

Total No. of printed pages = 4

ME 181604

Roll No. of candidate

6/8/20

--	--	--	--	--	--	--	--	--	--

2022

BINA CHOWDHURY CENTRAL LIBRARY
(GIMI & GIPS)
Azara, Haikhowapara,
Guwahati -781017

B.Tech. 6th Semester End-Term Examination

WORKSHOP THEORY AND PRACTICE – II

(New Regulation & New Syllabus)

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks
for the questions.

Answer question No. 1 and any *four* from the rest.

1. Answer the following (MCQ/ Fill in the blanks) : (10 × 1 = 10)
- (i) When resistance spot welding, which of the following materials for the same dimensions will have the highest weldability?
- (a) Copper
 - (b) Mild steel
 - (c) Acrylic
 - (d) Aluminium
- (ii) In which of the following arc welding processes the arc would have the highest power density?
- (a) Shielded Metal Arc Welding
 - (b) Gas Tungsten Arc Welding
 - (c) Plasma Arc Welding
 - (d) Flux Cored Arc Welding
- (iii) Which of the following values of rake angle results in enhancing tool life by increasing mechanical strength and reducing temperature at the tool tip?
- (a) Negative
 - (b) Zero
 - (c) Positive
 - (d) None of these

[Turn over

- (iv) During GTAW, the lowest penetration is achieved in _____ polarity.
- (a) DCEN
 - (b) AC
 - (c) DCEP
 - (d) Both (a) and (c)
- (v) Size of the built-up-edge _____ with increase in cutting velocity.
- (a) increases
 - (b) increases and then decreases
 - (c) decreases
 - (d) decreases and then increases
- (vi) In Electrochemical Machining (ECM), the primary mechanism of material removal is _____
- (a) etching
 - (b) ionic dissolution
 - (c) spark erosion
 - (d) chemical corrosion
- (vii) Which of the following methods may not be a suitable choice for machining ceramics, glass and plastics?
- (a) USM
 - (b) AJM
 - (c) EDM
 - (d) LBM
- (viii) The _____ file format has become the Rapid Prototyping industry's de facto standard data transmission format.
- (a) STL
 - (b) DWG
 - (c) 3DP
 - (d) FDM
- (ix) Choose the incorrect statement:
- (a) Submerged arc welding can't be used for fillet weld
 - (b) The electrode used in resistance spot welding is usually made up of copper
 - (c) Soft materials are difficult to machine by the abrasive jet machining process
 - (d) Directrix is the line generated by the feed motion

BINA CHOWDHURY CENTRAL LIBRARY
(GIMT & GIPS)
Azara, Halkhowapara,
Guwahati - 781017

- (x) Choose the correct statement:
- (a) Ideal properties of a material suited for Laser Beam Machining include high heat of fusion
 - (b) USM often uses a slurry comprising abrasive-particles and water
 - (c) Fixture is a type of jig with additional feature of tool guidance
 - (d) In comparison with constant voltage power sources, constant current power sources have higher arc length variation
2. (a) An orthogonal cutting operation is performed with a tool of rake angle 15° . The chip thickness before the cut = 0.305 mm and width of cut = 2.54 mm. The chip thickness ratio is measured after the cut to be 0.55. Determine
- (i) the chip thickness after the cut,
 - (ii) shear angle,
 - (iii) the average coefficient of friction between the tool and the chip, and
 - (iv) shear strain. (7)
- (b) With the help of neat sketches discuss the basic major types of chips and the conditions generally under which such types of chips form. (8)
3. (a) What is the need of jigs and fixtures in mass production? List few advantages of using jigs and fixtures. (5)
- (b) A Workshop Supervisor has to choose a suitable non-traditional machining process for machining Inconel-718, a nickel-based superalloy widely used in the aviation field. The application is a blind-hole of depth 15 mm in a cube of side 20 mm. The hole has a square cross-section of side 5 mm. Identify anyone non-traditional machining process that might be used and present argument(s) to support your selection. With neat sketches describe the process selected by you. Also mention the advantages and limitations of the process.
4. (a) The cutting speed during turning a job is reduced by 50%. Using Taylor equation for tool life and assuming $n=0.5$ and $C=120$, calculate the percentage change in tool life. Is it desirable to have high values of n and C ? Give reason(s). (5)
- (b) What is the technical difference between brazing and soldering? Under what circumstances would brazing or soldering be preferred over welding? (1+3)
- (c) With neat sketches compare constant current and constant voltage power sources used in electric arc welding. (6)

BINA CHOWDHURY CENTRAL LIBRARY
(GIMT & GIPS)
Azara, Halkhowapara,
Guwahati - 781017

5. (a) The voltage - arc length characteristic of a dc arc is given by, $V = \{20 + 4l\}$ volts, where l = length of the arc in mm. During a welding operation, it is expected that the arc length will vary between 4 mm and 6 mm. It is desired that the welding current is limited to the range 450-550 A. Assuming a linear power source characteristic, determine the open circuit voltage and the short circuit current of the power source. (5)
- (b) Why is the oxyacetylene welding process favoured over the other oxyfuel welding processes? With the help of neat sketches explain the regions, characteristics and applications of the different oxyacetylene gas welding flames. (1+9)
6. (a) What is the difference between oblique machining and orthogonal machining? (2)
- (b) With the help of neat sketches explain the effect of the following process parameters on material removal rate in abrasive jet machining:
- (i) Stand-off distance and
- (ii) Abrasive flow rate (3)
- (c) The cutting force and thrust force in an orthogonal cutting operation are 1470 N and 1589 N, respectively. The rake angle = 5° , the width of the cut = 5.0 mm, the chip thickness before the cut = 0.6 mm, and the chip thickness ratio = 0.38. Determine
- (i) the shear strength of the work material and
- (ii) the coefficient of friction in the operation. (10)
7. Write short notes on any *three* of the following: (3 × 5 = 15)
- (a) Fool proofing in work holding devices
- (b) Globular metal transfer in GMAW
- (c) Stereolithography
- (d) Friction Stir Welding
- (e) Selective Laser Sintering.

BINA CHOWDHURY CENTRAL LIBRARY
(GIMT & GIPS)
Azara, Hatkhowapara,
Guwahati - 781017