Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech Degree S6 (S,FE) (FT/WP/PT) Examination December 2025 (2019 Scheme)

Course Code: MET308
Course name: COMPREHENSIVE COURSE WORK

Max. Marks: 50   Duration: 1Hour

Instructions: *(1) Each question carries one mark. No negative marks for wrong answers*
        (2) Total number of questions: 50
        (3) All questions are to be answered. Each question will be followed by 4 possible answers of which only ONE is correct.
        (4) If more than one option is chosen, it will not be considered for valuation.

1. In a fluid the shear stress is proportional to ……….
   a) Rate of change of deformation
   b) Rate of change of mass
   c) Velocity gradient
   d) Applies force

2. The centre of pressure for a plane vertical surface lies at a depth of …………… the height of the immersed surface
   a) Two-third
   b) Half
   C) One third
   d) Full length

3. The differential manometers are used for
   a) Measuring pressure at a point
   b) Measuring fluid flow pressure
   c) The difference of pressure between the two points in a pipe
   d) Used to measure the gauge pressure

4. The force exerted by a static fluid on a vertical horizontal or an inclined plane immersed surface is
   a) $F = \rho g A \bar{h}$
   b) $F = \dfrac{\rho g \bar{h}}{A}$
   c) $F = m g A \bar{h}$
   d) $F = \rho g A \bar{h} \sigma \vartheta$

5. For a submerge body is said to be in static equilibrium when
   a) Centre of buoyancy above centre of gravity
   b) Meta centre is above the centre of gravity
   c) Meta centre and centre of gravity coincide
   d) None of the above

6. Flow net is defined as
   a) Grid obtained by drawing equipotential lines and stream lines
   b) Grid obtained by drawing streak lines and stream lines
   c) Derivative of potential function
   d) Negative derivative of equipotential function.

7. A flow is said to be viscous if………..
   a) The Reynold's number is
   b) The Reynold's number is less than 2000
   c) The Reynold's number is
   d) The Reynold's number is greater than 4000

	greater than 2000	between 2000 and 40000

8. The major losses in the pipe due to

a) Sudden contraction and bend
b) Due to pipe fittings and connections
c) Due to friction
d) Due to the pipe connectors

9. In a forced vertex flow in an open tank …………

a) Fall of liquid level at the centre equal to rise of liquid level at ends
b) Fall of liquid level at the centre greater to rise of liquid level at ends
c) Fall of liquid level at the centre lesser to rise of liquid level at ends
d) Momentum increases

10. The energy loss due to friction in a pipe is given by……….

a) Dracy's formula
b) Reynold's number
C) Newtons viscosity number
d) Bernoulli's principle

11 In a macroscopic view which of the following statement is true

a) Certain quantity of matter is considered without the events occurring at the molecular level being taken into account
b) Matter in molecular level is considered
c) The flow matter is considered
d) Mass of the system whole considered

12 The characteristics feature of a Quasistatic process is……….

a) Slowness
b) Infinite slowness
c) Equilibrium
d) Initial and final states are same

13 In a constant volume gas thermometer, which of the following property is used to measure the temperature

a) Volume
b) Pressure
c) Thermal emf
d) Mass

14 The basic principle for the measurement of temperature is ………..

a) Newtons law of cooling
b) First law of TD
c) Zeroth law of TD
d) Pressure volume relationship.

15 Under what condition the work done is equal to $\int_1^2 pdV$

a) During equilibrium condition
b) Process is quasistatic
c) End state point is same
d) During the point function.

16 A refrigerator and heat pump operates between the same temperature limits. If COP of the refrigerator is 4,then COP of the heat pump would be

a) 3
b) 5
c) 4
d) Cannot be predict

17 The equation $TdS = dU + pdV$ can be applied to the processes which are

a) Only reversible
b) Only irreversible
c) Reversible or irreversible
d) None of the above

18 A heat engine is supplied with 300kJ/s heat at 600 K and rejects 100 kJ/s at 300 K. The data refers to
  a) Reversible cycle   b) Irreversible cycle   c) Impossible cycle   d) None of the above

19 The change in entropy of a closed system….

  a) Is same for every process between two specified states
  b) Is not same for every process between two specified states
  c) Is same only for isothermal processes between two specified states
  d) Is same only for reversible adiabatic processes between two specified states

20 Gibbs function is expressed as

  a) $U + pV - TS$ b) $U + pV - TdS$ c) $U + dpdV - TS$ d) $dU + pV - TS$

21 In a covalent bond the electrons are ………..

  a) Accepted   b) Shared   c) Donated   d) Donated and accepted

22 Give below statements which condition is satisfied for the formation of Ionic bond

  a) The low ionisation energy of the atoms performing the action
  b) Negative and positive charges of the electron
  c) Pressure and temperature
  d) None of these

23 Total number of atoms in BCC structure is

  a) 8   b) 4   c) 2   d) 9

24 The ability of a material to withstand pressure induced distortion is known as

  a) Plasticity   b) Elasticity   c) Porosity   d) Fluidity

25 The mechanism explaining the generation of multiple dislocations in specified well-spaced slip plane in crystal is known as
  a) Crystallization mechanism   b) Frank read source   c) Dislocation mechanism   d) Super cooling

26 In an eutectoid reaction…….

  a) Reaction occurs in a point at which one single solid phase transforms into two solid phases simultaneously upon cooling
  b) Reaction occurs at point in which liquid phase transforms into two soild phases
  c) Molten soild phase react into secondary solid phase
  d) Point at which solidification starts

27 The system which shows a complete solubility of each other in solid phase and liquid phase is known as
  a) Isomorphous system   b) Single phase system   c) Mono crystal system   d) None of the above

28 The method adopted for the ferrous alloys to increase the toughness is known as ..

  a) Hardening   b) Tempering   c) Annealing   d) Case hardening

29   The test used to increase the hardenability of the steel is….

    a) Charpy test   b) Impact load test   c) Tensile test   d) Jominy end quench test

30   Rules that govern the formation of substantial sold solutions between two metals are known as

    a) Free thumb rule   b) Hume Rothery's rule   c) Gibb's phase rule   d) None of the above

31   The pattern which is used to make pipe tube and curved components are

    a) Loose piece pattern   b) Sweep pattern   c) Split pattern   d) Single piece pattern

32   The allowance that is given to a pattern in order to avoid the damage of leading edge break off is called

    a) Finishing allowance   b) Shake allowance   c) Draft allowance   d) Distortion allowance

33   Defects occurring due to improper design of gating system is known as

    a) Shrinkage   b) Crack   c) Blow holes   d) Holes

34   A portion in mould through which molten metal flows is known as ….

    a) Pouring basin   b) Runner   c) Sprue   d) Riser

35   The property of the material which influences the heat affected zone is ……….

    a) Thermal conductivity   b) Modulus of elasticity   c) Modulus of rigidity   d) Thermal diffusivity

36   Which NDT technique given below used for the welded joints ?

    a) Acid etch test   b) Free bend test   c) Eddy current test   d) Back bend test

37   The stress relieving occurs in metals by …………. With solid materials

    a) Diffusion of atoms   b) Due to the heat transfer   c) Dislocation of atoms   d) Propagation of heat

38   The arc welding process which uses a non-consumable electrode and shielding gas is …………..

    a) MIG welding   b) TIG welding   c) SAW   d) Molten metal pool welding

39   A hammer drop onto the metal to mould it into the shape of the die is known as

    a) Drop forging   b) Open-die forging   c) Close die forging   d) None of these

40   Which one is the defect in forging

    a) Inclusion   b) Cold shut   c) Process hole   d) None of these

41   Various kinematic pairs are given below. Choose the higher pair

    a) Roller bearing   b) Tooth gear in mesh   c) Cam and follower   d) All of the above

42   A mechanism have 7 links all binary pairs except one which is ternary pair. The number of instantaneous centres of rotation will be

    a) 14   b) 12   c) 21   d) 13

43   The kinematic chain having N links will have

    a) N-1 inversions   b) N inversions   c) N-2 inversions   d) N-3 inversions

44   A mechanism having n links will have the number of instantaneous centres equal to

    a) $2n$ b) $n(n-1)$ c) $(n-2)$ d) $n(n-1)/2$

45 In an offset slider crank mechanism with length of a connecting rod 'l' crank radius 'r' and offset 'e' the crank will be resolve only when
    a) $l < r + e$ b) $l > r + e$ c) $l < r - e$ d) $l \geq r + e$

46 The direction of Coriolis's component acceleration is such that it

| a) Leads the sliding velocity vector by 90^0 | b) Lags the sliding velocity vector by 90^0 | c) Is parallel to the sliding velocity vector | d) Depends upon the ratio of normal acceleration |

47 The cams are classified on the basis of

| a) Surface in contact between cams and follower | b) Types of movement of the follower on the cam | c) Line of motion of follower with respect to axis of cam | d) All of the above |

48 The path described by the trace point as referred to a cam is known as

| a) Base circle | b) Prime circle | c) Pitch circle | d) None of the above |

49 The stroke of the follower is equal to

| a) Half the travel of the follower from base circle | b) Maximum travel of the follower from the base circle | c) Half the travel of the follower from Pitch circle | d) maximum travel of the follower from pitch circle |

50 Automobile engines normally use cam and follower arrangement

| a) With knife edge follower | b) Roller follower | c) Mushroom follower with flat face | d) Mushroom follower with spherical face |

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