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UDAIPUR
Sample Question Paper for M.Tech.
(Mechanical Engineering) SPSAT'18

INSTRUCTIONS

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

1. An ideal gas as compared to a real gas at very high pressure occupies

   (a) More volume
   (b) Less volume
   (c) Same volume
   (d) Unpredictable behavior

2. Work done in an adiabatic process between a given pair of end states depends on

   (a) The end states only
   (b) Particular adiabatic process
   (c) The value of index n
   (d) the value of heat transferred

3. If value of n is infinitely large in a poly tropic process $PV'' = C$, then the process is known as constant

   (a) Volume
   (b) Pressure
   (c) Temperature
   (d) Enthalpy

4. The index of compression n tends to reach ratio of specific heats y when

   (a) Flow is uniform and steady
   (b) Process is isentropic
   (c) Process is isothermal
   (d) Process is isentropic and specific heat does not change with temperature

5. What does symbol 'D' imply in work study

   (a) Inspection
   (b) Transport
   (c) Delay temporary storage
   (d) Permanent storage

6. The efficiency of Dieseil cycle with decrease in cut off

   (a) Increases
   (b) Decreases
   (c) Remains unaffected
   (d) First increases and then decreases

7. The ideal efficiency of a Brayton cycle without regeneration with increase ni pressure ratio will

   (a) Increase
   (b) Decrease
   (c) Remain unchanged
   (d) Increase/decrease depending on application

8. LMTD in case of counter flow heat exchanger as compared-to parallel flow heat exchanger is

   (a) Higher
   (b) Lower
   (c) Same
   (d) Depends on the area of heat exchanger
   (e) Depends on temperature conditions.

9. In free convection heat transfer, Nusselt number is function of

   (a) Grashoff no. & Reynold no.
   (b) Grashoff no. & Prandtl no.
   (c) Prandtl no. & Reynold no.
   (d) Grashoff no., Prandtl no. & Reynold no.

10. In a forced vortex, the velocity of flow everywhere within the fluid is

    (a) Maximum   (b) Minimum   (c) Zero   (d) Non-zero finite

11. A streamline is defined as the line

    (a) Parallel to central axis flow   (b) Parallel to outer surface of pipe

    (c) Of equal velocity in a flow   (d) Along which the pressure drop is uniform

12. Total pressure on a l m2 gate immersed vertically at a depth of 2 m below the free water surface will be

    (a) 1000 kg   (b) 4000 kg   (c) 2000 kg   (d) 8000 kg

13. The centre of gravity of the volume of the liquid displaced by an immersed body is called

    (a) Centre of gravity   (b) Centre of pressure

    (c) Metacentre   (d) Centre of buoyancy

14. Which one of the following statements is not correct

    (a) The tangent of the angle of friction is equal to coefficient of friction

    (b) The angle of repose is equal to angle of friction

    (c) The tangent of the angle of repose is equal to coefficient of friction

    (d) The sine of the angle of repose is equal to coefficient to friction

15. The elasticity of various materials is controlled by its

    (a) Ultimate tensile stress   (b) Proof stress

    (c) Stress at yield point   (d) Stress at elastic limit

16. Poisson's ratio is defined as the ratio of

    (a) Longitudinal stress and longitudinal strain

    (b) Longitudinal stress and lateral stress

    (c) Lateral stress and longitudinal stress

    (d) Lateral stress and lateral strain

17. A boiler shell 200 cm diameter and plate thickness 1.5 cm is subjected to internal pressure of 1.5 MN/m2 , then the hoop stress will be

    (a) 30 MN/m2   (b) 50 MN/m2   (c) 100 MN/m2   (d) 200 MN/m2

18. The torsional rigidity of a shaft is expressed by the

    (a) Maximum torque it can transmit

    (b) Number of cycles it undergoes before failure

    (c) Elastic limit upto which it resists torsion, shear and bending stresses

    (d) Torque required to produce a twist of one radian per unit length of shaft

19. Shear stress induced in a shaft subjected to torsion will be

    (a) Maximum at periphery and zero at center   (b) Maximum at center

    (c) Uniform throughout   (d) Average value in center

20. The velocity of any point in mechanism relative to any other point on the mechanism on velocity polygon is represented by the line

    (a) Joining the corresponding points   (b) Perpendicular to line as per (a)

    (c) Not possible to determine with these data   (d) At 45° to line as per (a)

21. Lower pairs are those which have

    (a) Point or line contact between the two elements when in motion

    (b) Surface contact between the two elements when in motion

    (c) Elements of pairs not -held together mechanically

    (d) Two elements that permit relative motion

22. A pantograph is a mechanism with

    (a) Lower pairs   (b) Higher pairs   (c) Rolling pairs   (d) Turning pairs

23. Klein's construction is useful to determine

    (a) Velocity of various parts   (b) Acceleration of various parts

    (c) Displacement of various parts   (d) Angular acceleration of various parts

24. If p = bearing pressure on projected bearing area, z = absolute viscosity of lubricant, and N = speed of journal, then the bearing characteristic number is given by

    (a) ZN/p   (b) p/ZN   (c) Z/pN   (d) N/Zp

25. If two springs are in parallel then their overall stiffness will be

    (a) Half   (b) Same   (c) Double   (d) Unpredictable

26. The piston rod of a steam engine is usually connected to the cross head by means of

    (a) Bolted joint   (b) Knuckle joint   (c) Cotter joint   (d) Universal joint

27. Babbit metal is a

    (a) Lead base alloy   (b) Tin base alloy   (c) Copper base alloy   (d) (a) & (b)

28. The machinability of steel is increased by

    (a) Silicon & sulphur   (b) Phosphorous, lead & sulphur

    (c) Sulphur, graphite & aluminium   (d) Phosphorous & aluminium

29. The hardness of steel increases if it contains

    (a) Austenite   (b) Martensite   (c) Pearlite   (d) Cementite

30. Pick up the correct statement. Dummy activity on a PERT/CPM chart means, it

    (a) Consumes time, but no resources   (b) Consumes resources but no time

    (c) Consumes neither time nor resources   (d) Is a dangling event

31. Queing theory is associated with

(a) Sales (b) Inspection time

(c) Waiting time (d) Production time (e) Inventory

32. In A-B-C control policy, maximum attention is given to

(a) Those items which consume money (b) Those items which are not readily available

(c) Those items which are in more demand (d) Those items which consume more money

33. Jigs and fixtures are

(a) Machining tools (b) Precision tools (c) Both (a) & (b) (d) None of the above

34. Several machine tools can be controlled by a central computer in

(a) NC (Numerical Control) machine tool

(b) CNC (Computer Numerical Control) machine tool

(c) DNC (Direct Numerical Control) machine tool

(d) CCNC (Central-Computer Numerical Control) machine tool

35. Which of the following materials is/are used for Electrical Discharge Machining (EDM) process?

(a) Brass (b) Copper (c) Graphite (d) All of the above

36. In which process the material is removed due to the action of abrasive grains?

(a) Electro-Chemical Grinding (ECG) (b) Ultrasonic Machining (USM)

(c) Laser Beam Machining (LBM) (d) Electrical Discharge Machining (EDM)

37. Which type of chips form while machining of brittle materials?

(a) Continuous chipsq (b) Discontinuous chips

(c) Built-up chips (d) All of the above with some proportion

38. Tool life in orthogonal cutting is

(a) More than the tool life in oblique cutting (b) Less than the tool life in oblique cutting

(c) Equal to the tool life in oblique cutting (d) Cannot say

39. Calculate the power required for machining of a work piece on lathe having efficiency of 85% on full load, when tangential force required is 1200 N and cutting speed 195 m/min.

(a) 4.59 Kw (b) 275.29 W (c) 3.315 kW (d) Insufficient data

40. The process of bevelling sharp ends of a work piece is called as _____

(a) Knurling (b) Grooving (c) Facing (d) Chamfering