U.S.N

P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)
Fifth Semester, B.E. - Mechanical Engineering
Semester End Examination; February / March - 2022
Problem solving Skill for Competitive Examinations (Technical Skills - I)

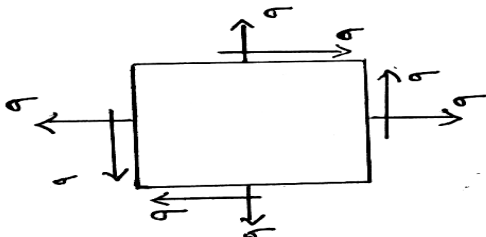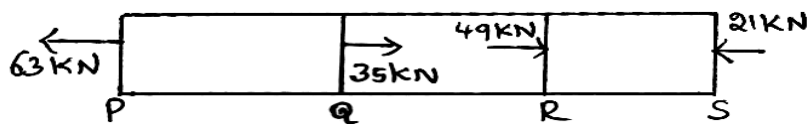*Time: 2 hrs* *Max. Marks: 50*

Course Outcomes

The Students will be able to:
CO1: Show the performance in competitive examinations.
CO2: Apply the technical skill to attend all kind of competitive examinations.
CO3: Develop the knowledge to solve real problems.

Note: All *questions are **compulsory** and each question carries **TWO** marks.*

Q. No.	Questions	Marks	BLs	COs	POs
1.	The maximum energy which can be stored in a body upto the elastic limit is called A) Proof Resilience B) Modulus of Resilience C) Impact toughness D) Endurance strength	2	L1	CO1	PO1
2.	Aluminum and mild steel having same cross section area are loaded with same force, The value of stress in Aluminum _____ with respect to mild steel A) Increases B) Decreases C) Remains Same D) May increase or decrease	2	L2	CO1	PO2
3.	The maximum principal stress for the stress state shown in figure is A) σ B) 2σ C) 3σ D) 1.5σ	2	L3	CO1	PO2
4.	Deformation formula for circular tapers cross section bar with length taper cross section bar of length l and diameter d_1, d_2 is A) $\dfrac{Pl \quad \ln\left(d_1/d_2\right)}{E+\left(d_1-d_2\right)}$ B) $\left(\dfrac{4pl}{\pi d_1 d_{2E}}\right)$ C) $\dfrac{1}{2}\left(\dfrac{wl}{AE}\right)$ D) $\dfrac{pl}{d_1 d_{2E}}$	2	L1	CO1	PO1
5.	A bar having a cross-sectional area of $700mm^2$ is subjected to axial loads at the position indicated. Determine the net tensile force on segment QR A) 25 kN B) 28 kN C) 27 kN D) 98 KN	2	L3	CO1	PO2

6. Match the items in columns 1 and II

	Column I		Column II
P.	Addendum	1.	Cam
Q	I – Center	2.	Beam
R.	Section Modulus	3.	Linkage
S	Prime Circle	4.	Gear

2   L1   CO1   PO1

   A) P-4, Q-3, R-2, S-1   B) P-4, Q-2, R-3, S-1

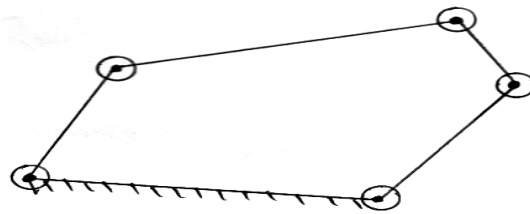   C) P-3, Q-4, R-1, S-4   D) P-3, Q-4, R-1, S-2

7. The Whitworth Quick Return mechanism is formed in a slider-crank chain when the

2   L2   CO1   PO1

   A) Coupler link is fixed   B) Longest link is fixed link

   C) Slider is a fixed link   D) Smallest link is a fixed link

8. A five link planar mechanism with five revolute pairs is as shown in the Figure. Determine the number of degrees of freedom of this mechanism is

2   L3   CO1   PO2

   A) 3   B) 2   C) 4   D) 0

9. Surface tension is due to

   A) Viscous forces   B) Cohesion

2   L1   CO2   PO1

   C) Adhesion   D) The difference between adhesion and cohesion.

10. Which one of the following is the condition for stable equilibrium of a floating body?

   A) The meta centre coincides with the centre of gravity

   B) The meta centre is above the centre of gravity

2   L1   CO2   PO1

   C) The meta centre is below the centre of gravity

   D) The centre of buoyancy is below the centre of gravity

11. A stream line is a line

   A) which is along path of the particle

   B) which is always parallel to the main direction of flow

2   L1   CO2   PO1

   C) along which there is no flow

   D) on which tangent drawn at any point gives the direction of velocity

12. Reynolds number is _____ for turbulent flow in pipe

   A) less than 2000   B) 2000-4000

2   L1   CO2   PO1

   C) less than 4000   D) Greater than 4000

13. Match List – I (Dimensionless number) with List – II (Dimensionless number) with List II (Nature of list forces) and select the correct answer using he codes given below the lists:

List I		List II	
A.	Euler number	1.	Surface tension
B.	Weber number	2.	Gravity
C.	Mach number	3.	Pressure
D	Fraude number	4.	Elastic

2   L1   CO2   PO1

Codes :

	A	B	C	D
A)	3	1	4	2
B)	3	4	1	2
C)	4	1	2	3
D)	4	2	1	3

14. Number of components(c) Phases (P) and degree of freedom (F) are related by Gibbs phase rule as:

A) C – P – F = 2   B) P + F – C = 2

C) F – C – P = 2   D) C + F – P = 2

2   L1   CO2   PO1

15. The ratio of two extensive property is always :

A) Intensive   B) Extensive

C) May be intensive or extensive   D) None of the above

2   L2   CO2   PO1

16. An ideal gas at 27ºC is heated at constant pressure till its volume constant pressure till its volume becomes three times. What would be the temperature of gas?

A) 81°C   B) 627°C   C) 543°C   D) 327°C

2   L3   CO2   PO2

17. An engine working on Carnot cycle rejects 40% of absorbed heat from the source, while the sink temperature is maintained at 27ºC then the source temperature is

A) 750°C   B) 203°C   C) 67.5°C   D) 477°C

2   L3   CO2   PO2

18. Three engines A, B and C operating on Carnot cycle use working substance as argon, Oxygen and air respectively. Which engines have higher efficiency?

A) Engine A   B) Engine B

C) Engine C   D) All engines have same efficiency

2   L1   CO2   PO1

19. Brinell hardness number is given by where P-load, D-dia of steel ball d-dia of indent

A) $BHN = \dfrac{P}{\dfrac{\pi D}{2}\left[D - \sqrt{D^2 - d^2}\right]}$ B) $BHN = \dfrac{PD}{2\pi\left[D - \sqrt{D^2 - d^2}\right]}$

C) $BHN = 1.41\dfrac{P}{D^2}$ D) $BHN = \dfrac{2P}{\pi D\left[D^2 - \sqrt{D^2 - d^2}\right]}$

2   L1   CO3   PO1

20. Select the correct relation between E, G & K

    A) $E = 3k(1-2G)$ B) $E = \dfrac{3KG}{2K+G}$ 2   L2   CO3   PO1

    C) $E = \dfrac{9KG}{3K+G}$ D) $E = 2G(1+G) =$

21. For a ductile material toughness is the measure of

    A) Resistance to scratching

    B) Ability to absorb energy upto fracture   2   L1   CO3   PO1

    C) Ability to absorb energy till elastic limit

    D) Resistance to identation

22. To improve the ductility and machinibility which of the heat treatment is most preferred

    A) Hardening

    B) Case Hardening   2   L1   CO3   PO1

    C) Annealing

    D) normalizing

23. The sudden change in shape of a structural component under load is called

    A) Deformation

    B) Impact   2   L1   CO3   PO1

    C) Buckling

    D) Deflection

24. Taylor's tool life equation is given by _____ where V-cutting speed, T-Tool life, C-machining constant N- Tool life Next exponent

    A) VT=C

    B) $VT^{\frac{1}{n}} = C$ 2   L1   CO3   PO1

    C) $VT^{-1} = C$

    D) $VT^{n} = C$

25. Which of the cutting tool material is used for very high speed machining operation?

    A) Cubic Boron Nitride

    B) Diamond   2   L1   CO3   PO1

    C) High speed steel

    D) Stellite

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