



Name:

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Note : Answer (5) Questions only:

**Q1: Compare between:**

- 1- Thermoplastic and Thermoset.
- 2- Macro-hardness tests and Micro-hardness tests.
- 3- Diamond and Graphite.
- 4- Ionic bonding and covalent bonding.

**Q2: What are the characteristics of?**

- 1- Secondary bonds.
- 2- Three-dimensional nonmaterials (3-D).
- 3- Biomaterials.
- 4- Graphene.

**Q3: Complete the following sentences:**

- 1- The most important factors affecting on the properties of nanomaterials are -----.
- 2- The major components of Material Science and Engineering -----.
- 3- Quantum effects for 0-D, 1-D and 2-D nanomaterials are -----.
- 4- Types of ceramic materials are -----.

**Q4: plot Fe-C diagram and answer about:**

- 1- What are the reactions occurred in this diagram?
- 2- What are the phases at: 723°C with 0.8%C, 1400°C with 4.3%C, 1492°C with 0.18%C.?
- 3- What are the phases at room temperature with 0.4% C.? What is the percentage of each phase?

**Q5: Explain briefly about:**

- 1- Optical properties of nanomaterials.
- 2- Elastomers and its properties.
- 3- Abrasive ceramics.
- 4- Zero-Dimensional nanomaterials and its properties.

**Subject: Engineering material and Nanotechnology**

**2013-2014**



**Time: 3 hour**

**Lecturer: Dr. Khansaa dawood.,  
Dr .Enaam Obaid**

**Date: 8 /6/2014**

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**Q6: A cylindrical specimen of aluminum having a diameter of 12.8 mm and a gauge length of 50.8 mm is pulled in tension. Use the readings**

**tabulated below:**

<b>F(N)</b>	<b>0</b>	<b>7.3</b>	<b>15.1</b>	<b>23.1</b>	<b>30.4</b>	<b>34.400</b>	<b>38.400</b>	<b>41.300</b>
<b>L(mm)</b>	<b>50.8</b>	<b>50.851</b>	<b>50.902</b>	<b>50.952</b>	<b>51.003</b>	<b>51.054</b>	<b>51.308</b>	<b>51.816</b>

<b>F(N)</b>	<b>44.800</b>	<b>46.200</b>	<b>47.300</b>	<b>47.500</b>	<b>46.100</b>	<b>44.800</b>	<b>42.600</b>	<b>36.400</b>
<b>L(mm)</b>	<b>52.832</b>	<b>53.848</b>	<b>54.864</b>	<b>55.880</b>	<b>56.896</b>	<b>57.658</b>	<b>58.420</b>	<b>59.182</b>

- a- Plot the data as true stress-true strain curve.**
- b- Compute the modulus of elasticity.**
- c- Determine the yield stress.**
- d- Determine the ultimate tensile strength.**