Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEMESTER– 7th EXAMINATION – SUMMER 2015

Subject Code: 172003 **Date: 12/05/2015**
Subject Name: Manufacturing Technology II
Time:02.30PM-05.00PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary and clearly mention the same.**
3. **Figures to the right indicate full marks.**
4. **Draw neat diagrams. Diagrams with inferior quality may not be awarded credit.**

Q.1 **(a)** Explain the working principle of sine bar for angle measurement. Briefly describe the other measuring devices available for angular measurement. **07**

(b) Differentiate between hot working and cold working process. Compare relative merits and demerits of these processes with critical reasoning. Give suitable examples of hot working and cold working processes. **07**

Q.2 **(a)** Describe in detail the effect of various process parameters of Abrasive Jet machining and Abrasive Water Jet machining processes on material removal rate (MRR) and surface roughness. **07**

(b) What is the working principle of interferometry? Draw corresponding fringe patterns to explain the presence of flat, concave and convex surfaces under observation. **07**

OR

(b) Explain the following in relation to Ultra Sonic Machining (USM) Process: **07**

1. Difference between piezoelectric and magnetostrictive transducer
2. Process parameters of USM to control MRR and surface roughness

Q.3 **(a)** Describe the following terms in relation to casting process. **07**
Permeability, green strength of molding sand, dry strength of molding strength, hot spot, hard spot, facing sand, ramming.

(b) Explain TIG and MIG welding process with the help of neat sketches and suitable description. **07**

OR

Q.3 **(a)** Describe the following terms in relation to casting process. **07**

1. Casting yield
2. Pressurized and non-pressurized gating system

(b) Compare and contrast machining and forging process for manufacturing a spur gear. Which manufacturing process is to be selected for manufacturing spur gear from raw material? Give your choice with strong reasons. **07**

Q.4 (a) Develop a process to measure the straightness of lathe guide ways. List out the tooling needed for it and produce a set up for straightness measurement of lathe guide ways. **07**

(b) List out various conventional and unconventional machining processes. Bring out the need of unconventional machining processes with suitable examples. **07**

OR

Q.4 (a) Explain the process to measure perpendicularity of Fitter's Square. Draw neat diagram to describe the procedure and set up for the squareness measurement of Fitter's Square along with the tooling used for it. **07**

(b) Compare and contrast geometric control and dimensional control with appropriate examples for workpiece control. **07**

Q.5 (a) A hypothetical alloy, consists (% by weight) nickel 75%, chromium 15%, iron 5% and titanium 5%, is required to be machined by ECM. Density of nickel, chromium, iron and titanium is 8.90 gm/cm^3, 7.19 gm/cm^3, 7.86 gm/cm^3 and 4.51 gm/cm^3, respectively. Moreover, following data are given for the alloy under consideration. **07**

Elements	**Nickel**	**Chromium**	**Iron**	**Titanium**
Atomic weight, gm	58.71	51.99	55.85	47.9
Valency	2	2	2	3

Your tasks:

1. Determine the density of alloy.
2. Determine chemical equivalent using percentage by weight method.
3. Find out material removal rate for current of 500 A.

(b) Design a fixture for the spindle bearing cap shown in figure1. Spindle bearing caps are required to be produced in a batch of 10,000 pieces. All features shown in the figure1 have been machined and manufactured as per the dimensional and geometrical requirements. Only three holes (equally spaced on pitch circle diameter) of 10 mm diameter are needed to be drilled on flange of each 10,000 components using drilling machine. Design a fixture to hold and locate spindle bearing cap for drilling these three holes on drilling machine. Assume suitable data, if is not given for fixture design and clearly mention the same. **07**

OR

Q.5 (a) Draw schematic diagram of Submerge Arc Welding (SAW) process and describe its process parameters, which affects the geometry of weld produced. Describe the effect of its process parameters on the quality of weld produced. **07**

(b) Draw and describe location system provided by the following engineering components for holding and locating workpiece or cutter into it: **07**

1. Sleeve
2. 3-Jaw self centering chuck

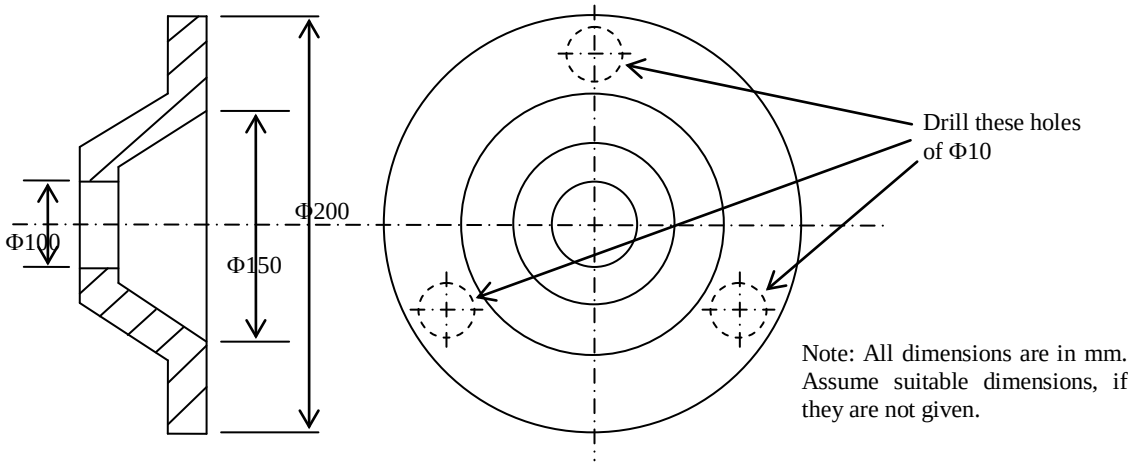

Figure1. Spindle Bearing Cap of Lathe Machine

****