# TUTOR MARKED ASSIGNMENT

## BME-008

## MACHINING TECHNOLOGY

**Maximum Marks : 100**
**Weightage : 30%**

**Course Code : BME-008**
**Last Date of Submission: Oct. 31, 2019**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Tool Machining Technology.

Q.1 (a) Name the different sources of heat generation in metal cutting. Show that for orthogond machining with zero rake angle tool, rate of heat generation in metal machining (PSDZ) can be expressed as

$$\frac{F_C V_C (j - \mu r_c)}{J}$$

Where,   $F_c$ = Cutting force
$V_c$ = Cutting speed
$\mu$   = Coefficient of friction
$r_c$ = Chip thickness ratio
J   = Mechanical equivalent of heat.

(b) Differentiate between abrasion and adhesion wear.

Q.2 (a) Write an equation that can express the effects of cutting speed, feed and depth of cut on tool life. Comment on their relative effect on tool life.

(b) Calculate the cutting speed at which the tool would work satisfactorily for 3 hours. Following data is available for the tool work combination:

Tool life = 2 hours, V = 4.5 m/min, n = 0.2

Q.3 (a) A grinding wheel carries the following marking:

39 – C – 120 – K – 4 –V

What does this signify?

(b) With the help of a suitable sketch describe the working and application of centreless grinding.

Q.4 (a) Explain the working principle of honing, lapping and super-finishing.

(b) Describe the burnishing operation. Give suitable application.

Q.5 (a) With the help of a suitable sketch, describe Abrasive Jet Machining (AJM). Give its process capabilities and applications.

Q.6 Explain in detail the process capabilities and applications of Ultrasonic Machining (USM).

Q.7 (a) With the help of a suitable sketch describe the mechanics of metal removal in Electric Discharge Machining (EDM). What are the elements of wire EDM machine tool?

Q.8 Write the working principle of LASER Beam Machining (LBM).

Q.9 Explain in detail the various criterion involved while selecting the cutting tool materials.

Q.10 Write short notes on the following:

(a) Dressing, Truing and Balancing of grind wheel

(b) Plasma Arc Cutting

# TUTOR MARKED ASSIGNMENT

## BME-009

### COMPUTER PROGRAMMING AND APPLICATION

**Maximum Marks : 100**                                    **Course Code: BME-009**
**Weightage : 30%**                          **Last Date of Submission: Oct. 31, 2019**

**Note :** All questions are compulsory and carry equal marks.

Q1  (a)  Find the real root of the equation
$$x^3 - 4x - 9 = 0$$
by bisection method correct to three decimal places.

   (b)  Find the real root of the equation
$$x = \frac{1}{(x+1)^2}$$
Correct to four decimal places.

Q2  (a)  Use Stirling's formula to find $U_{32}$ from the following table

$U_{20} = 14.035$, $U_{25} = 13.674$, $U_{30} = 13.257$
$U_{35} = 12.734$, $U_{40} = 12.089$, and $U_{45} = 11.309$

   (b)  Given the table of values

| $x$ | 50 | 52 | 54 | 56 |
|---|---|---|---|---|
| $\sqrt[3]{x}$ | 3.684 | 3.732 | 3.779 | 3.865 |

Use Lagranges formula to find x, when $\sqrt[3]{x} = 3.756$

Q3  (a)  Find the real root of the equation,
$$x^3 + 3x^2 - 3 = 0$$

by Newton Raphson's method correct to three decimal places.

(b) Solve the following systems of equation by using Cramer's rule.

$$3x_1 + 5x_2 = 8$$
$$-x_1 + 2x_2 - x_3 = 0$$
$$3x_1 - 6x_2 + 4x_3 = 1$$

Q4 Solve the given initial value problem by using Runge – Kutta method of order four:

$$\frac{dy}{dx} = \frac{y-x}{y+x}; \quad y(o) = 1 ;$$

Find y(0.5), using h = 0.25

Q5 Find approximate value of

$$I = \int_2^4 \frac{1}{4+3^x} dx$$

Using Simpson's 1/3rd rule taking $h = 0.5$

Q6 Write a C++ programme to calculate the factorial of an integer.

Q7 Write a C++ program which reads the values of A, B, and C (sides of a triangle) and computes the semi perimeters (s) and Area of the triangle. Also print A, B, C on one line, and s and area on the next line.

Q8 (a) Explain the difference between a class and a structure.
   (b) What is a derived data type? Give suitable example.

Q9 Given three numbers A, B, and C. Write a C++ programme to write their values in descending order.

Q10 (a) Write a C++ program to calculate and print the values of the function

$$f(x) = \frac{x^2 + 1.5 x + 5}{x-3}$$

for $x = -10\ to\ 10$
   $x$ should take values -10, -8, -6, …….. 6, 8, 10.

   (b) Write a C++ programme to input a number.
      If the number is even, print it's square, otherwise print its cube.

# TUTOR MARKED ASSIGNMENT

## BME-010

## TOOL ENGINEERING AND MANAGEMENT

**Maximum Marks : 100**
**Weightage : 30%**

**Course Code : BME-010**
**Last Date of Submission: Oct. 31, 2019**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Tool Engineering and Management.

Q.1 Differentiate between the following :

   (i)    Facing and Turning

   (ii)   Drilling and Trippanning

   (iii)  Broaching and Milling

   (iv)  Blanking and Punching

   (v)   Notching and Shaving

$(2 \times 5 = 10)$

Q.2 Describe the important characteristics and its applications of following tool materials :

   (i)    High Carbon Steel

   (ii)   High Speed Steel

   (iii)  Stellite

   (iv)  Carbide

   (v)   Ceramics

$(2 \times 5 = 10)$

Q.3 (a) State clamping principle. Describe the various types of clamps with its suitable application.

   (b) Explain with neat sketches the principle of indexing jig.

$(5 + 5 = 10)$

Q.4 List various types of fixtures. Also explain any three types of fixtures with its industrial applications.

(10)

Q.5 (a) What are various types of blanking and piercing dies? Explain in detail.

(b)   Briefly discuss various types of forming tools with neat sketch.

(5 + 5 = 10)

Q.6   (a)   What are the various types of hand tools used in foundry? Explain its detail.

(b)   Explain important types of mechanical tools used in foundary.

(5 + 5 = 10)


Q.7   (a)   What is the purpose of laying out the workpiece? Explain prick and centre punch in detail.

(b)   Explain laying out center hole. Discuss various steps involved in laying out centre hole using centre head.

(5 + 5 = 10)

Q.8   (a)   Describe the process of laying out internal and external radius.

(b)   What are the causes of accidents? Describe the various safety norms in the industry.

(5 + 5 = 10)

Q.9   (a)   What are the principle parameters in designing sideways? Design the sideways for machine tool.

(b)   Explain the design criteria for selection of materials for machine tool structure.

(5 + 5 = 10)

Q.10  (a)   What is process planning? Explain the significance of setup planning in process planning.

(b)   Explain in brief, the working of web-based virtual machine tool operations (WVMT).

(5 + 5 = 10)

# TUTOR MARKED ASSIGNMENT

## BME-011

## COMPUTER AIDED PROCESS PLANING

**Maximum Marks : 100**
**Weightage : 30%**

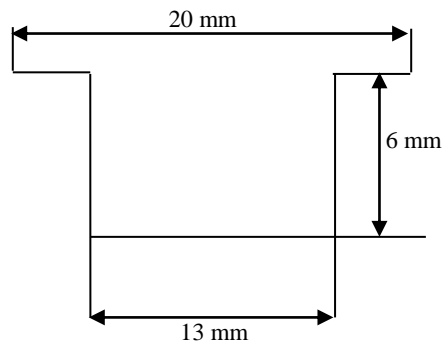**Course Code : BME-011**
**Last Date of Submission: Oct. 31, 2019**

**Note :** All questions are compulsory and carry equal marks.

Q.1 (a) Explain the various steps in process planning.

(b) What are the information required to decide the operation sequence ? Explaining them.

Q.2 (a) Explain in detail the working of Generative CAPP.

(b) Using Taylor's equation for tool wear, let n = 0.4 and c = 400. What is the percentage increase in tool life if the cutting speed is reduced by 20%?

Q.3 (a) Discuss the factors influencing the cutting tool selection.

(b) Explain all the seven parameters of tool geometry of single point cutting tool.

Q.4 (a) With the help of a suitable chart give the general classification of Bulk-forming processes.

Q.5 List and discuss the important factors to be considered in material selection to satisfy a particular design requirement.

Q.6 (a) Compare the relative merits and demerits of unilateral and bilateral tolerances with suitable applications.

(b) Find the values of allowance, hole tolerance and shaft tolerance for the following dimensions of mated parts according to basic hole system.

Hole : 37.50 mm        Shaft : 37.48 mm

37.52 mm                37.45 mm

Q.7　Differentiate between drawing and extrusion processes with suitable examples.

Q.8　(a)　A hole of 60 mm diameter and 80 mm depth is to be drilled in a mild steel component. The cutting speed can be taken as 60 m/min and feed rate as 0.2 mm/rev. Calculate the machining time and MRR.

　　　(b)　A plate of dimensions
300 mm X 100 mm X 40 mm is to be shaped along its wider face. Calculate the machining time taking approach = 20 mm, over travel = 20 mm, cutting speed = 10 m/min, return speed = 20 m/min, allowance on either side of the plate width = 5 mm and feed per cycle = 1 mm.

Q.9　(a)　What do you mean by process capability?

　　　(b)　How do you decide that process is under control or out of control using control charts for variables?

Q.10　A flanged cup shown in figure is to be produced by deep drawing. Calculate the size of the blank required for drawing.



Figure

# TUTOR MARKED ASSIGNMENT

## BME-012

## MANUFACTURING SYSTEMS INTEGRATION AND CONTROL

**Maximum Marks : 100**
**Weightage : 30%**

**Course Code: BME-012**
**Last Date of Submission: Oct. 31, 2019**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Manufacturing Systems Integration and Control.

Q.1 (a) What are the elements of manufacturing control? Explain with the help of a control loop of manufacturing system.

(b) What are the rules to be taken into amount while assigning control tasks to different hierarchical levels?

(5 + 5 = 10)

Q.2 What do you understand about quality function deployment (QFD)? Is it a quality concept or design concept? Comment.

(10)

Q.3 What is manufacturing system integration (MSI) architecture? Discuss about architectural units in MSI. Also discuss about the hierarchical levels in MSI.

(10)

Q.4 What data integration is necessary for an integrated manufacturing enterprise? Explain. Also discuss about CIM database and multi objective decision support system.

(10)

Q.5 What is agile manufacturing? What lead the development of agile manufacturing? What are the enablers of agile manufacturing?

(10)

Q.6 What is bionic manufacturing system? What are the aims and objectives of bionic manufacturing system? How a bionic manufacturing system is used to make the system intelligent?

(10)

Q.7 What do you mean by knowledge base? How knowledge is represented in knowledge base? What are the local and global approaches in knowledge base?

Q.8 What is supply chain management (SCM)? How it is different from logistics management? Discuss about integrated aspects of supply chain management.

Q.9  Describe the following with suitable examples :

    (a)    e-enabled supply chain

    (b)    e-commerce

    (c)    e-procurement

    (d)    e-collaboration

$(2.5 \times 4 = 10)$

Q.10  What do you understand by six sigma method of quality control? Describe the DMAIC approach of six sigma. What are the important benefits of six sigma practices?

(10)

# TUTOR MARKED ASSIGNMENT

## BME-013

## PRODUCTION MANAGEMENT

**Maximum Marks : 100**
**Weightage : 30%**

**Course Code : BME-013**
**Last Date of Submission: Oct. 31, 2019**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Production Management

Q.1 Explain why plant location decisions are important to the organization?

Q.2 What are the factors that influence the selection of location for a plant?

Q.3 The data given below refers to the past sales of production unit for last eleven years. Using least square method estimate sales forecast for next two years.

| Year | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Sales (Rs. 10000) | 35 | 50 | 48 | 47 | 53 | 58 | 68 | 79 | 92 | 85 | 96 |

Also plot the graph of sales data and draw the regression line on it.

Q.4 Distinguish between

(a) MRP-I and MRP-II.

(b) Fixed order quantity model and Fixed time period model.

Q.5 What factors should be taken into account while making make-or-buy decisions? Illustrate your answer with examples for both a manufacturing and a service organisation.

Q.6 An automobile parts and component manufacturing company has its fixed costs of Rs. 7,80,000/- this period. Variable costs include labor charges of Rs. 120 per unit and material cost of Rs. 250 per unit. Selling price of the product is Rs. 650 per unit. Calculate the break even point in units and in Rs. also.

Q.7 What is forecasting? Describe the different methods of forecasting. List out some of the merits and demerits of the forecasting.

Q.8 An aircraft company uses rivets at an approximate consumption rate of 2500 kg per year. The rivets costs Rs. 30 per kg and the company personnel estimates that it costs Rs. 130 to place an order and the inventory carrying cost is 10% per year. How frequently should order for rivets be placed and what quantities should be ordered?

Q.9 Explain nine rules for bottle neck scheduling in TOC.

Q.10 Write short notes on the following:

(a) Just in time

(b)Total quality management

# TUTOR MARKED ASSIGNMENT

## BME 014

## METROLOGY AND INSTRUMENTATION

**Maximum Marks : 100**
**Weightage : 30%**

**Course Code : BME 014**
**Last Date of Submission: Oct. 31, 2019**

**Note :** All questions are compulsory and carry equal marks. This assignment is based on all Blocks of Metrology and Instrumentation.

Q.1 (a) What are the necessary conditions for interference of light waves?

   (b) Enumerate the major requirements for gauge blocks.

$(5 + 5 = 10)$

Q.2 (a) What points will you keep in your mind in selecting the tolerance between the piston and cylinder of a steam engine?

   (b) What is meant by 50 H 5? What is the fundamental deviation of this hole? Is fundamental deviation a function of the tolerance grade?

$(5 + 5 = 10)$

Q.3 (a) A vernier scale consists of 25 divisions on 12 mm spacing and the main scale has 24 divisions on 12 mm, what is the least count?

   (b) How you will compare the vernier caliper with a micrometer screw gauge?

$(5 + 5 = 10)$

Q.4 (a) A calibrated meter end bar has an actual length of 1000.0005 mm. It is to be used in the calibration of two bars, *A* and *B*, each having a basic length of 500 mm. When compared with the meter bar $L_A + L_B$ was found to be shorter by 0.0003 mm. In comparing *A* with *B*, it was found that *A* was 0.0006 mm longer than *B*. Find the actual length of *A* and *B*.

   (b) Four length bars of basic length 100 mm are to be calibrated using a length bar of 400 mm whose actual length is 399.9992 mm. It was also found that lengths of bars *B*, *C* and *D* in comparison to *A* are + 0.0002 mm, + 0.0004 mm and – 0.0001 mm respectively and the length of all the four bars put together in comparison to standard calibrated bar is + 0.0003 mm longer. Determine the actual dimensions of all the four end bars.

$(10)$

Q.5 (a) A SONAR (Sound Navigation and Ranging) uses ultrasonic waves to detect and locate objects under water. In a submarine with a SONAR, the time delay between generation of a probe wave and the reception of its echo after reflection from an

enemy submarine is found to be 77.0 seconds. What is the distance of the enemy submarine?

(b) A hole is bored to the limits of 50.03 mm to 50.00 mm diameter and the shaft which is to fit the hole is machined to the limits of 50.02 mm to 49.98 mm.

(i) State the allowance for this fit and the value of maximum clearance

(ii) What type of fit it is?

(10)

Q.6 (a) Calculate the dimensions of plug and ring gauges to control the production of 50 mm shaft and hole pair of $H_7$ $d_8$ as per $I > S$ specification .The following assumptions may be made : 50 mm lies in diameter step of 30 and 50 mm and the upper deviation for '$d$' shaft is given by $- 16$ $D^{0.44}$ and lower deviation for hole $H$ is zero. Tolerance unit $i$ (microns) $= 0.45^3$ $\sqrt{D} + 0.001 D$ and $IT 6 = 10$ $i$ and above $IT 6$ grade the tolerance magnitude is multiplied by 10 at each fifth step.

(b) What is the difference between 'unilateral' and 'bilateral' tolerance? Why is unilateral tolerance preferred over bilateral tolerance?

(10)

Q.7 (a) One manufacturer of a co-ordinate measuring machine has indicated its accuracy as :

$$3 \sigma \text{ accuracy } : \pm 0.003 \text{ mm}$$

$$2 \sigma \text{ accuracy} : \pm 0.002 \text{ mm}$$

$$1 \sigma \text{ accuracy} : \pm 0.001 \text{ mm}$$

What do you understand by the statement?

(b) Design and sketch working and plug snap 'GO' and 'NO GO' gauges for spindle $\dfrac{30.980 \text{ mm}}{30.960 \text{ mm}}$ and hole of $\dfrac{31.023 \text{ mm}}{31.000 \text{ mm}}$.

(10)

Q.8 (a) What is a strain gauge? Describe the working principle of electrical wire strain gauge.

(b) Describe the different parts of the Coordinate Measuring Machine (CMM) and its applications.

(5 + 5 = 10)

Q.9 (a) Describe the principle and working of autocollimator.

(b) Draw a neat diagram of micro-meter. Also indicate all the parts of the instrument.

(10)

Q.10 (a) Why is sine bar not preferred for measuring angle more than 45°?

(b) What do you understand about the standard of measurement? How do you define a standard meter? (10)