

## Multiple Choice Questions:

1. Failure due to excessive deformation is controlled by \_\_\_\_\_.  
(a) Material properties (b) Design & Dimensions (c) Both (d) None
2. Failure due to excessive deformation is controlled by \_\_\_\_\_.  
(a) Yield strength (b) Tensile strength (c) Young's modulus (d) All
3. Time dependent yield is known as  
(a) Fracture (b) Fatigue (c) Buckling (d) Creep
4. Cleavage fracture appears  
(a) Bright (b) Dull (c) Difficult to identify (d) None
5. Usually materials with following crystal structure fail in ductile mode  
(a) FCC (b) BCC (c) HCP (d) None
6. Brittle fracture is more dangerous than ductile fracture because \_\_\_\_\_.  
(a) No warning sign  
(b) Crack propagates at very high speeds  
(c) No need for extra stress during crack propagation  
(d) All
7. Fracture voids usually form at  
(a) Inclusions (b) Second phase particles (c) Grain boundary triple points (d) All
8. Fracture stress ( $\sigma_f$ ) is proportional to  
(a) crack length (b) 1/crack length (c) (crack length)<sup>1/2</sup> (d) (crack length)<sup>-1/2</sup>
9. Fracture toughness is measured in terms of  
(a) Strain energy release rate (b) Stress concentration factor (c) Both (d) None
10. In fracture mode-II, fracture surfaces  
(a) shear parallel to edge of crack  
(b) shear perpendicular to edge of crack  
(c) displace normal to each other  
(d) None
11. Fracture toughness,  $K_{IC}$ , decreases with  
(a) increasing temperature  
(b) increasing strain rate  
(c) increase in yield strength  
(d) increase in grain size
12. DBTT for ceramics is in the range of \_\_\_\_\_ X  $T_m$ .  
(a) 0.1-0.2 (b) 0.2-0.3 (c) 0.3-0.5 (d) 0.5-0.7
13. Following impurity decreases DBTT for steels  
(a) Mn (b) P (c) Si (d) Mo
14. Fatigue strength for non-ferrous materials is defined at \_\_\_\_\_ stress cycles.  
(a)  $10^3$  (b)  $10^5$  (c)  $10^7$  (d)  $10^9$
15. The following equation defines S-N curve  
(a) Paris equation (b) Basquin equation (c) Andrede equation (d) Garofalo equation
16. Creep rate in ternary stage \_\_\_\_\_.  
(a) Decreases (b) Constant (c) Increases (d) None
17. Ternary stage creep is associated with \_\_\_\_\_.  
(a) Strain hardening (b) Recovery (c) Necking (d) None
18. Total strain range in a creep test  
(a) <1% (b) around 10% (c) around 50% (d) >>50%
19. Creep mechanism that is operational at stresses  $10^{-2} > \sigma/G > 10^{-4}$  \_\_\_\_\_.  
(a) Dislocation creep (b) Dislocation glide (c) Diffusion creep (d) GB sliding
20. Most often machine components fail by  
(a) Buckling (b) Creep (c) Fatigue (d) All

21. If the surface crack causing fracture in a brittle material is made twice as deep, the fracture strength will
- (a) decrease by a factor of  $\sqrt{2}$
  - (b) decrease by a factor of 2
  - (c) decrease by a factor of  $2^2$
  - (d) No change

Answers:

1. c
2. c
3. d
4. a
5. a
6. d
7. d
8. d
9. c
10. b
11. b
12. a
13. a
14. c
15. b
16. c
17. c
18. a
19. a
20. c
21. a