



JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

B. Tech. in Mechanical Engineering

2nd Year (3rd Semester)

Term-III Examination, Dec, 2021

Course No. : ME1101
Course Title : Materials Engineering
Nature of Exam : End Term Exam
Weightage : 30%
Max Marks : 60
Duration : 180 Minutes
Date of Exam : _____ - 12 - 2021

No. of Pages = 01
No. of Questions = 04 for each

Session: _____

Note:

1. Draw neat diagrams using pencil (if required).
2. All questions are compulsory.
3. Assume data as and when required

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|---|--|----|------|
| 1 | Atomic radius of aluminum (FCC) is $1.18 \text{ \AA}$ and steel (BCC) is $1.56 \text{ \AA}$. Calculate the density of the materials and find out the weight of the solid cylindrical block as shown in the figure 1. The solid cylindrical block with diameter A is made of aluminum and solid cylindrical block with diameter B is made of steel. The value of A, B, C, D and E are 20 mm, 45 mm, 22 mm, 28 mm and 54 mm respectively. | 15 | CO 1 |
| 2 | A dam is constructed and requires to inspect. Suggest a suitable NDT method to inspect the dam and with neat diagram write the procedure involved. | 15 | CO 2 |
| 3 | M52 bolt is manufactured and requires a heat treatment cycle. If material used is 0.56 percent carbon steel, recommend the heat treatment cycle involved. Draw Fe-Fe ₃ C diagram and explain its transformation stages. | 15 | CO 3 |
| 4 | Discuss atleast four alloying elements that are significantly effecting the mechanical properties of ferrous based alloys. Give composition and application of Malleable cast iron. | 15 | CO 4 |

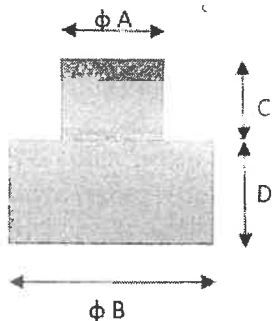


Fig 1