

30-1-2017

BOS Chairman, ME

MODEL PAPER

No. of Questions: 100

Time: 90 minutes

1. The eigen values of a symmetric matrix are all
(A) complex with non-zero positive imaginary part.
(B) complex with non-zero negative imaginary part.
(C) real.
(D) pure imaginary.
2. A lot has 10% defective items. Ten items are chosen randomly from this lot. The probability that exactly 2 of the chosen items are defective is
(A) 0.0036 (B) 0.1937 (C) 0.2234 (D) 0.3874
3. The product of two complex numbers $1 + i$ and $2 - 5i$ is
(A) $7 - 3i$ (B) $3 - 4i$ (C) $-3 - 4i$ (D) $7 + 3i$
4. The number of degrees of freedom of a planar linkage with 8 links and 9 simple revolute joints is
(A) 1 (B) 2 (C) 3 (D) 4
5. For a ductile material, toughness is a measure of
(A) resistance to scratching (B) ability to absorb energy up to fracture
(C) ability to absorb energy till elastic limit (D) resistance to indentation
6. If the principal stresses in a plane stress problem, are $\sigma_1 = 100 \text{ MPa}$, $\sigma_2 = 40 \text{ MPa}$, the magnitude of the maximum shear stress (in MPa) will be
(A) 60 (B) 50 (C) 30 (D) 20
7. If two nodes are observed at a frequency of 1800 rpm during whirling of a simply supported long slender rotating shaft, the first critical speed of the shaft in rpm is
(A) 200 (B) 450 (C) 600 (D) 900
8. A thin cylinder of inner radius 500mm and thickness 10mm is subjected to an internal pressure of 5MPa. The average circumferential (hoop) stress in MPa is
(A) 100 (B) 250 (C) 500 (D) 1000
9. In a rolling process, the state of stress of the material undergoing deformation is
(A) pure compression (B) pure shear (C) compression and shear (D) tension and shear
10. Green sand mould indicates that
(A) Polymeric mould has been cured (B) Mould has been totally dried
(C) Mould is green in colour (D) Mould contains moisture
11. Which one among the following welding processes uses non-consumable electrode?
(A) Gas metal arc welding (B) Submerged arc welding
(C) Gas tungsten arc welding (D) Flux coated arc welding

12. In a gating system, the ratio 1:2:4 represents
 (A) sprue base area: runner area: ingate area
 (B) pouring basin area: ingate area: runner area
 (C) sprue base area: ingate area: casting area
 (D) runner area: ingate area: casting area
13. A phenomenon is modeled using n dimensional variables with k primary dimensions. The number of non-dimensional variables is
 (A) k (B) n (C) $n-k$ (D) $n+k$
14. Heat and work are
 (A) Intensive properties (B) Extensive properties (C) Point functions (D) Path functions
15. In order to have maximum power from a Pelton turbine, the bucket speed must be
 (A) equal to the jet speed. (B) equal to half of the jet speed.
 (C) equal to twice the jet speed. (D) independent of the jet speed.
16. A cylinder contains 5 m^3 of an ideal gas at a pressure of 1 bar . This gas is compressed in a reversible isothermal process till its pressure increases to 5 bar . The work in kJ required for this process is
 (A) 804.7 (B) 953.2 (C) 981.7 (D) 1012.2
17. For an opaque surface, the absorptivity (α), transmissivity (τ) and reflectivity (ρ) are related by the equation:
 (A) $\alpha + \rho = \tau$ (B) $\rho + \alpha + \tau = 0$ (C) $\alpha + \rho = 1$ (D) $\alpha + \rho = 0$
18. The word **kanban** is most appropriately associated with
 (A) Economic order quantity (B) Just-in-time production
 (C) Capacity planning (D) Product design
19. In computer aided drafting practice, an arc is defined by
 (A) two end points only (B) center and radius
 (C) radius and one end point (D) two end points and centre
20. NC contouring is an example of
 (A) continuous path positioning (B) point-to-point positioning
 (C) absolute positioning (D) incremental positioning

Money