/min
   b) 35000m/min
   c) 35000mm/rev
   d) 20 m/min
2. Maximum machining Diameter of STAR SB-20R is
   a) 20 mm
   b) 18 mm
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3. Maximum Drilling Capability of STAR SB-20R for stationary tool is
   a) 20 mm
   b) 18 mm
   c) 25 mm
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   b) 20000 rpm
   c) 10000 rpm
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   a) Left Handed
   b) Right Handed
   c) Neutral
   d) Both a and b
6. Electric motors are driven by _____ forces.
   a) Ferromagnetic
   b) Electromagnetic
   c) Gamma
   d) External
7. Asynchronous motor is an ___ induction motor.
   a) AC

b) DC
c) Water
d) Gas

8. Basic Components of CNC Controllers are
   a) Power Supply unit
   b) Circuitry protection unit
   c) Motor driver unit
   d) All of the above

9. Power transmission component includes
   a) Belts
   b) Shaft
   c) Couplings
   d) All of the above

10. Joining elements include:
   a) Pins
   b) Snap-fits
   c) Both a & b
   d) None of the above

Section – B

04X04 = 16 Marks

11. Name the various functional units of STAR SB-20R.

Ans.
a) Guide Bush
b) Back Attachment
c) Back -4 spindle
d) Head Stock
e) Tool Post

12. Write down the capacity and major specifications of STAR SB-20R.

Ans.

Item		Specifications
Maximum machining diameter		Φ 20 mm
Maximum headstock stroke	Guide bush version	205 mm
	Non-guide bush version	50 mm
Maximum drilling capability	Stationary tool	Φ 20 mm
	Power driven tool	Φ 5 mm Φ 6 mm & Φ 7 mm
Maximum tapping capability	Stationary tool	M 10x P1.5
	Power driven tool	M 5 x P0.5, M6x P1.0
Maximum milling capability		Φ 7 mm, Φ 10 mm

13. Write down the main difference between synchronous and Asynchronous electric motor.

Ans. **Synchronous motor:**

Synchronous motor is a motor that operates at synchronous speed, i.e., speed of the rotor is equal to the stator speed of the motor.

Asynchronous motor:

Asynchronous motor is an AC Induction motor. The rotor of the Asynchronous motor rotates at the speed less than the synchronous speed

14. Write down the various popular controllers in use.

Ans. 1) Fanuc 21M

2) Sinumerik Operate 840D

3) Heidenhain TNC426

Section – C

04X06 = 24 Marks

15. Describe in brief about various types of five axis machining centers along with their application.

Ans. **1) Rotary table + Pivot Spindle Head**

This machine design is effective for tall workpieces and for cylindrical parts with holes around the periphery.

2) Double rotary table

This is the best machine for the use of long tools or extensions. It is also effective for cylindrical parts with a ring of holes in one face.

3) Double Pivot Spindle Head

This machine is effective for parts that are rectangular instead of round.

4) Rotary Table + Table Trunnion

This machine can take relatively deep cuts for its size.

16. Provide details of various Power transmission units of STAR SB-20R.

Ans.

Item			Specifications	Remarks
Power supply [redacted]	Voltage		3 phase, 200Vac±10%	
	Frequency		50/60Hz ±1Hz	
	Capacity	SB-12R	Load run average power: 4.5KVA	Power supply capacity of the machine body only
		SB-16R/ 20R [redacted]	Load run average power: 3.7KVA [redacted]	
Main circuit breaker	Machine		Rated current: 30A Rated shutdown capacity: Icu/Ics: 2.5/1kA	QF001
	External transformer		Rated current: 20A Rated shutdown capacity: Icu/Ics: 2.5/1kA	Transformer [0G492]
			Rated current: 20A Rated shutdown capacity: Icu/Ics: 7.5/4kA	Transformer CE Marking Version [0T497]
Leakage current			5mA	
Electric circuit diagram No.			10171/**_***	Included with the machine **_*** is an edition number

17. What do you mean by functional units of a machine tool? Name the various functional units of a CNC lathe.

Ans. 1) Drive Units
2) Power transmission Units
3) Work units
4) Supporting and holding components
5) Joints and fastening units
6) Measuring and control units
7) Units for environmental protection, disposal and safety at work.

18. Write down the differences between Five axis machining and (3+2) axis machining?

Ans. **5-Axes Machining**

1. Also called continuous or simultaneous 5-axis machining involves continuous adjustments of the cutting tool along all five axes to keep the tip optimally perpendicular to the part.
2. Machining is faster.
3. Movement at higher speed results in increased wear rate as well as greater need for part crash detection hence it is more difficult from programming point of view.

(3+2) Axes Machining

1. Also called positional 5-axis machining involves executing 3-axis program with cutting tool locked at an angle determined by the two rotational axes. Machining that involves reorienting the tool bit along the rotational axes between cuts is called '5-axis indexed' though it still counts 3+2.
2. Machining is relatively slow due to stopping and starting between each reorientation of the tool.
3. Part programming is relatively simpler.