FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
SCHOOL OF ENGINEERING & ENGINEERING TECHNOLOGY
DEPARTMENT OF MATERIAL & METALLURGICAL ENGINEERING
COURSE CODE: ENG 205: INTRODUCTION TO ENGINEERING MATERIALS
SESSION: 2005/2006 HARMATTAN SEMESTER TIME: **2 HOURS**
INTRODUCTION: ATTEMPT ALL QUESTIONS AND ANSWER SEQUENTIALLY. WRITE YOUR NAME (SURNAME FIRST) AND REG. NO. ON YOUR ANSWER BOOKLETS BOLDLY.

SECTION A

QUESTION 1

Calculate the packing factor (APF) for simple cubic structure.

QUESTION 2

Sketch the following planes and Directions.

(a) $(\bar{2}10)$ (b) (101) (c) (121) (d) (110) (e) (111) (f) $(\bar{1}01)$

SECTION B

QUESTION 3

Tungsten has a BCC structure, and atomic mass of 183.9g and density of 19.4 g/cm. Calculate the lattice constant (a) of a tungsten unit cell.

QUESTION 4

Calculate the quantity of heat conducted through $3m^2$ of a brick wa... 12cm thick in 1 hour if the temperature on one side is 10^0c and on the other is 28^0c. (Thermal conductivity of brick = 0.13N/mm.

QUESTION 5

(A) A Brinell hardnes test is performed on a load of 3000kg. A 3.2 mm impression is measured on the surface of the specimen. Calculate the Brinell hardness number (HB).

(B) If an Engineering Material has a tensile strength of 1252 MPa, Estimate its Endurance (fatigue) limit?.

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MATERIALS & METALLURGICAL ENGINEERING DEPARTMENT

HARMATTAN SEMESTER 2006/2007 EXAMINATIONS

COURSE: ENG 205/207; Introduction to Engineering Materials

DATE: 16/6/07

INSTRUCTIONS:
I. Write your names boldly on the answer booklet
II. Answer all Questions

TIME ALLOWED: 1½ HOURS

1a. Sketch the following crystallographic directions and planes
[1T1], [T00], [10T], [001], (2T0), (100)

b. Derive the miller indices of each of the directions

2a. Use diagrams to differentiate between the burgers vector of an edge dislocation and that of a screw dislocation.

b. Distinguish between a Frenkel defect and a Schottky defect.

3a. Highlight briefly the process of bacterial leaching.

b. What is the relationship between the number of electrons at the outermost shell and the reactivity of the metal?

4a. Why is iron making a reduction and steel making an oxidation process?

b. Discuss briefly the factors affecting the selection of electrodes during electrolysis.

5a. Why are ceramic materials good electrical and thermal insulators?

b. Define the following terms
i. Hardness ii. Impact iii. Stiffness iv. Creep v. Fatigue vi. Toughness

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2004/2005 RAIN SEMESTER EXAMINATION

ENG. 206 ENGINEERING WORKSHOP IV TIME: 2½Hrs.

INSTRUCTIONS: ANSWER ALL QUESTIONS IN SECTIONS A & B

SECTION A

Question 1.

a. A lathe is a machine Tool (b) A lathe have no bed

c. A lathe can be used to drive a car

d. A lathe has an apron.

Question 2. (a) The part of a lather include cross rail, column, ram

(b) The parts of a lather include taitslock, headstock and cross slide.

(c) The parts of a drill include table, fork and pin.

(d) The parts of a milling machine include lead screw and headstock.

Question 3. (a) The sharper uses a single point cutting tool.

(b) The lathe uses a multipoint cutting tool.

(c) The milling machine uses a broach.

(d) Broadching machine uses a single point cutting tool.

Question 4. (a) The grinder is used for making round holes

(b) The milling machine is used for turning a shaft.

(c) The sharper is used for machining shaped slots.

(d) The Broaching machine is also called a Broacher

Question 5. (a) Some of the parts a drill include: tongue, shank and flute.

(b) The parts of a miller cutting tool include bearing, and apron.

(c) The parts of a single point cutting tool include include chip and bed.

(d) The parts of a grinder include, work piece and machine table.

Question 6. (a) Milling machine is a general purpose machine

(b) Sharper is a specialized machine

(c) Lathe is the same thing as the Grinder.

(d) The drill is not a machine tool.

Question 7 (a) The drilling machine is the same machine as the Grinder.

(b) The drilling machine is used to turn a work piece

(c) The drilling machine is a machine tool.

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SECTION A

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a. A lathe is a machine Tool (b) A lathe have no bed
c. A lathe can be used to drive a car
d. A lathe has an apron.

Question 2. (a) The part of a lather include cross rail, column, ram
(b) The parts of a lather include tailstock, headstock and cross slide.
(c) The parts of a drill include table, fork and pin.
(d) The parts of a milling machine include lead screw and headstock.

Question 3. (a) The shaper uses a single point cutting tool.
(b) The lathe uses a multipoint cutting tool.
(c) The milling machine uses a broach.
(d) Broadching machine uses a single point cutting tool.

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(b) The milling machine is used for turning a shaft.
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Question 7 (a) The drilling machine is the same machine as the Grinder.
(b) The drilling machine is used to turn a work piece
(c) The drilling machine is a machine tool.

Question 8 (a) The person who works on a production machine, like lathe is called a painter

(b) The person who works on a production machine - the lathe is called a machinist

(c) The person who works on a production machine - lathe is called a welder.

(d) The person who works on a production machine - lathe is called driver.

Question 9. Maintenance staff who repairs production machines are called

(a) Machinists (b) Turners
(c) Brazers (d) Millurights.

Question. 10 A Method of preventing accidents in the work environments is identified as:

(a) Dress roughly but hard working
(b) Wear safety gadgets all the time
(c) Do not read the safety manuals or obey them.
(d) Be happy and playful in the work environment.

SECTION B

1. Describe briefly the operation of a lathe stating clearly the operations you can perform on it.

2. For the engineering items you produced during the workshop practice (Eng.206) (a) state the sequence of operations you performed during the production of any one of the items.

(b) State the type and market dimensions of the wood used or the engineering name and structural dimensions of the metals used.

3. Make a sketch of a shaping machine tool and identify three main components.

4. (a) Mention 2 types of cutting tools and describe one of them.
(b) Mention 5 components of a rulling machine
(c) List 5 types of welding processes in Engineering workshop
(d) Give 5 basic wood working tools.

5. Write the sequence of operation to machine a piece of steel Bushing - PN001 with 60 mm long 80mm outside diameter, 25.4mm inside diameter, and 10mm grease Kripple hole threaded with UNF-Tap.

Show the diagram of the Bushing PN001