

December 2018

ENGINEERING MATERIALS*Time Allowed: 3 Hours**Full Marks: 70*

Answer to Question No.1 is compulsory and to be answered first.

This answer is to be made in separate loose script(s) provided for the purpose.

Maximum time allowed is 45 minutes, after which the loose answer scripts will be collected and fresh answer scripts for answering the remaining part of the question will be provided.

**On early submission of answer scripts of Question No.1,
a student will get the remaining script earlier.**

Answer any five questions from the rest.

1. A. Choose the most appropriate answer from the following (any ten): 1×10
- i) Which of the following material has maximum ductility? - (a) Mild steel, (b) Copper, (c) Nickel, (d) Aluminium.
 - ii) The hardness is the property of a material due to which it: - (a) can be drawn into wires, (b) breaks with little permanent distortion, (c) can cut another metal, (d) can be rolled or hammered into thin sheets.
 - iii) The percentage of carbon in cast iron varies from: - (a) 0.1 to 0.5, (b) 0.5 to 1, (c) 1 to 1.7, (d) 1.7 to 4.5.
 - iv) Rapid quenching of austenite in the heat treatment of steel produces a super saturated and distorted crystal structure which is known as: - (a) cementite, (b) pearlite, (c) martensite, (d) ferrite.
 - v) Which among the following is a para-magnetic material? - (a) Iron, (b) Cobalt, (c) Nickel, (d) Aluminium.
 - vi) Bronze is a alloy of: - (a) copper & zinc, (b) copper, tin & zinc, (c) copper & tin, (d) none of these.
 - vii) Dye penetrant method is generally used to locate- (a) core defects, (b) surface defects, (c) superficial defects, (d) temporary defects.
 - viii) Silicon when added to copper improves: - (a) machinability, (b) hardness, (c) hardness and strength, (d) strength and ductility.
 - ix) The lower critical point for all steels is: - (a) 600C, (b) 700C, (c) 723C, (d) 913C.
 - x) The heat treatment process used for softening hardened steel is: - (a) carburizing, (b) normalizing, (c) annealing, (d) tempering.
 - xi) The hardness of steel increases if it contains: - (a) pearlite, (b) ferrite, (c) cementite, (d) martensite.
 - xii) Non-destructive testing is used to determine: - (a) location of defects, (b) chemical composition, (c) corrosion of metal, (d) All of these.
 - xiii) Which of the following tool is manufactured by powder metallurgy?: - (a) High speed steel, (b) Sintered carbides, (c) High carbon steel, (d) Low carbon steel.

B. State whether the following statements are true or false (any ten):

1×10

- i) Carbon is present in the form of graphite in gray cast iron.
- ii) Nickel increases strength and toughness in alloy steel.
- iii) Compression test is a type of non-destructive test.
- iv) Thermal conductivity of non metal is inversely proportional to temperature.
- v) Stiffness is the ability of a material to resist deformation under stress.
- vi) Pitting is a localized form of corrosion.
- vii) An eutectoid steel consists of pearlite and cementite.
- viii) Galvanization is a process of corrosion control of steel.
- ix) Chromium ranges from 16-18 percentages in ferritic stainless steel.
- x) Duralumin is a ferrous alloy.
- xi) Blast furnace is used to produce cast iron.
- xii) Steel with carbon above 0.8% is known as hyper-eutectoid steel.

2. a) State the differences between thermosetting and thermoplastic. Give two examples of each type.
b) What is annealing? What is the purpose of annealing process? (2+2)+(4+2)
3. a) What is powder metallurgy? Describe sintering process.
b) Differentiate between toughness and resilience.
c) List the applications of low carbon steel. (2+4)+2
4. a) What are composite materials? Explain with examples.
b) Distinguish between the full annealing and process annealing?
c) What is case hardening? 4+4+2
5. a) Why is cast iron used as a material for machine tool beds?
b) List the properties required for a material to withstand high temperature?
c) Give the composition of High speed steel? 3+5+2
6. a) Explain TTT curve for Eutectoid steel? <https://www.wbscteonline.com>
b) What do you mean by Tempering? What are different tempering processes? 5+5
7. a) Explain the corrosion mechanism?
b) What are the different methods of preventing corrosion? Briefly explain. 4+6
8. a) Name the various methods of manufacturing metal powders and give brief description of each.
b) What is infiltration? Give the metal powders used for porous bearings. 5+5
9. a) What do you mean by Engineering materials? Classify the various Engineering materials?
b) What is fatigue? How fatigue failure occurs? 7+3
10. a) Describe the types of rubber you know. Explain briefly.
b) Give some typical applications of Thermoplastic elastomers. 6+4

<https://www.wbscteonline.com>

Whatsapp @ 9300930012

Send your old paper & get 10/-

अपने पुराने पेपर्स भेजे और 10 रुपये पायें,

Paytm or Google Pay से