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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (R,S) / S6 (PT) / (WP) Examination April 2025 (2019 Scheme)

Course Code: MET 308

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. A simple U -tube manometer connected to a pipe in which liquid is flowing with a uniform speed will give……..

   a) Vacuum pressure b) Absolute pressure c) Gauge pressure d) Atmospheric pressure

2. In the stability of floating bodies, the equilibrium is attained, if the metacentre (M) point --------- the centre of gravity(G)

   a) Lies above b) Coincides with c) Is parallel to d) Lies below

3. A one-dimensional flow is one which

   a) Is uniform flow b) Is steady uniform flow c) Takes place in straight line d) Involves zero transverse component of flow

4. The pressure of the liquid flowing through the divergent portion of a Venturimeter

   a) Remains constant b) increases c) decreases d) Depends upon mass of liquid

5. According to Bernoulli's equation for steady ideal fluid flow

   a) Principle of conservation of mass holds b) Velocity and pressure are inversely proportional c) Total energy is constant throughout d) The energy is constant along a streamline but may vary across streamlines

6. The total pressure force on a plane area is equal to the area multiplied by the intensity of pressure at the Centroid, if

   a) The area is horizontal b) The area is vertical c) The area is inclined d) All of the above

7. The continuity equation is connected with

a) Open channel/pipe flow b) Compressibility of fluids c) Conservation of mass d) Steady/unsteady flow

8. The loss of head at exit of a pipe is (where v= Velocity of liquid in the pipe)

a) $v^2/2g$ b) $0.5v^2/2g$ c) $0.375v^2/2g$ d) $0.75v^2/2g$

9. The flow in which each liquid particle has a definite path and their paths do not cross each other is called

a) One dimensional flow b) Streamline flow c) Steady flow d) Turbulent flow

10. The line of action of the buoyant force acts through the Centroid of the

a) Submerged body b) Volume of the floating body c) Volume of the fluid vertically above the body d) Displaced volume of the fluid

11 A linearly elastic and perfectly plastic material is loaded slightly above the proportional limit. This will lead to.....

a) Fracture b) Small deformation c) Large deformation d) Cracking

12 Carbon content of mild steel can be

a) 0.15% b) 0.51% c) 0.87% d) 1.8%

13 Crystallographic structure of austenite is

a) BCC b) FCC c) HCP d) Simple cubic

14 Amorphous solids have _____ structure.

a) Regular b) Linear c) Irregular d) Dendritic

15 What is the atomic packing factor of BCC structure?

a) 0.54 b) 0.68 c) 0.74 d) 0.96

16 Which of the following is a point defect in crystals?

a) Edge dislocation b) Interstitialcies c) Grain boundaries d) Cracks

17 A disturbance in a region between two ideal parts of a crystal is known as

a) Boundary defect b) Point defect c) Line defect d) Volume defect

18 Generation of dislocations can be identified using _____

a) Schottky mechanism b) Burger's vector c) Twist d) Frank-Read mechanism

19 According to Hume-Rothery rules, for unlimited solubility difference in atomic sizes of solute and solvent should be less than _____

a) 10% b) 15% c) 20% d) 25%

20 Iron-Carbon phase diagram is a _____

a) Unary phase diagram
b) Binary phase diagram
c) Tertiary phase diagram
d) Ternary phase diagram

21 Heat and work are

a) Intensive properties
b) Extensive properties
c) Point functions
d) Path functions

22 The internal energy of an ideal gas is a function of

a) Temperature and Pressure
b) Volume and Pressure
c) Entropy and Temperature
d) Temperature Only

23 Which among the following has an infinite heat capacity

a) heat engine
b) thermal energy reservoir
c) both a. and b
d) none of the above

24 What is a quasi-static process

a) a process which is random
b) a process which is spontaneous
c) a process which is infinitely slow
d) a process which is stationary

25 Superheated vapour behaves:

a) exactly as gas
b) as steam
c) as ordinary vapour
d) approximately as a gas

26 The unit of energy in S.I. units is

a) watt
b) joule
c) joule/s
d) joule/m

27 According to Gay Lussac law for a perfect gas, the absolute pressure of given mass varies directly as:

a) temperature
b) absolute temperature, if volume is kept constant
c) volume, if temperature is kept constant
d) remains constant, if volume and temperature are kept constant

28 According to Dalton's law, the total pressure of the mixture of gases is equal to

a) greater of the partial pressures of all
b) average of the partial pressures of all
c) sum of the partial pressures of all
d) sum of the partial pressures of all divided by average molecular weight

29 What is the relation between the specific heat of gas at constant pressure (C_v) and the specific heat of gas at constant volume (C_p) at the absolute zero point?

a) $(C_p) > (C_v)$
b) $(C_p) < (C_v)$
c) $(C_p) = (C_v)$
d) Unpredictable

30 In an isothermal process, the internal energy

a) Increases b) Decreases c) Remains constant d) First increases then decreases

31 Which of the following is 'not' an allowance given to the pattern for casting?

a) Shrinkage b) Draft c) Hole d) Machining

32 The quality of the final product is not dependent on

a) Method of withdrawal of pattern b) Allowance provided to the pattern c) The complexity of the casting d) The metal used in Casting

33 Upper half of a mold is known as

a) Drag b)) Gating c) Cope d) Riser

34 In the forging operation, fullering is done to

a) Upset the material b) Bend the material c) Draw out the material d) Extrude the material

35 Hot working of metal is carried out

a) At the re-crystallization temperature b) below the re-crystallization temperature c) Above the re-crystallization temperature d) Just above the melting temperture

36 Which of the following is also called gas welding

a) Oxy fuel gas welding b) Metallic welding c) Arc welding d) Fuel gas welding

37 The inner cone of the flame in welding has the following nature

a) Highest temperature b) Coldest temperature c) Moderate temperature d) Uncertain

38 In plasma arc welding the gas is

a) Ionized b) Heated c) Magnetized d) Vaporized

39 In a four high rolling mill, there are four rolls out of which

a) One is working rolls and three are backing up rolls b) two are working rolls and two are backing up rolls c) three are working rolls and one is backing up roll d) All of the four are working rolls

40 In order to get uniform thickness of the plate by rolling process, one provides

a) Camber on the rolls b) Offset on the rolls c) Hardening of the rolls d) Antifriction bearings

41 In a kinematic chain a quaternary joint is equal to

a) One binary joint b) Two binary joint c) Three binary joint d) Four binary joint

42 Which of the following mechanism is not associated with a four bar linkage

a) Double -crank mechanism b) Double -rocker mechanism c) Crank- rocker mechanism d) Crank -shaper mechanism

43 The number of inversions for a slider crank mechanism is

a) 6 b) 5 c) 4 d) 3

44 Which of these is an approximate straight line motion mechanism

a) Scott Russell's mechanism b) Hart's mechanism c) Peaucellier mechanism d) Watt's mechanism

45 When the elements of a pair have ---------- when in motion, it is said to a lower pair

a) Line or point contact b) Surface contact c) Permit relative motion d) None of the mentioned

46 Cam with Knife edge follower is an example of ----------

a) Screw pair b) Lower pair c) Higher pair d) Spherical pair

47 Which among the following cam follower is extensively used in an aircraft engine

a) Spherical follower b) Roller follower c) Flat faced follower d) Knife edge follower

48 A cam in which the follower reciprocates or oscillates in a plane parallel to the axis of the cam is known as

a) Cylindrical cam b) Circular cam c) Reciprocating cam d) Tangent cam

49 In shaper mechanism, the Coriolis component of acceleration will

a) Not exist b) Exist c) Depends on position of crank d) None of the above

50 A cosine curve depicts simple harmonic motion of a cam follower .....

a) Normal stress diagram b) Acceleration diagram c) Velocity diagram d) Displacement diagram