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Pages: 5

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Supplementary Examination May 2023 (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. The centre of buoyancy of a submerged body.

a) Coincides with the centre of gravity of the body
b) Is always below the centre of gravity of the body
c) Coincides with the centroid of the displaced volume of the fluid
d) Is always above the centroid of the displaced of the fluid

2. In a capillary tube, the weight of the liquid raised is supported by.

a) Friction of tube
b) Vertical component of surface tension
c) Atmospheric pressure
d) Vapour pressure

3. Pascal's law states that pressure at a point is equal in all directions.

a) In a liquid at rest
b) In a fluid at rest
c) In a laminar flow
d) In a turbulent flow

4. The difference in pressure head measured by a mercury water differential manometer for a 20 cm difference of mercury level will be.

a) 2.72 m
b) 2.52 m
c) 2.0 m
d) 0.2 m

5. Velocity potential function when equated to a series of constants yields the equations of.

a) Path lines
b) Stream lines
c) Equipotential lines
d) U and V

6. Due to variation of venturimeter constant, venturimeters are not suitable for.

a) Low velocity
b) Low pressure
c) High pressure
d) High velocity

7. The boundary layer thickness in turbulent flow varies as.

a) $X^{2/3}$
b) $X^{4/5}$
c) $X^{1/7}$
d) $X^{3/7}$

8. One poise is equivalent to

a) 360 kg/m-hr
b) 9.81 kgf.sec/m^2
c) 1 dyne sec/cm^2
d) All of the above

9. What is the dynamic viscosity of liquid having kinematic viscosity 6 stokes and specific gravity 2?

a) 6 poise b) 12 poise c) 18 poise d) 14 poise

10. Printer ink is an example of.

a) Elastic solid b) Newtonian fluid c) Thyxotropic substance d) Non-Newtonian fluid

11 TTT diagram indicates time and temperature transformation of.

a) Cementite b) Ferrite c) Pearlite d) Austenite

12 Primary object of full annealing is to

a) Increase toughness and yield point (b) Reduce ductility and resilience b) Remove foreign impurities and improve surface finish c) Reduce ductility and resilience d) Increase ductility and machinability

13 Resilience of a material becomes important when it is subjected to.

a) Fatigue b) Shock loading c) Thermal stresses d) Pure static loading

14 Materials which show direction dependent properties are called.

a) Homogeneous b) Viscoelastic c) Isotropic d) Anisotropic

15 Gunmetal, which is used in journal bearings, contains

a) 88% Cu, 10% Sn, 2% Zn b) 80% Cu, 10% Zn, 10% Al c) 85% Cu, 5% Mg, 10% Al d) 85% Cu, 5% Sn, 10% Pb

16 Atomic packing factor for Face Centred Cubic (FCC) structure is.

a) 0.52 b) 0.74 c) 0.68 d) 0.64

17 As per Hume-Rothery rules of solid solubility, the difference between atomic sizes of solute and solvent should be less than:

a) 20% b) 25% c) 15% d) 28%

18 Ferrous metals include which of the following?

a) Cast iron, Aluminium b) Cast iron, Steel c) Steel, Copper d) Steel, Aluminium

19 Working of metals at temperature below their recrystallization temperature is defined as.

a) Hot working b) Cold working c) Hot spinning d) Cold spinning

20 Machinability of a steel is improved by adding.

a) Nickel and Chromium b) Nickel c) Chromium d) Sulphur, Lead and Phosphorus

21 Which of the following is NOT a thermal prime mover?

a) Water turbine b) Steam turbine c) Gas turbine d) petrol engine

22 This reading will be the same in Centigrade and Fahrenheit temperature units.

a) 100° b) - 100° c) 40° d) - 40°

23 Which one of the following is correct statement?

a) Latent heat is the heat that does not follow first law of thermodynamics
b) Latent heat is the heat that is required to change the substance from solid to gaseous state
c) Latent heat is the heat that can be detected.
d) Latent heat is the heat required to change a state of substance from liquid to gaseous state.

24 The statement that energy can neither be created nor be destroyed but can only be converted from one form to another is known as.

a) Avogadro's hypothesis b) Gay-Lussac's law c) Second Law of thermodynamics d) First Law of thermodynamics

25 Which one of the following is a heterogeneous system?

a) The cooling fluid in a radiator a) Atmospheric air a) Cooking gas in a cylinder a) A mixture of ice, water and steam

26 Maxwell's thermodynamic relations are valid for.

a) Closed system only a) All processes of thermodynamics a) Only reversible process a) A thermodynamic system in equilibrium

27 In a throttling process.

a) W=0 b) E=0 c) $\Delta H=0$ d) All of the above

28 A vessel having a volume of 0.6 m² contains 3 kg of liquid water and water vapour mixture in equilibrium. The specific volume of mixture is.

a) 0.2 m³//kg b) 0.5 m³/kg c) 1.8 m³/kg d) 5 m³/kg

29 A gas contained in a cylinder is compressed, the work required for compression being 5000 kJ. During this process, heat interaction of 2000 kJ causes the surroundings to be heated. The change in internal energy of the gas during the process is.

a) - 7000 kJ b) -3000 kJ c) + 3000 kJ d) +7000 kJ

30 The entropy may be expressed as a function of.

a) Pressure and temperature b) Volume and pressure c) Heat and work d) All of the above

31 In a three high rolling mill, the middle roll rotates in a direction _____ to those of the upper and lower rolls.

a) Same as b) Opposite as c) Same or opposite d) Perpendicular

32 What are the changes of metal dimensions in hot rolling process as the metal passes through the rolls?

a) Reduced in thickness and increased in length
b) Reduced in thickness and in length.
c) Increased in thickness and reduced in length
d) Increased in thickness and in length

33 Which process is used to produce tools, gear blanks, crankshafts, connecting rods, gears etc.?

a) Forging b) Smiting c) Swaging d) Fullering

34 Tumbling is done to.

a) Remove blow holes b) Create hard surface c) Clean the casting d) Fill-up the blow holes

35 The process used for making large-diameter pipes, hollow propeller shafts or gun barrels, is.

a) Centrifugal casting b) Forging c) Rolling d) Die-casting

36 The property by virtue of which sand mould is capable of withstanding high temperature of the molten metal without fusing is known as.

a) Porosity b) Adhesiveness c) Cohesiveness d) Refractoriness

37 The most commonly used flame in gas welding is.....

a) Neutral b) Oxidising c) Carburising d) All of the above

38 Arc length in arc welding should be equal to.....

a) Half the diameter of electrode rod b) Rod diameter c) Twice the rod diameter d) 2.5 times the rod diameter

39 In which of the following forging process poor material utilization occurs?

a) Open die b) Closed die c) Impression dies d) Hold dies

40 Forging of a plain carbon steel is carried out.....

a) 750°C b) 900°C c) 1300°C d) 1100°C

41 Angular acceleration of a link AB is found by dividing the.

a) Centripetal component of acceleration of B relative to A by length AB b) Linear velocity of B relative to A by length AB c) Total acceleration of B relative to A by length AB d) Tangential component of acceleration of B relative to A by length AB

42 Kennedy's theorem states that, if three rigid links have plane motion, their instantaneous centres lie on.

a) A triangle b) A point c) A straight line d) None of the above

43 The motion of a rotating shaft in foot step bearing, constitutes between the elements of a kinematic pair.

a) Successfully constrained motion b) Completely constrained motion c) Incompletely constrained motion d) Unsuccessfully constrained motion

44 The relation between number of pairs (p) forming a kinematic chain and the number of links (L) is.

a) L =2p-2 b) L =2p-3 c) L=2p-4 d) L=2p-5

45 The instantaneous centre of a slider moving on a curved surface lies at:

a) Infinity b) Their point of contact c) The centre of curvature of curved surface d) The pin point

46 A constrained kinematic chain is known as a mechanism when.

a) None of the links are fixed b) One of the links is fixed c) Two of the links are fixed d) None of the above

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

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

48 A circle drawn with centre as the cam centre and radius equal to the distance between the cam centre and the point on the pitch curve at which the pressure angle is maximum, is called.

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

49 The cam follower generally used in automobile engines is

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

50 Offset is provided to a cam follower mechanism to

a) Minimise the side thrust b) Accelerate c) Avoid jerk d) None of the mentioned

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