

**SUBJECT MATTER TEST FOR RECRUITMENT FOR THE POST OF
ASST. PROFESSOR OF MECHANICAL ENGINEERING**

1. Temperature of a gas is produced due to.
 - A. Its heating value
 - B. Kinetic energy of molecules
 - C. Repulsion of molecules
 - D. Attraction of molecules
2. Which of the following variables controls the physical properties of a perfect gas
 - A. Pressure
 - B. Temperature
 - C. Volume
 - D. All of the Above
3. The unit of temperature in S.I. units is.
 - A. Centigrade
 - B. Celsius
 - C. Fahrenheit
 - D. Kelvin
4. The unit of energy in S.I. units is.
 - A. Watt
 - B. Joule
 - C. Joule/s
 - D. Joule/m
5. Which of the following laws is applicable for the behavior of a perfect gas.
 - A. Boyle's law
 - B. Charles' law
 - C. Gay-lussac law
 - D. All of the above
6. According to Gay-Lussac law for a perfect gas, the absolute pressure of given mass varies directly as.
 - A. Temperature
 - B. Absolute
 - C. Absolute temperature, if volume is kept constant
 - D. Volume, if temperature is kept constant
7. Work done in a free expansion process is.
 - A. + ve
 - B. -ve
 - C. Zero
 - D. Maximum
8. Which of the following can be regarded as gas so that gas laws could be applicable, within the commonly encountered temperature limits?
 - A. O_2 , N_2 , steam, CO_2
 - B. O_2 , N_2 , water vapour
 - C. SO_2 , NH_3 , CO_2 , moisture
 - D. O_2 , N_2 , H_2 , air
9. 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
10. According to Dalton's law, 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
11. According to kinetic theory of gases, the absolute zero temperature is attained when
 - A. Volume of the gas is Zero
 - B. Pressure of the gas is zero
 - C. Kinetic energy of the molecules is zero
 - D. Specific heat of gas is zero

**SUBJECT MATTER TEST FOR RECRUITMENT FOR THE POST OF
ASST. PROFESSOR OF MECHANICAL ENGINEERING**

12. Superheated vapour behaves
- A. Exactly as a Gas
 - B. As Steam
 - C. As ordinary vapour
 - D. Approximately as a gas
13. Boyle's law i.e. $pV = \text{constant}$ is applicable to gases under.
- A. All ranges of pressures
 - B. Only small range of pressures
 - C. High range of pressures
 - D. Steady change of pressures
14. Absolute zero pressure will occur
- A. At sea level
 - B. At the centre of the earth
 - C. When molecular momentum of the system becomes zero
 - D. Under vacuum conditions
15. Intensive property of a system is one whose value.
- A. Depends on the mass of the system, like volume.
 - B. Does not depend on the mass of the system, like temperature, pressure
 - C. Is not dependent on the path followed but on the state
 - D. Is dependent on the path followed and not on the state
16. Which law states that the internal energy of a gas is a function of temperature
- A. Charles' law
 - B. Joule's law
 - C. Regnault's law
 - D. Boyle's law
17. Which law states that the specific heat of a gas remains constant at all temperatures and pressures?
- A. Charles' law
 - B. Joule's law
 - C. Regnault's law
 - D. Boyle's law
18. According to which law, all perfect gases change in volume by $1/273$ th of their original volume at 0°C for every 1°C change in temperature when pressure remains constant.
- A. Charles' law
 - B. Joule's law
 - C. Regnault's law
 - D. Boyle's law
19. According to Avogadro's Hypothesis.
- A. the molecular weights of all the perfect gases occupy the same volume under same conditions of pressure and temperature
 - B. the sum of partial pressure of mixture of two gases is sum of the two
 - C. product of the gas constant and the molecular weight of an ideal gas is constant
 - D. gases have two values of specific heat
20. To convert volumetric analysis to gravimetric analysis, the relative volume of each constituent of the flue gases is.
- A. Divided by its molecular weight
 - B. Multiplied by its molecular weight
 - C. Multiplied by its density
 - D. Multiplied by its specific weight

**SUBJECT MATTER TEST FOR RECRUITMENT FOR THE POST OF
ASST. PROFESSOR OF MECHANICAL ENGINEERING**

21. Fluid is a substance that
- Cannot be subjected to shear forces
 - Always expands until it fills any container
 - Has the same shear stress. at a point regardless of its motion
 - Cannot remain at rest under action of any shear force
22. In a static fluid
- Resistance to shear stress is small
 - Fluid pressure is zero
 - Linear deformation is small
 - Only normal stresses can exist
23. Practical fluids are
- Are viscous
 - Possess surface tension
 - Are compressible
 - Possess all the above properties
24. Mercury does not wet glass. This is due to property of liquid known as
- Adhesion
 - Cohesion
 - Surface tension
 - Viscosity
25. Principle of similitude forms the basis of
- Principle of similitude forms the basis of.
 - Designing models so that the result can be converted to prototypes
 - Comparing similarity between design and actual equipment
 - Hydraulic designs
26. Cavitation will begin when
- The pressure at any location reaches an absolute pressure equal to the saturated vapour pressure of the liquid
 - Pressure becomes more than critical pressure
 - Flow is increased
 - Pressure is increased
27. Property of a fluid by which its own molecules are attracted is called
- Adhesion
 - Cohesion
 - Vicocity
 - Compressibility
28. The pressure at a point in a fluid will not be same in all the directions when the fluid is.
- Moving
 - Viscous
 - Viscous and static
 - Viscous and Moving
29. object having 10 kg mass weighs 9.81kg on a spring balance. The value of 'g' at this place is.
- 10 m/sec²
 - 9.81 m/sec²
 - 10.2 / m sec
 - 9.75 m/sec²
30. A fluid in equilibrium can't sustain
- Tensile stress
 - Compressive stress
 - Shear stress
 - Bending stress

**SUBJECT MATTER TEST FOR RECRUITMENT FOR THE POST OF
ASST. PROFESSOR OF MECHANICAL ENGINEERING**

31. The bulk modulus of elasticity with increase in pressure
- Increases
 - Decreases
 - Remains constant
 - Increases first up to certain limit and then decreases
32. A balloon lifting in air follows the following principle.
- Law of Gravitation
 - Archimedes principle
 - Principle of buoyancy
 - All of the above
33. The value of the coefficient of compressibility for water at ordinary pressure and temperature in kg/cm^2 is equal to.
- 210
 - 2,100
 - 21,000
 - 2,10,000
34. The stress-strain relation of the Newtonian fluid is
- Linear
 - Prabolic
 - Hyperbolic
 - Inverse Type
35. A liquid compressed in cylinder has a volume of 0.04 m^3 at 50 kg/cm^2 and a volume of 0.039 m^3 at 150 kg/cm^2 . The bulk modulus of elasticity of liquid is.
- 400 kg/cm^2
 - $40 \times 10^6 \text{ kg/cm}^2$
 - $40 \times 10^5 \text{ kg/cm}^2$
 - $40 \times 10^6 \text{ kg/cm}^2$
36. Which of the following meters is not associated with viscosity.
- Red Wood
 - Say Bold
 - Engler
 - Orsat
37. For manometer, a better liquid combination is one having
- Higher Surface Tension
 - Lower Surface Tension
 - Surface Tension is no Criterion
 - High Density and Viscosity
38. If mercury in a barometer is replaced by water, the height of 3.75 cm of mercury will be following cm of water.
- 51 cm
 - 50 cm
 - 52 cm
 - 52.2 cm
39. A one dimensional flow is one which
- Is uniform flow
 - is steady uniform flow
 - is steady uniform flow
 - is steady uniform flow
40. A bucket of water is hanging from a spring balance. An iron piece is suspended into water without touching sides of bucket from another support. The spring balance reading will
- Increase
 - Decrease
 - Remains same
 - increase/decrease depending on depth of immersion
41. Adiabatic compression is one in which.
- Temperature during compression remains constant
 - No heat leaves or enters the compressor cylinder during compression
 - Temperature rise follows a linear relationship
 - Work done is maximum

**SUBJECT MATTER TEST FOR RECRUITMENT FOR THE POST OF
ASST. PROFESSOR OF MECHANICAL ENGINEERING**

42. The- most efficient method of compressing air is to compress it.
- A. Isothermally
 - B. Adiabatically
 - C. Isentropically
 - D. Isochronically
43. Clearance volume in actual reciprocating compressors is essential.
- A. To accommodate Valves in the cylinder head
 - B. To provide cushioning effect
 - C. To attain high volumetric efficiency
 - D. To provide cushioning effect and also to avoid mechanical bang of piston with cylinder head.
44. Aeroplanes employ following type of compressor
- A. Radial Flow
 - B. Axial Flow
 - C. Centrifugal
 - D. Combination of Above
45. Out of the following, from where you will prefer to take intake for air compressor
- A. from an air conditioned room maintained at 20°C
 - B. from outside atmosphere at 1°C
 - C. from coal yard side
 - D. from a side where cooling tower is located nearby
46. Which is false statement about multistage compression?
- A. Power consumption per unit of air delivered is low
 - B. Volumetric efficiency is high
 - C. It is best suited for compression ratios around 7:1
 - D. The moisture in air is condensed in the intercooler
47. To avoid moisture troubles, the compressed air main line should
- A. Rise gradually towards the point of use
 - B. Drop gradually towards the point of use
 - C. Be laid vertically
 - D. Be laid exactly horizontally
48. The area of actual indicator diagram on an air compressor as compared to area of ideal indicator diagram is
- A. Less
 - B. More
 - C. Same
 - D. More/less depending on compressor capacity
49. The thrust on the rotor in a centrifugal compressor is produced by
- A. Radial component
 - B. Axial component
 - C. Tangential component
 - D. Resultant
50. The ratio of outlet whirl velocity to blade velocity in case of centrifugal compressor is called
- A. Slip factor
 - B. Velocity factor
 - C. Velocity coefficient
 - D. Blade
51. The ratio of isentropic work to Euler work is known as
- A. Pressure coefficient
 - B. Work coefficient
 - C. Polytropic reaction
 - D. Slip factor

**SUBJECT MATTER TEST FOR RECRUITMENT FOR THE POST OF
ASST. PROFESSOR OF MECHANICAL ENGINEERING**

52. Diffuser in a compressor is used to.
- A. Increase Velocity
 - B. Make the flow stream-line
 - C. Convert Kinetic energy into pressure energy
 - D. convert kinetic energy into pressure energy
53. The ratio of the increase in pressure in rotor blades to total increase in pressure in the stage is called
- A. Pressure ratio
 - B. Pressure coefficient
 - C. Degree of reaction
 - D. Slip factor
54. Gas turbine works on
- A. Brayton or Atkinson cycle
 - B. Brayton or Atkinson cycle
 - C. Rankine cycle
 - D. Ericsson cycle
55. Mechanical efficiency of gas turbines as compared to I.C engines is.
- A. Higher
 - B. Lower
 - C. Same
 - D. depends on other considerations
56. The thermal efficiency of a gas turbine as compared to a diesel plant is
- A. Same
 - B. More
 - C. Less
 - D. Depends on other factors
57. The degree of reaction of an axial flow turbine is the ratio of isentropic temperature drop in a blade row to the
- A. Adiabatic temperature drop in the stage
 - B. Total temperature drop
 - C. Total temperature drop in the stage
 - D. Total adiabatic temperature drop
58. A jet engine works on the principle of conservation of
- A. Mass
 - B. Energy
 - C. Flow
 - D. Inner Momentum
59. For speed above 3000 km / hour, it is more advantageous to use
- A. Turbo-jet engine
 - B. Ram-jet engine
 - C. Propellers
 - D. Rockets
60. Thermal conductivity of solid metals with rise in temperature normally
- A. Increases
 - B. Decreases
 - C. Remains constant
 - D. May increase or decrease depending on temperature
61. Heat transfer takes place as per –
- A. Zeroth law of thermodynamics
 - B. First law of thermodynamic
 - C. Second law of the thermodynamics
 - D. Kerchoff's Law
 - E. Steafan's Law

**SUBJECT MATTER TEST FOR RECRUITMENT FOR THE POST OF
ASST. PROFESSOR OF MECHANICAL ENGINEERING**

62. When heat is transferred from one particle of hot body to another by actual motion of the heated particles, it is referred to as heat transfer by
- A. Conduction
 - B. Convection
 - C. Radiation
 - D. Conduction and Convection
63. Sensible heat is the heat required to
- A. Change vapour into liquid
 - B. Change liquid into vapour
 - C. Increase the temperature of a liquid or vapour
 - D. Convert water into steam and superheat it
64. When heat is transferred from a hot body to cold body, in a straight line, without affecting the intervening medium, it is referred to as heat transfer by
- A. Conduction
 - B. Convection
 - C. Radiation
 - D. Conduction and Convection
65. The insulation ability of an insulator with the presence of moisture would.
- A. Increase
 - B. Decrease
 - C. Remains unaffected
 - D. may increase/decrease depending on temperature and thickness of insulation
66. When heat is transferred by molecular collision, it is referred to as heat transfer by
- A. Conduction
 - B. Convection
 - C. Radiation
 - D. Scattering
67. Which of the following is a case of steady state heat transfer
- A. I.C. Engine
 - B. Air Preheaters
 - C. Heating of Building in Winter
 - D. None of the Above
68. Total heat is the heat required to
- A. Change vapour into liquid
 - B. Change liquid into vapour
 - C. Increase the temperature of a liquid or vapour
 - D. Convert water into steam and superheat it
69. The air-fuel ratio in gas turbines is of the order of
- A. 7:1
 - B. 15:1
 - C. 30:1
 - D. 50:1
70. For water, at pressures below atmospheric.
- A. Melting point rises slightly and boiling point drops markedly
 - B. Melting point rises markedly and boiling point drops markedly
 - C. Melting point drops slightly and boiling point drops markedly
 - D. Melting point drops slightly and boiling point drops slightly

**SUBJECT MATTER TEST FOR RECRUITMENT FOR THE POST OF
ASST. PROFESSOR OF MECHANICAL ENGINEERING**

71. Cork is a good insulator because it has
- A. Free Electrons
 - B. Atoms colliding frequency
 - C. Low Density
 - D. porous body
72. Heat transfer in liquid and gases takes place by
- A. Conduction
 - B. Convection
 - C. Radiation
 - D. conduction and convection
73. The time constant of a thermocouple is
- A. the time taken to attain the final temperature to be measured
 - B. the time taken to attain 50% of the value of initial temperature difference
 - C. the time taken to attain 63.2% of the value of initial temperature difference
 - D. determined by the time taken to reach 100°C from 0°C
74. The concept of overall coefficient of heat transfer is used in heat transfer problems of
- A. Conduction
 - B. Convection
 - C. Radiation
 - D. conduction and convection
75. According to Prevost theory of heat exchange
- A. it is impossible to transfer heat from low temperature source to high temperature source
 - B. heat transfer by radiation requires no medium
 - C. all bodies above absolute zero emit radiation
 - D. heat transfer in most of the cases takes place by combination of conduction, convection and radiation
76. Thermal diffusivity is
- A. A dimensionless parameter
 - B. function of temperature
 - C. used as mathematical model
 - D. a physical property of the material
77. In convection heat transfer from hot flue gases to water tube, even though flow may be turbulent, a laminar flow region (boundary layer of film) exists close to the tube. The heat transfer through this film takes place by
- A. Convection
 - B. Radiation
 - C. Conduction
 - D. both convection and conduction
78. The rate of energy emission from unit surface area through unit solid angle, along a normal to the surface, is known as
- A. Emissivity
 - B. transmissivity
 - C. reflectivity
 - D. intensity of radiation
79. 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

**SUBJECT MATTER TEST FOR RECRUITMENT FOR THE POST OF
ASST. PROFESSOR OF MECHANICAL ENGINEERING**

80. In regenerator type heat exchanger, heat transfer takes place by
- A. Direct mixing of hot and cold fluids
 - B. A complete separation between hot and cold fluids
 - C. Flow of hot and cold fluids alternately over a surface
 - D. Generation of heat again and again
81. Carbonisation of coal is the process of
- A. Pulverising coal in inert atmosphere
 - B. Of air at temperatures below 300°C
 - C. Strongly heating coal continuously for about 48 hours in the absence of air in a closed vessel
 - D. Binding the pulverized coal into brick-ettes
82. The specific volume of steam with increase in pressure decreases
- A. Linearly
 - B. Slowly first and then rapidly
 - C. Rapidly first and then slowly
 - D. Inversely
83. Stoichiometric quantity of air is the
- A. Air present in atmosphere at NTP conditions
 - B. Air required for complete combustion of fuel with no excess air
 - C. Air required for optimum combustion so as to have reasonable excess air
 - D. Air required to convert CO into CO₂
84. If a steam sample is nearly in dry condition, then its dryness fraction can be most accurately determined by
- A. Throttling calorimeter
 - B. Separating calorimeter
 - C. Combined separating and throttling calorimeter
 - D. Bucket calorimeter
85. On Mollier chart, flow through turbine is represented by
- A. Horizontal straight line
 - B. Vertical straight line
 - C. Straight inclined line
 - D. Curved line
86. Pulverized fuel is used for
- A. Better Burning
 - B. More calorific value
 - C. Less radiation loss
 - D. Medium sized units
87. Film boiling occurs at
- A. Very Low Pressure
 - B. Atmospheric pressures
 - C. Medium pressures
 - D. Very high pressures
88. A wet vapour can be completely specified by
- A. Pressure Only
 - B. Temperature only
 - C. Pressure and dryness
 - D. Dryness fraction only
89. Water at pressure of 4 kg/cm² and 160°C temperature when exposed to atmosphere will.
- A. Boil
 - B. Flash / steam
 - C. Remain as it was
 - D. Cool down

**SUBJECT MATTER TEST FOR RECRUITMENT FOR THE POST OF
ASST. PROFESSOR OF MECHANICAL ENGINEERING**

90. While steam expands in turbines, theoretically the entropy
- A. Remains Constant
 - B. Increases
 - C. Decreases
 - D. behaves unpredictably
91. Hygrometry deals with the
- A. Hygroscopic substances
 - B. Water vapour in air
 - C. Temperature of air
 - D. Pressure of air
 - E. Density
92. Cochran boiler is a
- A. Horizontal fire-tube boiler
 - B. Horizontal water-tube boiler
 - C. Vertical water-tube boiler
 - D. Vertical fire tube boiler
93. One kilowatt-hour energy is equivalent to
- A. 1000 J
 - B. 360 kJ
 - C. 3600 kJ
 - D. 3600 kW/sec
94. 100% efficiency of a thermal cycle cannot be achieved because of
- A. Frictional losses
 - B. It is not possible to achieve 0°K temperature
 - C. Leakage
 - D. Non-availability of ideal substance
95. Which of the following substance will have same percentage in both proximate and ultimate analysis
- A. Ash
 - B. Volatile matter
 - C. Moisture
 - D. Hydrogen
96. The basic purpose of drum in boiler is to
- A. Serve as Storage of Steam
 - B. Serve as storage of feed water for water wall
 - C. Remove salts from water
 - D. Separate steam from water
97. Which of the following boilers is best suited to meet fluctuating demands
- A. Babcock and wilcox
 - B. Locomotive
 - C. Lancashire
 - D. Cochran
98. Bomb calorimeter is used to determine
- A. Higher calorific value at constant volume
 - B. Lower calorific value at constant volume
 - C. Higher calorific value at constant pressure
 - D. Lower calorific value at constant pressure
99. Pour point of fuel oil is the
- A. Lowest temperature at which oil will flow under set condition
 - B. Storage temperature
 - C. Temperature at which fuel is pumped through burners
 - D. Temperature at which oil is transported
100. The three "Ts" for good combustion are
- A. Temperature, time, and turbulence
 - B. Total air, true fuel, and turbulence
 - C. Thorough mixing, total air, and temperature

**SUBJECT MATTER TEST FOR RECRUITMENT FOR THE POST OF
ASST. PROFESSOR OF MECHANICAL ENGINEERING**

D. total air, time, and temperature