Register Number.....

B.E. DEGREE EXAMINATIONS: APRIL /MAY 2009

Third Semester

MECHANICAL ENGINEERING

U07ME301 Engineering Materials and Metallurgy

Time: Three Hours **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (20 × 1 = 20 Marks)

1. The tiny blocks formed by the arrangement of a small group of atoms is called the------.
   A. Unit cell B. Space lattice C. Component D. system
2. --------- may be defined as a solution in the solid state which consists of two kinds of atoms combined in one type of space lattice.
   A. Liquid solution B. Gas solution C. Solid solution D. Allotropy
3. Eutectoid steel is a steel containing carbon
   A. less than 0.8% B. equal to 0.8% C. from 0.8% to 2% D. Zero
4. ---------- is a phase transformation that takes place when a single-phase liquid transforms directly to a two-phase solid.
   A. Peritectic system B. Eutectic system
   C. Peritectoid system D. Eutectoid system.
5. Annealing is done
   A. to reduce the carbon content B. to change the crystalline structure
   C. to reduce the hardness D. to soften the material for machining
6. ---------- does not harden when cooled rapidly.
   A. Ferrite B. Cementite C. Martensite D. Austenite
7. ----------process decomposes the martensite into a ferrite-cementite mixture.
   A. Hardening B. Annealing C. Tempering D. Normalizing
8. ----------test is one of the most useful and widely accepted methods for measuring the hardening response of steel to heat treatment.
   A. Jominy end quench B. Vickers Hardness
   C. Brinell hardness D. Rockwell hardness
9. Corrosion resistance of stainless steel is due to
   A. Carbon B. Chromium C. Vanadium D. Sulphur

10. Brass is an alloy of

A. Lead and Tin
B. Copper and Zinc
C. Tin and Silver
D. Nickel and Zinc

11. The main constituent of duralumin is

A. Aluminium
B. Manganese
C. Magnesium
D. Copper

12. In tool steel the sulphur content is usually not allowed to exceed

A. 0.001 %
B. 0.035 %
C. 0.35 %
D. 5 %

13. PVC stands for

A. Polyvinyl chloride
B. Polythene vinyl chloride
C. Phosphorus-vanadium-chloride
D. Plastic vinyl composite

14. Silicon carbide is

A. Natural abrasive
B. Synthetic abrasive
C. Artificial abrasive
D. General abrasive

15. Fibre-reinforced plastic is

A. Alloy
B. Ceramic
C. Composite
D. Organic polymer

16. Out of four materials namely PVC, SiO_2, Porcelain and bakelite, the best insulator is

A. SiO_2
B. PVC
C. Porcelain
D. Bakelite

17. The treatment covering the surfaces is called

A. Hardening treatment
B. Annealing treatment
C. Surface treatment
D. Normalizing treatment

18. Applying paints on the surfaces. This type of treatment falls under which category of the following

A. Organic coating
B. Inorganic coating
C. Tempering
D. Electroplating

19. ---------- is an electrochemical process by which metal is deposited on a substrate by passing a current through the bath.

A. Thermal spraying
B. Electroplating
C. Coating
D. Diffusion coating

20. The energy source for flame spraying

A. Oxyacetylene flame
B. Plasma gun
C. Spark ignition of explosive gas gun
C. Electric arc

PART B (5 x 16 = 80 Marks)

21. (a) Explain the different types of solid solutions with suitable examples (16)

(OR)

21. (b) Draw the neat sketch of Iron – Iron carbide equilibrium diagram and indicate the various points on it. (16)

22. (a) Explain the following heat treatment process

(i) Full annealing and (ii) Normalizing (8+8)

(OR)

22 (b) Explain the flame hardening process with suitable examples (16)

23. (a) Explain the properties and applications of any two types of stainless steels (8+8)

(OR)

23. (b) (i)Explain the steps involved in precipitation strengthening treatment (8)

(ii) Explain the properties and applications of copper alloys (8)

24. (a) List the properties and applications of the following

(i) PTFE (ii) PET (8+8)

(OR)

24 (b) List the properties and applications of the following

(i) SiC (ii) Al_2O_3 (8+8)

25. (a) Explain thermal spraying processes with suitable examples (16)

(OR)

25. (b) Explain electroplating processes with suitable examples (16)

****