



**SIR PADAMPAT SINGHANIA UNIVERSITY
UDAIPUR**

**Sample Question Paper for Ph.D. (Mechanical Engineering)
SPSAT'18**

INSTRUCTIONS

The test is 60 minutes long & consists of 40 multiple choice questions (MCQ) adding up to 40 marks.

1. The component of the total force exerted by fluid on a body in the direction parallel to the direction of motion is called as
(a) Lift (b) Drag (c) Both (a) & (b) (d) None of the above
2. Square root of the ratio of inertia force to elastic force is called as
(a) Mach's Number (b) Cauchy's Number (c) Both (a) & (b) (d) None of the above
3. What is the ratio of maximum velocity to average velocity, when the fluid is passing through two parallel plates & flow is laminar?
(a) $3/2$ (b) $2/3$ (c) $4/3$ (d) $3/4$
4. Which of the following production processes is least flexible?
(a) Job order production (b) Batch or quantity production
(c) Mass production (d) None of the above
5. The patterns which are made in two or more pieces are called as
(a) Solid patters (b) Split patterns
(c) Loose piece patterns (d) None of the above
6. Which casting process has no size & shape limits?
(a) Sand casting (b) Shell-mould casting
(c) Plaster-mould casting (d) None of the above
7. Which characteristic of material is used in forging process?
(a) Characteristics of elasticity of material (b) Characteristics of ductility of material
(c) Characteristics of plasticity of material (d) None of the above
8. What is the process, in which the metal is caused to flow through a restricted orifice to create an extremely elongated strip of uniform & comparatively smaller cross-sectional area, called?
(a) Rolling (b) Extrusion (c) Drawing (d) Spinning
9. Hot working process is the plastic deformation of metal which is carried out
(a) At temperature below the recrystallisation temperature
(b) At temperature above the recrystallisation temperature

- (c) At temperature equals to boiling point of water
 (d) None of the above
10. What is used as joining medium in brazing operation?
 (a) Copper-zinc alloy (b) Nickel-silver alloy (c) Lead-tin alloy (d) All of the above
11. Calculate time taken to face a work piece of 100 mm diameter. The cross feed is 0.2 mm/rev & spindle speed is 200 r.p.m.
 (a) 10 min (b) 5 min (c) 2.5 min (d) 1.25 min
12. Which operation can correct hole location, size or alignment of the hole which is already drilled in work piece?
 (a) Boring (b) Rimming (c) Both (a) & (b) (d) None of the above
13. Which type of mechanism is used in shaper machine?
 (a) Indexing mechanism (b) Four-bar chain mechanism
 (c) Quick return mechanism (d) None of the above
14. Which type of chips form while machining of brittle materials?
 (a) Continuous chips (b) Discontinuous chips
 (c) Built-up chips (d) All of the above with some proportion
15. In Electrical Discharge Machining (EDM) process the metal removal is carried out by
 (a) Electrolysis (b) Melting & vaporisation
 (c) Fracture of work material due to impact of grains
 (d) None of the above
16. Which of the following condition is true for uniform wear theory?
 (a) $p = \text{constant}$ (b) $p/r = \text{constant}$ (c) $p.r = \text{constant}$ (d) None of the above
17. Watt's mechanism is based on
 (a) Inversions of single slider chain mechanism
 (b) Inversions of double slider chain mechanism
 (c) Inversions of four bar chain mechanism (d) Inversions of five bar chain mechanism
18. What is meant by pitching of ship?
 (a) Up & down motion of bow & stern along transverse axis
 (b) Up & down motion of bow & stern along longitudinal axis
 (c) Up & down motion of port & starboard along transverse axis
 (d) None of the above
19. Gyroscopic effect is not observed in which of the following actions performed by the ships?
 (a) Rolling (b) Pitching (c) Steering (d) All of the above
20. In spiral gears if normal circular pitch is 13 mm. What is the normal module?

- (a) 40.84 mm (b) 2.06 mm (c) 4.13 mm (d) None of the above

21. Interference in gear tooth profiles can be avoided by

- (a) Modifying tooth profile
(b) Modifying center distance between pinion & wheel
(c) Both (a) & (b) (d) None of the above

22. In parallel flow heat exchangers,

- (a) The exit temperature of hot fluid is always equal to the exit temperature of cold fluid
(b) The exit temperature of hot fluid is always less than the exit temperature of cold fluid
(c) The exit temperature of hot fluid is always more than the exit temperature of cold fluid
(d) We cannot predict comparison between exit temperatures of hot fluid & cold fluid

23. The Grashof number in natural convection plays same role as

- (a) Prandtl number (Pr) in forced convection (b) Reynolds number (Re) in forced convection
(c) Nusselt number (Nu) in forced convection (d) None of the above

24. Calculate area of a pipe if, flow rate is 20 l/min & flow velocity is 5 cm/s.

- (a) 66.66 cm² (b) 60 cm² (c) 62 cm² (d) None of the above

25. What is the degree of subcooling?

- (a) The difference between saturation temperature of liquid & actual temperature of liquid
(b) The difference between saturation temperature of vapour & actual temperature of liquid
(c) The difference between saturation temperature of liquid & actual temperature of vapour
(d) The difference between saturation temperature of vapour & actual temperature of vapour

26. A cyclic heat engine operates between a source temperature of 927 °C & a sink temperature of 27 °C. What will be the maximum efficiency of the heat engine?

- (a) 100 % (b) 80 % (c) 75 % (d) 70 %

27. Humidification is the process of addition moisture in air at

- (a) Constant wet bulb temperature (b) Constant dry bulb temperature
(c) Constant latent heat (d) None of the above

28. What is the entropy of the system at equilibrium state?

- (a) Zero (b) Minimum (c) Maximum
(d) Constant but not maximum

29. Which of the following is a not a surface finishing process?

- (a) Honing (b) Buffing (c) Lapping (d) Turning

30. In which of the following processes, material is neither added nor removed but is deformed into desired shape?

- (a) Surface finishing process (b) Metal forming process

- (c) Casting (d) Machining
31. Which design consideration deals with appearance of the product?
 (a) Ergonomics (b) Aesthetics (c) System design (d) Creative design
32. Factor of safety is the ratio of _____
 (a) Working stress & ultimate strength (b) Yield strength & endurance strength
 (c) Ultimate strength & yield strength (d) Yield strength & working stress
33. The elongation of a bar is 0.5 mm, when a tensile stress of 200 N/mm² acts on it. Determine original length of a bar if modulus of elasticity is 150×10^3 N/mm²
 (a) 375.93 mm (b) 300 mm (c) 360 mm (d) None of the above
34. Why is an idler gear used in gear trains?
 (a) To obtain minimum centre distance between driving & driven shaft
 (b) To have required direction of rotation (c) Both (a) & (b)
 (d) None of the above
35. Determine torque transmitted on the pinion shaft if torque transmitted on gear shaft is 20 Nm. Consider Gear ratio = 4
 (a) 8 Nm (b) 5 Nm (c) 80 Nm (d) 16 Nm
36. Which type of bearings are known as antifriction bearings?
 (a) Sliding contact bearings (b) Rolling contact bearings
 (c) Both (a) & (b) (d) None of the above
37. The component deforming progressively under load at high temperatures is called as
 (a) Resilience (b) Creep (c) Fatigue (d) All of the above
38. Determine logarithmic decrement, if the amplitude of a vibrating body reduces to 1/6th in two cycles.
 (a) 0.223 (b) 0.8958 (c) 0.3890 (d) None of the above
39. Which theory gives satisfactory results for brittle materials?
 (a) Maximum shear stress theory (b) Maximum principle stress theory
 (c) Shear strain energy theory (d) None of the above
40. Slenderness ratio is the ratio of effective length of column &
 (a) lateral dimension of a column (b) least radius of gyration of a column
 (c) maximum radius of gyration of a column (d) none of the above