

Form Number: OBE/TE/Spring-2026


 $4\pi \times 10^{-7}$

Daffodil International University

Department of Textile Engineering

Faculty of Engineering

Final Examination; Spring-2026

Course Code: 722-721

Course Title: Materials and Manufacturing

Engineering Level & Term: L2T3

Section: F1, F2, F3

Name & Designation of the Course Teacher: Dr. Md. Abdul Gafur (MAG) and Professor

Time: 02 hours.

Total Marks: 40

Answer all the questions:

- Q1. ☒ How can you prove $a_0 = \frac{4r}{\sqrt{3}}$ and APP = 0.68 for BCC crystal. Marks 4+3+3
- ☒ List in a table i) no of atoms per unit cell, ii) coordination number and iii) atomic packing factor for SC, BCC and FCC crystals.
- ☒ Define Rock salt structure. [CLO1, PO1, C1]
- Q2. ☒ Distinguish between brittle and ductile fracture? 3+4+3
- ☒ Examine stress-strain curve for brittle and ductile materials.
- ☒ Analyze the steps of ductile fracture [CLO2, PO1, C4]
- Q3. ☒ Compare between electronic and ionic conduction. 3+2+5
- ☒ Metals are strong electrical conductors-Explain?
- ☒ An Al-8%Si alloy rod is heated from 20 to 220°C. The linear thermal expansion co. is 20.5/°C. Show the compressive stress developed if the rod is not allowed to free move. Given elastic modulus of Al-8% Si alloy is 80 GPa. [CLO4, PO1, C2]
- Q4. a) Illustrate B-H loop. Interpret Coercivity (Hc) and Remanence (Br). 3+2+5
- ☒ Relate magnetic field, H and Magnetic flux density, B.
- ☒ A magnetic material is placed inside a solenoid. The magnetic field intensity is H = 2000 A/m, and the magnetization of the material is M = 500 A/m. Show the value of B. [CLO4, PO1, C2]

 3.14×10^{-3}
 $3.28 \times 10^{14} \text{ Pa}$