



**BHARTIYA SKILL DEVELOPMENT UNIVERSITY**  
**SCHOOL OF MANUFACTURING SKILLS**  
**5<sup>th</sup> SEMESTER, 2<sup>nd</sup> In-SEMESTER EXAMINATION**  
**WINTER SEMESTER, B.VOC. PROGRAM**  
**SESSION 2018-2019**

**Course Code: SMS1504**

**Course Name: 3D Measurement**

**Time (Minutes): 60**

**Maximum Marks: 20 Marks**

**Instructions:**

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 5 Questions. Each question carries 1 Mark.
4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

**Section-A**

1. The carbon percentage range in steel is.  
(a) 4.5% to 6%      (b) 0.1% to 2%      (c) 3% to 8.7%      (d) None of these.
2. What is the crystal structure of austenite?  
(a) BCT      (b) BCC      (c) FCC      (d) BCC & BCT
3. What is the lower critical temperature of steel?  
(a) 720°C      (b) 721°C      (c) 722°C      (d) 723°C
4. Name the microstructure type of quenched steel.  
(a) Martensite      (b) Ferrite      (c) Cementite      (d) Pearlite
5. What is the range of heating temperature in spheroidizing annealing?  
(a) 680°C to 750°C      (b) 720°C to 870 C      (c) 500°C to 1070°C      (d) 723°C to 900°C

**Section- B**

6. Write the significance of iron carbon equilibrium diagram.
7. Why recrystallization annealing is done for steels?
8. Write any two annealing defects.

**Section- C**

9. Explain the microstructure of steel for following-
  - a) With less than 0.8% carbon.
  - b) With more than 0.8% carbon.
10. Write any four types of heat treatment process and explain any two.
11. What are hardening distortion and hardening cracks? Explain.





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**Answer – Sheet**

**Section-A**

**(05 x 01 = 05)**

1. Write the carbon percentage range in steel.

**Ans. (b) 0.1 % to 2 %.**

2. What is the crystal structure of austenite?

**Ans. (c) FCC**

3. What is the lower critical temperature of steel?

**Ans. (d) 723°C**

4. Name the microstructure type of quenched steel.

**Ans. (a) Martensite**

5. What is the range of heating temperature in spheroidizing annealing?

**Ans. (a) 680°C to 750°C**

**Section- B**

**(03 x 02 = 06)**

6. Write the significance of iron carbon equilibrium diagram.

**Ans.** The iron-carbon phase diagram provides an overview of which type of microstructure a ferrous material with a certain carbon content has, at specific temperature.

7. Why recrystallization annealing is done for steels?

**Ans.** Recrystallization annealing (Process annealing) is used if a microstructure is deformed by cold forming has to be returned to its undistorted microstructure state. A completely new microstructure is formed over several hours of annealing at 550°C to 650°C.



8. Write any two annealing defects.

**Ans. Annealing defects**

- Non-compliance with annealing temperature and annealing times leads to unforeseen microstructure transformation.
- If the annealing temperature is exceeded by a significant amount for an extend period of time, it can damage or destroy the material.

**Section- C**

**(03 x 03 = 09)**

9. Explain the microstructure of steel for following-

- a) With less than 0.8% carbon.
- b) With more than 0.8% carbon.

**Ans.**

- Steel with less than 0.8 % carbon have a microstructure that contain ferrite and pearlite grains. This is referred to as ferrite- pearlite microstructure.
- Steel with more than 0.8 % carbon contain so much carbon that, besides the lamellar cementite in the pearlite grains, cementite is also deposited at the grain boundaries.

The greater the amount of cementite in the microstructure, the harder, but also more brittle, the steel.

10. Write any four types of heat treatment process and explain any two.

**Ans.**

- I. Annealing** is a heat treatment that consists of slow heating, holding at an annealing temperature and slow cooling.  
Annealing processes differ according to the annealing temperature and the duration of the annealing.
- II. Hardening** consists of several working steps. The workpiece is first heated to the hardening temperature and then held at this temperature. It is then quenched, i.e. immersed in water or oil. This makes the steel very hard, but also brittle and fragile. As a result, the workpiece is then tempered, i.e. heated to the tempering temperature. The workpiece is then air cooled. This gives steel its customary hardness.
- III. Skin hardening**
- IV. Case hardening**

11. What are hardening distortion and hardening cracks? Explain.

**Ans.**

Hardened workpieces displays changes in dimension and form, so-called hardening distortion. Particularly abrupt quenching may even lead to hardening cracks. Hardening distortion and hardening cracks form in two phases: During immersion in the quenching agent, the skin zone cools very quickly and decreases in size as a result. The core is still hot and retain its original size, which prevents the skin zone from shrinking. This leads to stresses, distortion or cracks at the boundaries.



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**WINTER SEMESTER, B.VOC. PROGRAM**  
**SESSION 2018-2019**

**Course Code: SMS1503**

**Course Name: Quality Management**

**Time (Minutes): 60**

**Maximum Marks: 20 Marks**

**Instructions:**

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 5 Questions. Each question carries 1 Marks.
4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

**Section-A**

1. Which generic approach's precursor is the Toyota Production System?
  - A. Kaizen
  - B. TQM
  - C. Lean manufacturing
  - D. Six sigma
  
2. The project phase model was introduced. Which of the following phases is typically not part of project management?
  - A. Conception & Initiation
  - B. Definition & Planning
  - C. Launch or Execution
  - D. Project Close
  
3. Which of the following undertakings can be called a "Project"?
  - A. Production of the Mobile Phone "Samsung Galaxy J7 Star".
  - B. Work at the cash checkout in the "Reliance Smart" shop in Jaipur (Elements Mall).
  - C. Planning and execution of the reforestation of the lost forest areas due to the urbanization in industrialized nations.
  - D. Playing on the mobile phone during the lectures in Project Management.



4. Pareto charts is applicable for
  - A. 80/20 rules
  - B. For root cause analysis
  - C. To define the OEE
  - D. None of the above
5. Dock Inspection is called.
  - A. Incoming Inspection
  - B. Final Inspection
  - C. In process Inspection
  - D. BOP Inspection

#### **Section- B**

6. Define the six sigma.
7. In the very start of the lecture the term "Project" was defined by two different sentences. Reproduce one of them or explain the term "Project" with your own words.
8. What is ISO 9001:2015?

#### **Section- C**

9. What are the different type of wastes in Lean manufacturing & define them?
10. In the classroom the acronym S.M.A.R.T. was discussed. Explain the a) purpose of the acronym and b) define the meaning of each letter.
11. Name the 7 QC tool. Explain the fishbone diagram with neat & clean Sketch.



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**3<sup>rd</sup> SEMESTER, 2<sup>nd</sup> In-SEMESTER EXAMINATION**  
**WINTER SEMESTER, B.VOC. PROGRAM**  
**SESSION 2018-2019**

**Course Code:** SMS1503  
**Time (Minutes):** 60

**Course Name:** Quality Management  
**Maximum Marks:** 20 Marks

**Instructions:**

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**Answer – Sheet**

**Section-A**

**(05 x 01 = 05)**

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

**Ans. (c)** Lean manufacturing

2. The project phase model was introduced. Which of the following phases is typically not part of project management?
  - A. Conception & Initiation
  - B. Definition & Planning
  - C. Launch or Execution
  - D. Project Close

**Ans. (c)** Lean manufacturing

3. Which of the following undertakings can be called a "Project"?
  - A. Production of the Mobile Phone "Samsung Galaxy J7 Star".
  - B. Work at the cash checkout in the "Reliance Smart" shop in Jaipur (Elements Mall).
  - C. Planning and execution of the reforestation of the lost forest areas due to the urbanization in industrialized nations.
  - D. Playing on the mobile phone during the lectures in Project Management.



**Ans. (c) Lean manufacturing**

4. Pareto charts is applicable for
- A. 80/20 rules
  - B. For root cause analysis
  - C. To define the OEE
  - D. None of the above

**Ans. (A) 80/20 rules**

5. Dock Inspection is called.
- A. Incoming Inspection
  - B. Final Inspection
  - C. In process Inspection
  - D. BOP Inspection

**Ans. (B) Final Inspection**

### **Section- B**

**(03 x 02 = 06)**

6. Define the six sigma.

**Ans.** its statistical concept where a process only produces 3.4 defects per million opportunities (DPMO). Six Sigma is developed at Motorola in the 1980's. Six Sigma reduces the amount of defective products manufactured or services provided, resulting in increased revenue and greater customer satisfaction.

7. In the very start of the lecture the term "Project" was defined by two different sentences. Reproduce one of them or explain the term "Project" with your own words.

**Ans.** Definition Nb. 1

A project is defined as a "temporary endeavor with a beginning and an end and it must be used to create a unique product, service or result".

(ref: Project Management Body of Knowledge, 3rd edition)

Definition Nb. 2

Projects are undertakings that are characterized essentially by the uniqueness of the conditions that affect it as a whole.

(ref: DIN 69901-5 (2009-01))

Note: If the student explains the term "Project" with its own words. The **a)** unique character of the project and **b)** the temporarily boarder condition must be named.



8. What is ISO 9001:2015?

**Ans**

ISO 9001 is the latest revision of the ISO 9001 international standard that specifies for the Quality Management System. The 2015 revision has replaced 1so9001:2008. Organization that were certified to ISO 9001:2008 had until September 2018.

Benefits of the ISO 9001:2015

Internal Operational efficiency

Access to the new markets

Customer request

### Section- C

(03 x 03 = 09)

9. What are the different type of wastes in Lean manufacturing & define them?

**Ans.** In lean manufacturing there are seven type of wastes as given below

A. Overproduction:

Overproduction occurs when something is created before it is needed. overproduction the worst type of waste because it is very expensive, lowers quality and contributes to other types of waste, such as inventory and transport.

B. Transport

Any unnecessary movement of raw materials, works-in-progress or finished products contributes to the waste of transport. Not all transport is waste, of course, but moving items only when strictly necessary is a key goal of Lean organizations.

C. Inventory

One of the biggest advantages of modern point of sale and manufacturing technology is the ability for producers to create products only when doing so is dictated by demand.

D. Motion

The waste of transport is about unnecessary movement of items. The waste of motion, on the other hand, is about unnecessary movements of people. Poorly organized workspaces are frequent contributors to the waste of motion.

E. Waiting

The waste of waiting is idle time that happens when two interdependent processes are out of sync. A process may be stalled waiting for parts, instructions, workers, or repairs.

F. Over process

Over processing occurs when complex processes are used when a simple one would do. Over processing can also involve adding features to products that customers don't need. Another example of over processing is using expensive equipment that is not really necessary.

G. Defects

Defects are a very obvious form of waste. When a product or part can't be used for its intended purpose the cost of the resources and labor that went into its creation are lost.

H. Human potential

The waste of human potential is a recent addition to the list of Lean wastes. It is an important one. It involves the underutilization of talent.

10. In the classroom the acronym S.M.A.R.T. was discussed. Explain the a) purpose of the acronym and b) define the meaning of each letter.

Ans.

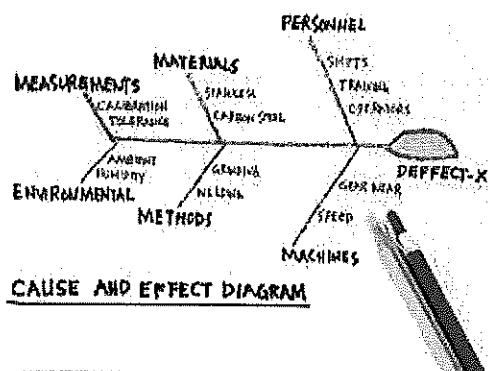
A) SMART is an acronym to guide in the setting of objectives and goals in project management.

- B)
- |          |                     |  |
|----------|---------------------|--|
| <i>S</i> | <i>Specific</i>     | – target a specific area for improvement.                                      |
| <i>M</i> | <i>Measurable</i>   | – quantify or at least suggest an indicator of progress.                       |
| <i>A</i> | <i>Achievable</i>   | – specify who will do it.  |
| <i>R</i> | <i>Realistic</i>    | – state what results can realistically be achieved, given available resources. |
| <i>T</i> | <i>Time-related</i> | – specify when the result(s) can be achieved.                                  |

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

Ans.

1. Check Sheet
2. Control Sheet
3. Flow chart
4. Fishbone diagram
5. Pareto chart
6. Histogram Chart
7. Scatter diagram





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**1<sup>st</sup> SEMESTER, FIRST IN-SEM. EXAMINATION**  
**WINTER SEMESTER, B.VOC. PROGRAM**  
**SESSION 2018-2019**

**Course Code: SMS1102**  
**Time (Minutes): 60**

**Course Name: Handskills**  
**Maximum Marks: 20**

**Instruction:**

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 05 Questions. Each question carries 1 Mark.
4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

**Section – A**

05X01 = 05 Marks

1. What would be the 'tap depth' formula for 'Through-out Tap' if thickness of work piece is H and tap diameter is d?
  - a)  $H+0.5d+3$
  - b)  $H+0.7d+3$
  - c)  $H+0.7d+0.3d+3$
  - d)  $H+0.3d+3$
2. What would be the procedure for reaming process?
  - a) Drill – core drill – reamer
  - b) Spot drill – drill – CSK – reamer
  - c) Spot drill – drill – CSK – core drill – reamer
  - d) None of the above
3. For in 'straight cut' and 'curved cut' configuration, which one has better chip evacuation in case of filling?
  - a) Both straight cut and curved cut
  - b) Curved cut
  - c) Straight cut
  - d) None of the above
4. What is the application of the anvil plate?
  - a) To support the work piece for scribing
  - b) To use as a base plate
  - c) To measure the angle
  - d) None of the above



5. What will be the sum of wedge angle, relief angle and rake angle?
- Less than  $90^\circ$
  - More than  $90^\circ$
  - Equal to  $90^\circ$
  - None of the above

**Section – B**

03X02 = 06 Marks

- Write the types of saw cut with figures.
- Describe the free cutting in sawing. Classify 3 types of Saw Blade with the help of sketches
- Differentiate between the 'cut file' and 'milled file'.

**Section – C**

03X03 = 09 Marks

- Derive the formula to calculate the chamfer value for Radius 'R' with a diagram.
- Write the formula of cutting speed. Also define its nomenclature with its unit. If cutting speed is 70 m/min and tool diameter is 5.5 mm then calculate RPM.
- Write short notes on following;
  - Drilling
  - Reaming
  - Tapping
  - Counter sinking



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**Course Code:** SMS1102  
**Time (Minutes):** 60

**Course Name:** Handskills  
**Maximum Marks:** 20

**Section – A**

1. What would be the 'tap depth' formula for 'Throughout Tap' if thickness of work piece is H and tap diameter is d? 1 Mark

- a)  $H+0.5d+3$
- b)  $H+0.7d+3$
- c)  $H+0.7d+0.3d+3$
- d)  $H+0.3d+3$

**Ans.** a.

2. What would be the procedure for reaming process? 1 Mark

- a) Drill – core drill – reamer
- b) Spot drill – drill – csk – reamer
- c) Spot drill – drill – csk – core drill – reamer
- d) None of the above

**Ans.** c.

3. For In 'straight cut' and 'curved cut' configuration, which one has better chip evacuation? 1 Mark

- a) Both straight cut and curved cut
- b) Curved cut
- c) Straight cut
- d) None of the above

**Ans.** b.

4. What is the application of the anvil plate? 1 Mark

**Ans.** b

5. None of the above what will be the sum of wedge angle, relief angle and rake angle? 1 Mark

- a) Less than  $90^\circ$
- b) More than  $90^\circ$
- c) Equal to  $90^\circ$
- d) None of the above

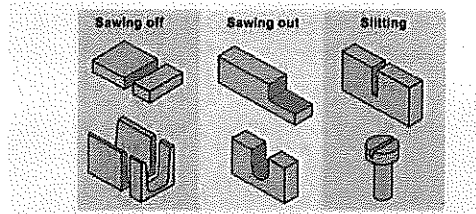
**Ans.** c.

Section – B

6. Write the types of saw cut with figures.

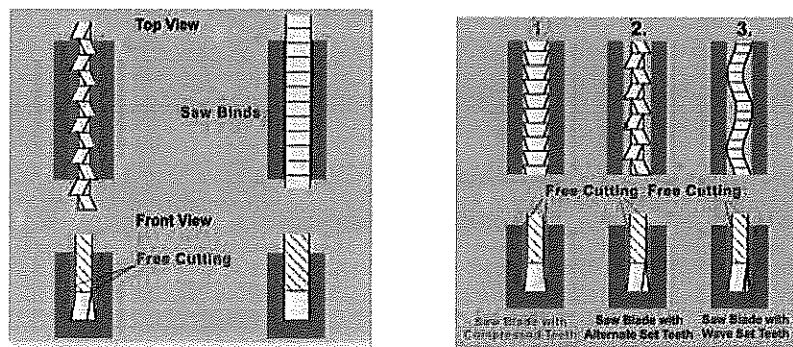
Ans.

There are three types of saw cuts –



7. Describe the free cutting in sawing. Classify 3 types of Saw Blade using sketch.

Ans. To prevent the saw blade from binding, the kerf must be wider than the thickness of the saw blade. If this is not the case, the saw blade will bind. Therefore, the saw blades are designed so that they cut themselves free.



Free cutting types:

- Compression of the teeth
- Alternation of the teeth
- Wave setting of the teeth

8. Write the differences between the 'cut file' and 'milled file'.

Ans.

**Cut file** – cut files are made by chiseling notches into the file face. This results in a file with a negative rake angle and a scraping effect. Therefore, cut files are preferred for hard materials.

**Milled file** – milled files are made by milling the cutting edge into the file face. Files with milled teeth have a positive rake angle, and therefore cut better than cut files. Milled files are especially suited for use on soft material

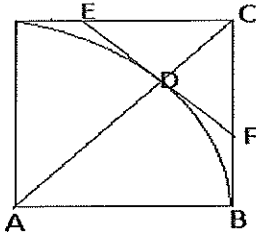


Section – C

03X03 = 09 Marks

9. Derive the formula to calculate the chamfer value for Radius R.

Ans.



In triangle ABC –

$$AB^2 + BC^2 = AC^2$$

$$AC = \sqrt{AB^2 + BC^2} = \sqrt{R^2 + R^2} = \sqrt{2R^2} = R\sqrt{2} = 1.414R$$

$$\text{Since, } AC = AD + DC ; \quad DC = AC - AD = 1.414R - R = 0.414R$$

In triangle CDF –

Since DC and DF are equal,

$$\text{Hence, } CF^2 = DC^2 + DF^2 = 0.414R^2 + 0.414R^2$$

$$CF = \sqrt{(0.414R^2 + 0.414R^2)} = 0.414R\sqrt{2} = 0.414R \times 1.414$$

$$CF = 0.58R$$

10. Write the formula of cutting speed .Also define its nomenclature with its unit. If cutting speed is 70 m/min and tool diameter is 5.5 mm then calculate the RPM.

Ans.

The formula of cutting speed is –

$$V_c = \pi DN / 1000,$$

Where,  $V_c$  = cutting speed in m/min

$D$  = diameter of tool/work piece in mm

$N$  = RPM

$$\text{With this formula, } 70 = 3.14 \times 5.5 \times N / 1000$$

$$N = 4053 \text{ rev/min}$$

11. Write short note on the following:

- a) Drilling                      b) Reaming                      c) Tapping                      d) CSK

Ans.

a) Drilling – It is a process of making hole onto the work piece.

b) Reaming – It is a process of enlarging a hole with high surface quality and within tolerance of 10 – 20 microns.

c) Tapping – It is a process of making internal thread with a special tool named 'tap'.

d) CSK – It is a process of making a conical shape at the entrance of the hole.

