KATHMANDU UNIVERSITY
End Semester Examination [C]
May/June, 2019

Marks scored:

Level : B.E.
Year : II

Course : MEEG 217
Semester : I

Exam Roll No. :

Time: 30 mins.

F.M : 20

Registration No. :

Date 05 JUN 2019

SECTION "A"
[20 Q. × 1 = 20 marks]

Choose and mark "X" in the most appropriate answer.

1. The welding process by Metal Inert-Gas (MIG) welding is
   [ ] slower than the welding process by Tungsten Inert-Gas (TIG) welding
   [ ] faster than the welding process by Tungsten Inert-Gas (TIG) welding
   [ ] at same speed as the welding process by Tungsten Inert-Gas (TIG) welding
   [ ] at unpredictable speed

2. Which of the following is not a part of carriage of the center lathe?
   [ ] Tool post [ ] Apron [ ] Compound rest [ ] Gear box controls

3. The process utilizing mainly thermal energy for removing material is
   [ ] Ultrasonic Machining [ ] Electrochemical Machining
   [ ] Abrasive Jet Machining [ ] Laser Beam Machining

4. The commonly used flux in brazing is
   [ ] Borax [ ] Rosin [ ] Lead sulphide [ ] Zinc chloride

5. In submerged arc welding, an arc is produced between a
   [ ] carbon electrode and the work
   [ ] metal electrode and the work
   [ ] bare metal electrode and the work
   [ ] two tungsten electrodes and the work

6. Total solidification time is defined as which one of the following?
   [ ] Time between pouring and complete solidification
   [ ] Time between pouring and cooling to room temperature
   [ ] Time between solidification and cooling to room temperature
   [ ] Time to give up the heat of fusion.

7. The process of pulling a wire or bar through a die opening is called
   [ ] Open die forging process [ ] Drawing process
   [ ] Rolling process [ ] Sheet forming process

8. A hole is being drilled with 5 mm drill at a feed of 0.1 mm/revolution and rpm is 200. Calculate the metal removal rate (m) in mm3/minute.
[ ] 392.5 [ ] 785 [ ] 1570 [ ] 410.5

9. Which of the following is not true for taper turning?
[ ] taper turning is one type of lathe operation
[ ] the amount of taper is specified by the ratio of its length to the difference in the diameter of the taper
[ ] amount of taper is designated by the letter K
[ ] none of the above

10. In which of the following test specimen is in the form of the simply supported beam.
[ ] Izod test [ ] Rockwell harness test
[ ] Charpy test [ ] Vickers Hardness test

11. Using the Taylor Equation for tool life and letting n = 0.5 and C = 120, calculate the percentage increase in tool life when the cutting speed is reduced by 50%.
[ ] 100% [ ] 200% [ ] 300% [ ] 400%

12. A single-point cutting tool with 120 rake angle is used to machine a steel work-piece. The depth of cut, i.e., uncut thickness is 0.81 mm. The chip thickness under orthogonal machining condition is 1.8 mm. The shear angle is approximately
[ ] 22 [ ] 26 [ ] 56 [ ] 76

13. The ratio of the cutting force to the cross-sectional area being cut is called
[ ] specific cutting force [ ] thrust force
[ ] frictional force [ ] Strain energy

14. Which of the following is not true for gas welding?
[ ] Heat effected zone and distortion are less as compare to arc welding
[ ] It is suitable for thin sheets
[ ] It is slower than arc welding
[ ] There are safety problems in storing and handling the gases

15. In arc welding, the three elements to be controlled to obtain satisfactory welding operation are
[ ] Current, voltage and speed of travel
[ ] Current, voltage and arc length
[ ] Current, arc length and speed of travel
[ ] Voltage, arc length and speed of travel

16. The casting defect which is not caused by the high pouring temperature of melt is
[ ] Cuts [ ] Metal Penetration
[ ] Rat Tails [ ] Fusion

05 JUN 2019

05 JUN 2019

17. A cube shaped casting solidifies in 5 min. The solidification time in min for a cube of the same material, which is 8 times heavier than the original casting, will be

[ ] 10 [ ] 20 [ ] 24 [ ] 40

18. In the deep drawing of cups, blanks show a tendency to wrinkle up around the periphery (flange). The most likely cause and remedy of the phenomenon are, respectively,

[ ] Buckling due to circumferential compression; Increase blank holder pressure
[ ] High blank holder pressure and high friction; Reduce blank holder pressure and apply lubricant
[ ] High temperature causing increase in circumferential length; Apply coolant to blank
[ ] Buckling due to circumferential compression; decrease blank holder pressure

19. What is the process, in which the metal is caused to flow through a restricted orifice to create an extremely elongated strip of uniform and comparatively smaller cross-sectional area, called?

[ ] Rolling [ ] Extrusion [ ] Drawing [ ] Spinning

20. An orthogonal cutting operation is being carried out under the following conditions: cutting speed 2 m/s, depth of cut 0.5 mm, chip thickness 0.6 mm. Then the chip velocity is

[ ] 2.0 m/s [ ] 2.4 m/s [ ] 1.0 m/s [ ] 1.66 m/s

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SECTION "B"
[55 marks]

Attempt ALL questions. Supply figures wherever necessary. Assume suitable data if necessary.

1. What is a manufacturing process? And discuss how product design process influences manufacturing and enlist the important considerations for the same. [5]

2. A paper clip is made of wire 1.2 mm in diameter. If the original material from which the wire is made is a rod 15 mm in diameter, calculate the longitudinal and diametrical engineering and true strains that the wire has undergone. [5]

3. Write a difference between hot extrusion and Cold extrusion. Give a clear picture of applications in industry using hot and cold extrusion. [5]

4. Explain in short notes [5 × 2 =10]
   a. Homologous Temperature
   b. Hot Working and Cold Working
   c. Instability in Tension
   d. Forging Defects
   e. Chvorinov's Rule

5. In an orthogonal cutting operation, the following data are given;
   Uncut chip thickness = 0.25 mm; Width of Cut = 7.5 mm; Cutting speed = 2.5 m/s, Rake angle = 10; Cutting force = 750 N; Thrust force = 300 N; Chip thickness = 0.35mm. Determine Shear angle, friction angle, shear stress along the shear plane and the power for the cutting operation. [5]

6. A welding operation is performed with 20 volt 200A current. The CSA of the weld bead is 30 mm 2 estimate the welding speed if the work piece and the electrode are made of aluminum, carbon steel and titanium. Use efficiency of the process as 75%. [5]

   U_{al}= 2.9 J/mm3, $U_{carbon\ steel}$= 12.3 J/mm3, $U_{titanium}$= 14.3 J/mm3
   Estimate the welding speed of the various operations.

7. List types of chip formations in machining and discuss parameters influence different chip formation in detail. [5]

8. List and discuss about various types of casting defects. Explain it with drawing and list the reasons of defects formation precisely. [5]

9. What is forging process, explain Open die forging with and without friction. And explain fullering, cogging and edging. [5]

10. What is Resistance welding and its application? Explain Spot welding, Seam welding and Percussion welding in detail. [5]