1. ***The significance of a test is:***
   a) the identification of the properties of materials through well-established procedures
   b) in its ability to predict the performance of a materials in service
   c) the supplement of the classroom instructions in Materials Science and Engineering through demonstration of basic principles of material properties
   d) to introduce the student to the safety signs in order to avoid any undesired circumstances

2. ***The name of the figure and table are written:***
   a) Above the figure and below the table
   b) Above the figure and above the table
   c) below the figure and below the table
   d) below the figure and above the table

3. ***If the experimental uncertainty is presented as shown in equation $R = 90.1 \pm 0.1$ (20:1), then (20:1) indicates that:***
   a) 19 out of every 20 measurements are expected to be equal to or between the value 90.0 and 90.2
   b) 19 out of every 20 measurements are expected to be equal to 90.0
   c) 19 out of every 20 measurements are expected to be equal to the value 90.1
   d) 19 out of every 20 measurements are expected to be equal to or between the value 90.1 and 90.2

4. ***The degree of segregation is determined by:***
   a) Microetching
   b) Carburizing
   c) Macroetching
   d) Mechanical testing

5. ***It is recommended to use silicon carbide wheels to cut:***
   a) Ferrous alloys
   b) Ceramic materials
   c) non-ferrous alloys
   d) Sintered carbide materials

6. ***In most cases the surface roughness of the specimen can be removed almost totally by:***
   a) Cutting, grinding and polishing
   b) Cutting and grinding only
   c) Grinding only
   d) Grinding and polishing

7. ***Etching may be done by:***
   a) immersing the specimen face up in a shallow beaker of the reagent
   b) swabbing the face of the specimen with cotton
   c) leaving the specimen in a shallow beaker of the reagent for at least one hour
   d) a and b

8. **Case depth for carbon penetration can be obtained for carburizing, using the following simple formula:**

a) Case depth= $x = \sqrt{(2Dt)}$, Where: D- diffusion coefficient (cm^2/s), t- time of diffusion (s)
b) Case depth= $x = 2D\sqrt{(t)}$, Where: D- diffusion coefficient (cm^2/s), t- time of diffusion (s)
c) Case depth= $x = 2\sqrt{(Dt)}$, Where: D- diffusion coefficient (cm^2/s), t- time of diffusion (s)
d) Case depth= $x = t\sqrt{(2D)}$, Where: D- diffusion coefficient (cm^2/s), t- time of diffusion (s)

9. **The hardness test, in which a diamond cone and a sphere are used for testing, is:**

a) Brinell
b) Knoop
c) Vickers
d) Rockwell

10. **The following tests are not used for microhardness testing:**

a) Brinell only
b) Knoop only
c) Vickers only
d) B and C

11. **The Brinell hardness number usually falls within a range of:**

a) 75 to 300
b) 90 to 630
c) 240 to 3000
d) 250 to 450

12. **The method that you used to construct the phase diagram in the lab is:**

a) The mechanical properties technique
b) The thermal analysis technique
c) The casting technique
d) The grain size calculation technique

13. **The magnetic particle method of inspections is a procedure used to:**

a) determine the presence of defects at or near the surface of ferromagnetic objects
b) determine the presence of defects at the surface of ferromagnetic objects only
c) determine the presence of defects near the surface of non ferromagnetic objects
d) determine the presence of defects at or near the surface of ceramic objects

14. **eddy current testing is the most wildly used non-destructive testing technique :**

a) in the non-ferrous wrought metal industries
b) the ferrous wrought metal industries
c) for the detection of surface and near surface defects in products of uniform section such as bar tubes and wire
d) a and c

Transmitting and receiving transducers are used at the same time for the following nondestructive testing method:

a) Transmission method
b) Pulse reflection method
c) Dye penetrant method
d) A and b

Defects are revealed, in the radiographic testing, through:

a) Shadows on the radiograph
b) waves that are introduced to the component under the test and the time which elapses between the transmission signal and the return of the reflected echo from the back wall of the component
c) The indication of the transmitted pulses and reflected echoes, and the measurement of the time interval between them
d) b and c

17. When calculating the case depth for the carburized specimen, the formula in question 8 is used. This means that:

a) the temperature is not a factor
b) The temperature is implicitly included in t
c) The temperature is implicitly included in D
d) A part is included in t and another part is included in D

18. In Sulphur printing, the paper will darken due to formation of:

a) Ag_2S b) HBr c) AgBr d) SiO_2

b) The following photo macrograph (Figure 1) shows:

a) microstructure of impurities in a small cast ingot of commercially pure aluminium
b) internal cracks of hot forged Al-2014
c) Flow lines of Forged structure of aluminium 2014 specimen
d) Cross section through a carburized bar with a case depth of 1mm

Figure 1

c) The grinding direction of successive steps are those shown in:

a) Figure 2 b) Figure 3 c) Figure 4 d) Figure 5

Figure 2

Figure 3

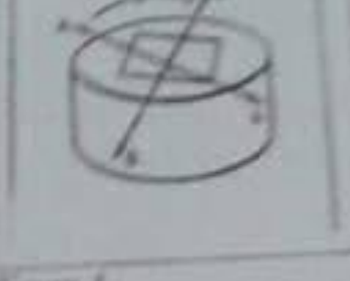

Figure 4

Figure 5

1.) a
2.)
3.) a
4.)
5.)
6.) d
7.) d
8.) a
9.) d
10.) a
11.) b
12.) b
13.) a
14.) d
15.) a
16.)
17
18.) a
b.]
c] bc