

KATHMANDU UNIVERSITY
End Semester Examination
July/August 2024

Level : B.E.
Year : II
Time : 2 hrs. 30mins.

02 AUG 2024

Course : MEEG 217
Semester : I
F. M. : 55

SECTION "B"
[55 marks]

Attempt ALL questions. Assume suitable data if necessary.

1. [4+4+3]
 - a. How much time will be required to reduce the diameter of a bar from 120mm to 80mm diameter over a length of 100mm by turning on lathe? (Assume job RPM = 600, feed = 0.24mm/rev and depth of cut = 4mm, refer $MRR = V \cdot F \cdot D$).
 - b. Define cutting speed, feed and depth of cut in machining process. Illustrate all of them considering turning operation?
 - c. Describe the differences between cold, warm and hot forging of metals in detail.

2. [3+4+4]
 - a. How can you tell whether a certain part is forged or cast, describe in detail?
 - b. Explain Direct and indirect extrusion process with the help of graphical illustration.
 - c. Explain why cold extrusion is an important manufacturing process. Is lubrication necessary in extrusion? If so, why, describe with neat diagram in detail with the help of die design perspective?

3. [5+4+2]
 - a. Why the pattern is different from casting? Describe in neat sketch of casting process. What is the function of core in casting?
 - b. A mould has a downsprue whose length is 20cm and the cross sectional area at the base of the downsprue is 1 cm². The downsprue feeds a horizontal runner leading into the mould cavity of volume 1000cm³. Calculate the time required to fill the mould cavity. (refer $V = \sqrt{2gh}$ and $T = V/Q$)
 - c. What are the consideration on riser design in sand casting mould?

4. [9+2]
 - a. Draw merchant circle diagram and derive the relation of necessary force components in cutting process.
 - b. Resistance spot welding is performed on two plates of 1.5mm thickness with 6mm diameter electrode, using 15000A current for a time duration of 0.25se. Assuming the interface resistance to be 0.0001 ohm. Calculate the heat generated to from the weld.

5. [2+3+3+3]

Write short notes on

 - a. Indexing (Plain and differential Indexing)
 - b. Welding defects cause and remedies.
 - c. Casting defects cause and remedies.
 - d. Forging defects cause and remedies.

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Marks Scored:

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Registration No.:

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SECTION "A"

[20Q. × 1 = 20 marks]

Choose and mark [X] in the most appropriate option from each set of choices

- The optimum pouring time for a casting depends on several factors. One important factor among them is?
 Location of Riser
 Fluidity of casting metal
 Porosity of Sand mould
 Area of pouring basin
- In gang milling
 Several jobs can be performed in one setup.
 One job is completed on several milling machines located together.
 Two or more cutters are mounted on the arbor and all of them remove the metal simultaneously.
 Cutters are mounted and perform their operation one by one.
- The accurate spacing of teeth in a gear blank requires the use of ,
 Dividing head.
 Gear tooth Vernier.
 Index plate.
 Differential mechanism.
- In arc welding, arc is created between the electrode and work by
 Flow of Current
 Material Characteristics
 Voltage
 Contact resistance
- Which of the following statement is true about extrusion process,
 Structure is homogeneous.
 No heat is generated between product and die wall.
 Service life of extrusion tool is too high.
 Its leading end is in good shape as compared to rolling.
- Riser is designed:
 Freeze after the casting freezes.
 Freeze at the same time as the casting.
 Freeze before the casting freezes.
 Minimize the time of pouring.
- Abrasive material used in grinding wheels selected for grinding ferrous alloys is _____
 SiC
 Diamond
 Al₂O₃
 Boron Carbide
- In case of a shaper, the feeding of the job is done,
 At the start of forward stroke
 At the end of the forward stroke
 At the middle of the forward stroke
 At the end of the return stroke

9. Machining operation of cutting a key-way (Slot) inside a drilled hole is
 Reaming Boring Tapping Broaching
10. Two streams of liquid metal which are not hot enough to fuse properly result into a casting defect known as
 Sand wash Swell Cold shut Scab
11. Which one of the following is not a property of sand mould,
 Permeability Collapsibility Strength Fluidity
12. The size of BUE in Metal cutting increases with,
 Very high speed Large uncut chip thickness
 Use of cutting fluid Increase in positive rake angle
13. A test specimen is stressed slightly beyond the yield point and then released, its yield strength.
 Decreases Increases Halved Unchanged
14. A moving mandrel is used on ,
 Wire drawing Tube drawing Metal Cutting Forging
15. In which of the following operation of a lathe, spindle speed will be minimum.
 Knurling Threading Taper turning Parting Off
16. An important parameters of specification of milling machine is
 Size of the Table Spindle size Arbor size Horse power
17. Weld spatter is
 Flux Electrode coating
 Welding defect Welding test
18. In which of the following resistance welding process continuous weld is produced,
 Spot welding Projection welding
 Seam welding Tag welding
19. Ductility of material with work hardening _____,
 Increases Decreases
 Remains unchanged Unpredicted
20. In a rolling process, the state of stress of material undergoing deformation is :
 Pure Compression Pure shear
 Compression and shear Tension and Shear