Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – SUMMER • 2014

Subject Code: 172003 **Date: 05-06-2014**

Subject Name: Manufacturing Technology-II

Time: 02.30 pm - 05.00 pm **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. Shabbily drawn diagrams may not be awarded any credit.**

Q.1 **(a)** Describe briefly the working principle of wire cut EDM process (with the help of neat schematic diagram) and its process parameters. Bring out the practical application of wire cut EDM. **07**

(b) Draw the fringe pattern observed on the following surfaces when seen under monochromatic light and optical flat: **07**

1. flat surface with a deep scratch on it
2. concave surface without any scratch on it
3. convex surface without any scratch on it

Support your answer with critical reasoning for the fringe pattern likely to be generated in each of the cases mentioned above.

Q.2 **(a)** Describe briefly the working principle and the effect of following factors on machinability of workpiece in LASER beam machining process. **07**

Reflectivity of workpiece surface, wave length of LASER, oxide layer on workpiece surface, surface roughness and temperature of workpiece.

(b) Briefly explain the following terms used in casting process: **07**

1. Permeability
2. Core and core print (draw sketch of it)

OR

(b) Evaluate the following statements: **07**

1. EDM is not the last machining process on workpiece material.
2. Ultrasonic machining is considered as the safest unconventional machining process.

Q.3 **(a)** While finding out the height difference between reference slip gauge and working slip gauge using monochromatic light source and optical flat, 14 numbers of fringes were observed on reference slip gauge over a length of 1 cm. The distance between the slip gauges was 4.5 cm and the wavelength of monochromatic light was 0.40 µm. Find out the height difference between the given slip gauges in µm. **07**

Support your answer with the help of neat schematic diagram showing this set up and clearly mention the assumption/s.

(b) Illustrate with neat sketch the working principle of Sine-bar. Describe the design requirements of a Sine-bar. **07**

OR

Q.3 **(a)** Draw and explain different possible ways to produce adjustable locators while designing fixture for component in hand. **07**

(b) Calculate the choke area below the sprue for casting a plate, 400 x 200 x 40 mm in size, from cast iron. The density of the given cast iron is 6.90 x 10^{-6} kg/mm^3. The fluidity of liquid cast iron at 1400^0C is 23 inch and coefficient of efficiency is 0.70. Take pouring time, t = K [1.41 + (T / 14.59)] x ($w^{1/2}$). Assume top gating system with sprue height of 100 mm. Also find out the dimensions of in-gates in case of pressurized gating system with 3 in-gates. **07**

Q.4 **(a)** What is significance of flushing system in EDM? Describe types of flushing systems used in EDM process with the help of neat schematic diagrams. **07**

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

1. Arbor on horizontal milling machine
2. 4-Jaw self centering chuck

OR

Q.4 **(a)** For the component shown in figure 1, slot of 15 mm x 60 mm is required to be machined on horizontal milling machine with a suitable 'side and face milling cutter' loaded on arbor at appropriate position. For the dimensional requirements shown in the figure, suggest the most appropriate location system for designing its fixture with necessary justification. **07**

(b) Describe the complete procedure to measure weld bead width and depth for a weld produced on submerged arc welding machine from its conception to development. Also illustrate the effect of significant welding parameters, which controls the weld bead width and depth. **07**

Q.5 **(a)** Briefly describe the possible defects generated during rolling process. Also mention the reason for its cause and possible remedial effect. Draw necessary diagrams to describe the same. **07**

(b) Explain in brief the following terms in context of casting process: **07**

1. Function of pouring basin and skimmer or strainer
2. Function of chills

OR

Q.5 **(a)** What is called resistance welding process and how does it differ from regular welding process? List out various resistance welding process and give its practical applications in real world. **07**

(b) Compare and contrast the cold working and hot working processes from their relative merits and demerits point of view. **07**

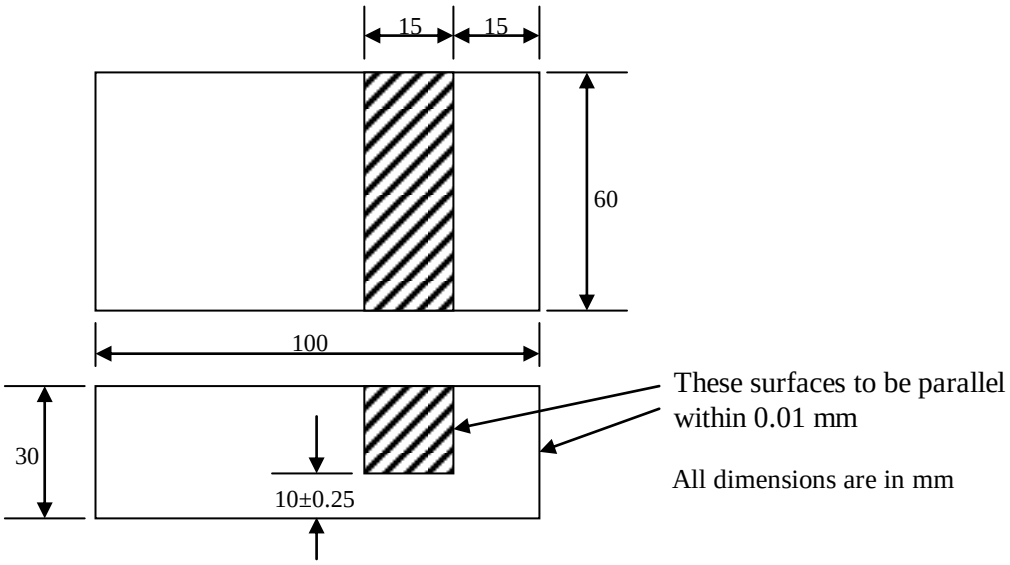

Figure1. Plate shape component to be machined on horizontal milling machine (Question 4(a)OR)

****