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Question Paper Code : 50034

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Sixth Semester
Aeronautical Engineering
AE 6604 – AIRCRAFT MATERIALS AND PROCESSES
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. Describe crystal structure.
2. Classify the crystalline imperfections.
3. Distinguish between yielding and fracture.
4. What is strain hardening ?
5. Define 'corrosion' and state the types of corrosion.
6. Enumerate the heat treatment processes done on magnesium alloy parts.
7. State the classification of plastics.
8. Enumerate the manufacturing processes done on rubber parts of air craft.
9. State the testing methods for determining the factors affecting the mechanical properties of high temperature materials.
10. High temperature problems to be averted in New Design aircraft. State the factors to be considered for the selection of materials to avert high temperature problems in a new design aircraft.

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PART - B

(5×16=80 Marks)

11. a) Describe the importance of X-ray diffraction.

(OR)

b) State the general materials required for aerospace applications and list the materials for specific aircraft components – turbines, compressors, combustion chambers. (8+8)

12. a) Explain the following methods for determining the yield point of a material.

i) Divider method. (8)

ii) Drop of beam method. (8)

(OR)

b) i) What is Creep ? (2)

ii) Explain creep limit. (2)

iii) Explain the stages of creep with neat diagram. (12)

13. a) Explain the following operations in heat treatment.

i) Hardening. (4)

ii) Tempering. (4)

iii) Annealing. (4)

iv) Normalising. (4)

(OR)

b) Explain the following inspection methods with neat diagram.

i) Radiography. (8)

ii) Magnaflux. (8)

14. a) State the manufacturing processes of plastic components of aircraft.

(OR)

b) Explain the various manufacturing processes of rubber components of aircraft.



15. a) Discuss causes for troubles over the entire airframe due to aerodynamic heating.

(OR)

- b) State the specific material applications in the following aircraft components.
- i) Propeller blades
 - ii) Exhaust collector
 - iii) Cowling
 - iv) Engine mount
 - v) Fire wall
 - vi) Oil tank
 - vii) Fuel tank
 - viii) Landing gear
 - ix) Fuselage
 - x) Wings
 - xi) Instrument Board
 - xii) Wing ribs
 - xiii) Wing leading edge
 - xiv) Wind shield
 - xv) Tail surface
 - xvi) Flooring.
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