



**SIR PADAMPAT SINGHANIA UNIVERSITY
UDAIPUR**

**Sample Question Paper for M.Tech
(Civil Engineering) SPSAT'18**

INSTRUCTIONS

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

1. Shear stress on principal planes is
(a) Zero (b) Maximum (c) Minimum (d) None of the above
2. A beam of triangular cross section is placed with its base horizontal. The maximum shear stress intensity in the section will be
(a) At the neutral axis (b) At the base
(c) Above the neutral axis (d) Below the neutral axis
3. Buckling load for a given column depends upon
(a) Length of column only (b) Least lateral dimension only
(c) Both length & least lateral dimension (d) None of the above
4. A beam simply supported at both the ends, of length "L" carries two equal unlike couples M at two ends. If the flexural rigidity $EI = \text{constant}$, then the central deflection of beam is given by
(a) $ML^2/4EI$ (b) $ML^2/16EI$ (c) $ML^2/64EI$ (d) $ML^2/8EI$
5. Castigliano's first theorem is applicable
(a) For statically determinate structures only
(b) When the system is elastic
(c) Only when principle of superposition is valid
(d) None of the above
6. The moment required to rotate the near end of a prismatic beam through a unit angle without translation, the far end being simply supported, is given by
(a) $3EI/L$ (b) $4EI/L$ (c) $2EI/L$ (d) EI/L
where EI is flexural rigidity & L is span of the beam.
7. A two hinged semicircular arch of radius R carries a concentrated load W at the crown. The horizontal thrust is
(a) $W/2\pi$ (b) W/π (c) $2W/3\pi$ (d) $4W/3\pi$

8. A fixed beam of uniform section is carrying a point load at its mid-span. If the moment of inertia of the middle half-length is now reduced to half its previous value, then the fixed end moments will
- (a) Increase (b) Decrease
(c) Remain constant (d) Change their directions
9. The ratio of the diameter of reinforcing bars & the slab thickness is
- (a) 1/4 (b) 1/5 (c) 1/6 (d) 1/8
10. The limits of percentage p of the longitudinal reinforcement in a column is given by
- (a) 0.15% to 2% (b) 0.8% to 4% (c) 0.8% to 6% (d) 0.8% to 8%
11. The minimum diameter of longitudinal bars in a column is
- (a) 6 mm (b) 8 mm (c) 12 mm (d) 16 mm
12. The partial safety factor for steel as per IS:456-2000 is taken as
- (a) 1.15 (b) 1.35 (c) 1.50 (d) 1.65
13. The plastic section modulus for a rectangular section of width b & depth d is
- (a) $bd^2/3$ (b) $bd^2/4$ (c) $bd^2/6$ (d) $bd^2/12$
14. Horizontal stiffener in a plate girder is provided to safeguard against
- (a) Shear buckling of web plate (b) Yielding
(c) Compression buckling of web plate (d) All of the above
15. Minimum pitch provide in riveted steel tanks is
- (a) 1.5d (b) 2.0d (c) 2.5d (d) 3.0d
- Where d is diameter of rivets.
16. The ratio of the lateral strain to the longitudinal strain is a constant. This ratio is given by
- (a) Castigliano (b) Poisson (c) Euler (d) Newton
17. Which of the following BIS codes is used for the design of steel structures?
- (a) IS:456 (b) IS:800 (c) IS:875 (d) IS:343
18. Udaipur lies in which of the following seismic zones
- (a) II (b) III (c) IV (d) V
19. If a material has identical properties in all directions, it is said to be
- (a) Homogeneous (b) Esotropic (c) Elastic (d) Orthotropic
20. If a composite bar of steel & copper is heated, then the copper will be under
- (a) Tension (b) Compression (c) Shear (d) Torsion
21. For quality control of Portland cement, the test essentially done is
- (a) Setting time (b) Soundness & consistency
(c) Tensile strength (d) All of the above

22. Under normal conditions using ordinary cement, the period of removal of the form work is:
- 7 days for beam soffits
 - 14 days for bottom slabs of spans 4.6 m & more
 - 21 days for bottom beams over 6 m spans
 - All of the above
23. M10 grade of concrete approximates
- 1 : 3 : 6 mix
 - 1 : 1 : 2 mix
 - 1 : 2 : 4 mix
 - 1 : 1.5 : 3 mix
24. For ensuring quality of concrete, use
- Single sized aggregates
 - Two sized aggregate
 - Graded aggregates
 - Coarse aggregates.
25. The risk of segregation is more for
- Wetter mix
 - Larger proportion of maximum size aggregate
 - Coarser grading
 - All of the above
26. In a liquid limit test, the moisture content at 10 blows was 70% & that at 100 blows was 20%. The liquid limit of the soil, is
- 35%
 - 50%
 - 65%
 - None of the above
27. The minimum water content at which the soil just begins to crumble when rolled into threads 3 mm in diameter, is known
- Liquid limit
 - Plastic limit
 - Shrinkage limit
 - Permeability limit
28. Which one of the following statements is true?
- Clays are more porous than sands
 - Pressure of organic matter in a soil decreases the bearing capacity of the soil
 - Aluminous cement is used for foundations in soils with chemical deposits
 - All of the above
29. The effective size of particles of soil is denoted by
- D_{10}
 - D_{20}
 - D_{30}
 - D_{60}
30. The seepage force in a soil, is
- Perpendicular to the equipotential lines
 - Proportional to the exit gradient
 - Proportional to the head loss
 - All of the above
31. The ratio of the volume of voids to the volume of soil solids in a given soil mass, is known
- Porosity
 - Specific gravity
 - Void ratio
 - Water content

32. A partially saturated sample of soil has a unit weight of 2.0 g/cm^3 & specific gravity of soil particles is 2.6. If the moisture content in the soil is 20%, the degree of saturation is
(a) 20% (b) 77% (c) 92% (d) None of the above
33. The liquid limit & plastic limit exist in
(a) Sandy soils (b) Silty soils (c) Gravel soils (d) Clay soils
34. A Pitot tube is used to measure
(a) Pressure (b) Difference in pressure
(c) Velocity of flow (d) None of the above
35. Unit of kinematic viscosity is
(a) m^2/sec (b) Newton-sec/m^2 (c) Newton-sec/m^3 (d) Kg-sec/m^2
36. The shear stress distribution in viscous fluid through a circular pipe is:
(a) Maximum at the center (b) Maximum at the inside of surface
(c) Same throughout the section (d) None of the above
37. Reynolds's number is the ratio of inertial force &
(a) Viscosity (b) Elasticity (c) Gravitational force (d) Surface tension
38. The phenomenon occurring in an open channel when a rapidly flowing stream abruptly changes to a slowly flowing stream causing a distinct rise of liquid surface, is
(a) Water hammer (b) Hydraulic jump (c) Critical discharge (d) None of the above
39. Highest dam in India, is
(a) Bhakra dam (b) Hirakund dam (c) NagarjunaSagar dam (d) Iddiki dam
40. Atmospheric pressure varies with
(a) Altitude (b) Temperature (c) Weather conditions (d) None of the above