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1. The locus of a point which moves at a constant distance from a fixed point called its center.
   A. Circle
   B. Ellipse
   C. Parabola
   D. Hyperbola
   ANSWER: A
2. An equation of the second degree in which the xy - term is missing and only one square term is present represents a ___ with its axis parallel to a coordinate axis.
   A. Circle
   B. Ellipse
   C. Parabola
   D. Hyperbola
   ANSWER: C
3. A solid generated by the rotation of a circle about a line in its plane not intersecting it.
   A. Torus
   B. Paraboloid of revolution
   C. Sphere
   D. Hyperbola of revolution
   ANSWER: A
4. The sum of the focal distances of any point on the ellipse is constant and is equal to the length of the
   A. minor axis
   B. latus rectum
   C. major axis
   D. directrix
   ANSWER: C
5. The eccentricity of an equilateral or rectangular hyperbola is
   A. 2 sq. rt. of 2
   B. 2 sq. rt. of 3
   C. sq. rt. of 2
   D. sq. rt. of 3
   ANSWER: C
6. The length of the transverse axis of a hyperbola
   A. is always greater than the conjugate axis
   B. is always less than the conjugate axis
   C. may be greater than or less than but never equal to the conjugate axis
   D. may be greater than, equal to, or less than the conjugate axis
   ANSWER: D
7. The diagonals (prolonged) of the rectangle of sides 2a and 2b and parallel to the transverse and conjugate axes respectively are ___ of the hyperbola.
   A. transverse and conjugate axes
   B. asymptotes
   C. lines
   D. intersections
   ANSWER: B
8. What do you call a line through focus perpendicular to the directrix is?
   A. axis of the conic
   B. focal length
   C. latus rectum
   D. directrix
   ANSWER: A
9. Conic sections are classified according to the value of which of the following?
   A. latus rectum
   B. focus
   C. directrix
   D. eccentricity
   ANSWER: D
10. The conic section whose eccentricity is 1 (e = 1)
    A. circle
    B. ellipse
    C. parabola
    D. hyperbola
    ANSWER: C
11. The conic section whose eccentricity is less than 1 (e < 1)
    A. circle
    B. ellipse
    C. parabola
    D. hyperbola
    ANSWER: B
12. The conic section whose eccentricity is greater than 1 (e>1)
    A. circle
    B. ellipse
    C. parabola
    D. hyperbola
    ANSWER: D
13. The conic section whose eccentricity approaches zero (e→0)
    A. circle
    B. ellipse
    C. Parabola
    D. hyperbola
    ANSWER: A
14. The locus of points which are equidistant from a fixed point and a fixed line.
    A. circle
    B. ellipse
    C. parabola
    D. hyperbola
    ANSWER: C
15. The axis of the hyperbola passes through the foci, vertices and center is called
    A. conjugate axis
    B. transverse axis
    C. latus rectum
    D. directrix
    ANSWER: B
16. The vertical line passing through the origin has an equation
    A. x = 0
    B. y = 0
    C. $x = x_1$
    D. $y = y_1$
    ANSWER: A
17. A horizontal line passing through the origin has an equation
    A. x = 0
    B. y = 0
    C. $x = x_1$
    D. $y = y_1$
    ANSWER: B
18. A solid generated by the rotation of an ellipse about its minor axis.
    A. elliptic spheroid
    B. prolate spheroid
    C. hyperbolic spheroid
    D. oblate spheroid
    ANSWER: D
19. If the second derivative of the equation of a curve is equal to the negative of the equation of that same curve, the curve is
    A. an exponential
    B. a tangent
    C. a sinusoid
    D. a parabola
    ANSWER: C

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20. If the first derivative of the equation of a curve is a constant, the curve is a _____.
A. circle
B. hyperbola
C. straight line
D. sine wave
ANSWER: C

21. The set of first elements of the ordered pair in the relation or function.
A. Domain
B. Function
C. Range
D. Abscissa
ANSWER: A

22. An interval that includes the two-end point is
A. open – closed interval
B. closed – open interval
C. open interval
D. closed interval
ANSWER: D

23. A function f is said to have a _____ value at c if there exist an open interval containing c on which f is defined such that f(c) ≥ f(x) for all x in this interval.
A. relative minimum
B. relative inflection
C. relative maximum
D. relative maximum
ANSWER: D

24. Refers to a quantity which does not change its value in a general relationship between variables.
A. modulus
B. argument
C. absolute value
D. constant
ANSWER: D

25. An infinite change in an independent variable or in a dependent variable due to a small change in independent variable.
A. integral
B. approximations
C. differential
D. error
ANSWER: C

26. The critical points of a graph occur where the derivative of the function is
A. one
B. infinity
C. zero
D. indeterminate
ANSWER: C

27. At point of inflection.
A. y' = 0
B. y" is negative
C. y" = 0
D. y" is positive
ANSWER: C

28. The ____ derivative of the function is the rate of change of the slope of the graph.
A. First
B. Third
C. Second
D. Fourth
ANSWER: C

29. The operation of finding the derivative of function.
A. Derivation
B. Approximation
C. Differentiation
D. Iteration
ANSWER: C

30. If n is the number of trials and m is the number of successes, what is the frequency-based interpretation of the probability of event E?
A. $P(E) = \lim_{n\to\infty} \frac{n-m}{n}$
B. $P(E) = \lim_{n\to\infty} \frac{n}{m}$
C. $P(E) = \lim_{n\to\infty} \frac{m}{m-n}$
D. $P(E) = \lim_{n\to\infty} \frac{m}{n}$
ANSWER: D

31. At the maximum point of y = f(x)
A. the curve is concave upward
B. the curve is concave downward
C. y" is positive
D. y" is zero
ANSWER: B

32. At the minimum point of y = f(x)
A. the curve is concave upward
B. the curve is concave downward
C. y" is negative
D. y" is zero
ANSWER: A

33. The biggest rectangle inscribed in a circle is
A. square
B. rhombus
C. rectangle
D. parallelogram
ANSWER: A

34. A method used for finding a root of an equation by successive approximations in the form of the iterations.
A. Cardan's method
B. L'Hopital's method
C. Ferrari's method
D. Newton-Raphson method
ANSWER: D

35. The other term of derivative is
A. differential coefficient
B. summation
C. approximations
D. differential error
ANSWER: A

36. If n is a positive integer, then $\frac{d^n}{d_x{}^n}(x^n)$
A. (n – 1)!
B. n!
C. (n + 1)!
D. 0
ANSWER: B

37. An equation which defines one variable purely in terms of another.
A. explicit function
B. algebraic function
C. implicit function
D. transcendental function
ANSWER: A

38. A function f(x) is called _____ of f(x) if f'(x) = f(x)
A. explicit function
B. derivative
C. implicit function
D. antiderivative
ANSWER: D

39. At a point where y' = 0, if y changes from positive to negative as x increases,
A. y is minimum

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B. x is minimum
C. y is maximum
D. x is maximum
ANSWER: C

40. In mathematics, a quantity larger than any that can be specified.
A. maximum
B. infinity
C. boundary
D. indeterminate
ANSWER: B

41. A point at which the curve changes from concave upward to concave downward or vice-versa is called as
A. critical point
B. point of intersection
C. point of inflection
D. point of tangency
ANSWER: C

42. The operation of finding the derivative of function.
A. derivation
B. approximation
C. differentiation
D. iteration
ANSWER: C

43. The derivative of a function is identical to the ___ of the graph of the function.
A. tangent
B. slope
C. secant
D. normal
ANSWER: B

44. The curve Spiral of Archimedes has an equation of
A. $r = a\cos\theta$
B. $r^2\theta = a^2$
C. $r = a\theta$
D. $x^2 + y^2 = a^2$
ANSWER: C

45. If the derivative of a function is a constant, then the function is ___.
A. sinusoidal
B. logarithmic
C. linear
D. quadratic
ANSWER: C

46. In mathematics, a quantity larger than any that can be specified.
A. maximum
B. infinity
C. boundary
D. indeterminate
ANSWER: B

47. A set of all numbers or points lying between two endpoints.
A. difference
B. boundary
C. interval
D. internal points
ANSWER: C

48. A point at which the curve changes from concave upward to concave downward or vice-versa is called as
A. critical point
B. point of intersection
C. point of inflection
D. point of tangency
ANSWER: C

49. If a is a simple constant, what is the derivative of $y = x^a$?
A. ax
B. x^{a-1}
C. ax^{a-1}
D. (a-1)x
ANSWER: C

50. The biggest rectangle inscribed in a circle is
A. square
B. rhombus
C. rectangle
D. parallelogram
ANSWER: A

51. The integral of $\sin^m\theta\cos^n\theta\,d\theta$ can easily be determined by using Wallis formula provided the limits are from
A. 0 to π
B. 0 to π/2
C. 0 to π/4
D. 0 to 2π
ANSWER: B

52. The chemical most commonly used to speed sedimentation of sewage is
A. Lime
B. Copper sulfate
C. Sulfuric acid
D. Mebylene blue
ANSWER: A

53. Most of the bacteria in sewage are
A. Saprophytic
B. Dangerous
C. Parasitic
D. Pathogenic
ANSWER: A

54. One of the two types of non – material nuclear radiation is:
A. Gamma radiation
B. Transmutation radiation
C. Walton radiation
D. Betatron radiation
ANSWER: A

55. If you wished the temperature distribution within a room to be as even as possible, would you blow hot air into the room near the:
A. Floor
B. Ceilings
C. Walls
D. Door
ANSWER: A

56. Which is not a qualification for an applicant for ME Board Examination?
A. Certified plant mechanic
B. At least 18 years of age
C. A holder of BSME degree
D. A citizen of the Philippines
ANSWER: A

57. The maximum power rating of mechanical works or plant that can tended or operated by a Certified Plant Mechanic is
A. 37.3 KW
B. 298.4 KW
C. 223.8 KW
D. 111.9 KW
ANSWER: C

58. The most important factor in determining high temperature behavior of an alloy is:
A. Dispersion
B. Ionization
C. Crystallization
D. Composition
ANSWER: D

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59. With regards to corrosion of metals, passivation is the process that:
A. Inhibits further deterioration
B. Changes metal composition
C. Intensifies deterioration
D. Alters the grain size of the metal
ANSWER: A

60. At relatively high temperature and low rates of strains, structures will perform better if their material is:
A. Coarsed grain
B. Fine grained
C. Behavior is independent of grain
D. None of the above
ANSWER: A

61. Intermittent sand filters are primarily used to:
Oxidized putrescible matter
Remove solids from sewage
Supply lemons to farmers
Neutralize sludge
ANSWER: A

62. The gas from sludge digestion large is mainly composed of:
A. Nitrogen
B. Methane
C. Carbon dioxide
D. Oxygen
ANSWER: B

63. Quantity of chlorine in parts per million required to satisfactorily chlorinate sewage is usually:
A. 125 – 150
B. 85 – 90
C. 0 – 25
D. 30 – 60
ANSWER: C

64. Ratio of oxygen available to the oxygen required for stabilization of sewage is called:
A. Concentration factor
B. Relative stability
C. Oxygen – ion concentration
D. Bacterial stability factor
ANSWER: B

65. In the design of grit chambers
A. Maximum velocity of flow is 1 foot per second
B. Temperature is an important factor
C. Baffles are essential
D. Detention period should be at least 30 minutes
ANSWER: A

66. The greatest unit pressure the soil can continuously withstand
A. Bearing strength
B. Yield point
C. Ultimate strength
D. Point of rupture
ANSWER: A

67. An equation in which a variable appears under the radical sign
A. Irrational equation
B. Radical equation
C. Irradical equation
D. Literal equation
ANSWER: A

68. The logarithm of 1 to any base is:
A. Infinity
B. Indeterminate
C. Zero
D. One
ANSWER: C

69. All circles having the same center but with unequal radii are called:
A. Concentric circles
B. Encircles
C. Concylic
D. Tangent circles
ANSWER: A

70. A plane closed curve, all points of which are the same distance from a point within called the center is
A. Arc
B. Circle
C. Radius
D. Chord
ANSWER: B

71. A statement of equality between two ratios:
A. Power factor
B. Evaluation
C. Proportion
D. Theorem
ANSWER: C

72. A polygon with fifteen sides:
A. Nonagon
B. Decagon
C. Pentedecagon
D. Dodecagon
ANSWER: C

73. The first derivative of Kinetic energy with respect to time
A. Force
B. Momentum
C. Work
D. Power
ANSWER: D

74. The point where the second derivative of function is equal to zero
A. Inflection point
B. Minima
C. Point of intersection
D. Maxima
ANSWER: A

75. Linear momentum is a product of mass and velocity and this can be expressed also as a function of:
A. Force, time
B. Force, velocity
C. Force, displacement
D. Force, acceleration
ANSWER: A

76. The name of a vector representing the sum of two vectors
A. Tangent
B. Resultant
C. Scalar
D. Tensor
ANSWER: B

77. A curve generated by a point which moves in uniform circular motion about an axis while travelling with a constant speed parallel to the axis
A. Epicycloid
B. Helix
C. Cycloid
D. Spiral of Archimedes
ANSWER: B

78. The tendency of a liquid surface to contract
A. Surface tension
B. Cohesion
C. Adhesion
D. Capillarity
ANSWER: A

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79. The study of motion without reference to the forces which causes motion is known as:
A. Kinematics
B. Kinetics
C. Dynamics
D. Statics
ANSWER: A

80. A leak from a faucet comes out in separate drops. Which of the following is the main cause of this phenomenon?
A. Surface tension
B. Air resistance
C. Gravity
D. Viscosity of fluid
ANSWER: A

81. Measure of the fluid resistance when acted upon by an external force
A. Viscosity
B. Density
C. Flash point
D. Tackiness
ANSWER: A

82. An instrument for measuring high temperature gases
A. Pyrometer
B. Oil meter
C. Odometer
D. Anemometer
ANSWER: A

83. A rectangle with equal sides:
A. Rectangle
B. Square
C. Rhombus
D. Trapezoid
ANSWER: B

84. The base unit for mass in the SI system of measurement
A. Newton
B. Hyls
C.Kilogram
D. Joule
ANSWER: C

85. Absolute viscosity is a derived unit describes as:
A. Pascal second
B. Newton per meter
C. Sq. meter per second
D. Watt per meter Kelvin
ANSWER: A

86. Property of the body which measures its resistance to change in motion
A. Acceleration
B. Mass
C. Rigidity
D. Weight
ANSWER: B

87. Chemical method of feedwater treatment which uses calcium hydroxide and sodium carbonate as reagents:
A. Demineralization process
B. Lime soda treatment
C. Thermal treatment
D. Ion exchange treatment
ANSWER: B

88. Date of the signing of the New Mechanical Engineering Law:
A. Feb. 12, 1998
B. Feb. 15, 1998
C. Feb. 21, 1998
D. Feb. 26, 1998
ANSWER: A

89. If equals are added to equals, their sums are equal
A. Axiom
B. Corollary
C. Postulate
D. Theorem
ANSWER: D

90. A straight line perpendicular to one of two parallel planes is perpendicular to the other also
A. Theorem
B. Postulate
C. Axiom
D. Corollary
ANSWER: A

91. Sum of the sides of a polygon
A. Hexagon
B. Circumference
C. Perimeter
D. Square
ANSWER: C

92. A quadrilateral whose opposite sides are equal:
A. Parallelogram
B. Triangle
C. Median
D. Trapezoid
ANSWER: A

93. The PSME Code 1993 defines the five grades of Commercial Fuel Oils and also provides specifications for underground and above ground Oil Storage Tanks such as for a maximum capacity of 1100 gallons. The tank thickness of the metal shall be:
A. Number 12 gage
B. Number 14 gage
C. Number 16 gage
D. Number 18 gage
ANSWER: A

94. Kinematic viscosity is an SI derived unit described as:
A. Pascal second
B. Watt per meter Kelvin
C. Square meter per second
D. Newton per meter
ANSWER: C

95. Locus of points on a side which rolls along a fixed line
A. Cycloid
B. Cardioid
C. Epicycloid
D. Hypocycloid
ANSWER: A

96. A specimen is subjected to a load. When the load is removed, the strain disappears. The material is
A. Ductile
B. Elastic
C. Plastic
D. At high modulus of elasticity
ANSWER: B

97. Study of motion without reference to the forces which causes motion
A. Kinematics
B. Hydrodynamics
C. Statics
D. Aerodynamics
ANSWER: A

98. In a cantilever beam with a concentrated load at the free end, the moment is:
A. Maximum at the wall
B. Constant along the beam

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C. Maximum at the free end
D. Maximum at midspan
ANSWER: A

99. The loss weight of a body submerged in a fluid is:
A. Equal to the weight of the body displaced
B. Proportional to the weight of the body
C. Independent of the volume of the body
D. None of the above
ANSWER: A

100. A line segment joining two points on a circle
A. Sector
B. Chord
C. Arc
D. Tangent
ANSWER: B

101. It is defined as the motion of a rigid body in which a straight line passing through anything of its particle always remains parallel to its initial position
A. Rotation
B. Plane motion
C. Translation
D. Kinematics
ANSWER: C

102. Foaming is caused by:
A. Chemicals
B. Scales
C. Hard water
D. Soft water
ANSWER: A

103. Priming is caused by:
A. Too much blowdown
B. Cold feedwater
C. Low hardwater
D. Load swings
ANSWER: D

104. High alkaline water in boiler causes:
A. Pitting
B. Fire cracks
C. Corrosion
D. Caustic
ANSWER: D

105. A thermodynamic system which undergoes a cyclic process during a positive amount of work is done by the system
A. Heat pump
B. Heat engine
C. Reversed Rankine Cycle
D. Reversible – Irreversible process
ANSWER: B

106. Amount of heat needed to raise the temperature of 1 pound of that substance one degree Fahrenheit is:
A. BTU
B. Specific heat
C. Relative heat
D. Latent heat
ANSWER: A

107. The study of the condition of air and moisture in the atmosphere
A. Thermodynamics
B. Atmospherics
C. Gas dynamics
D. Psychometrics
ANSWER: D

108. The gage used to measure 0.001 to 1 atmospheric pressure
A. Bourdon
B. Mercury manometer
C. Water manometer
D. Metallic diaphragm
ANSWER: B

109. Water in an open glass at room temperature is:
A. Saturated liquid
B. Compressed liquid
C. Liquid with quality is zero
D. Liquid with quality of unity
ANSWER: B

110. Which of the process where work is zero
A. Isopheistic
B. Isometric
C. Isentropic
D. Polytropic
ANSWER: B

111. In an internal combustion engine, the stroke that discharges gas inside the engine cylinder
A. Power
B. Intake
C. Compression
D. Exhaust
ANSWER: D

112. An adiabatic process with no work done is:
A. Throttling
B. Isobaric
C. Isometric
D. Isothermal
ANSWER: A

113. In a system, the sum of internal energy and the product of pressure and volume is
A. Entropy
B. Enthalpy
C. Work
D. Heat
ANSWER: B

114. Dew point is which of the following:
A. Wet bulb temperature
B. Temperature at 50% RH
C. Adiabatic saturation temperature
D. Dry bulb temperature
ANSWER: C

115. Force on a submerged area
A. Weight
B. Fluid pressure
C. Fluid force
D. Density
ANSWER: B

116. Hydraulic power is expressed whp in English Units. In SI it is expressed in
A. hp
B. wkw
C. kwh
D. whp
ANSWER: B

117. One English hp is 746 Watts. In SI, one metric hp is
A. 736 watts
B. 746 watts
C. 756 watts
D. 760 watts
ANSWER: A

118. One mechanical hp is equivalent to
A. 16 Boiler hp
B. 14.5 Boiler hp
C. 13.15 Boiler hp
D. 24 Boiler hp
ANSWER: C

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119. One mm of HG is equivalent to:
A. 13.33 kPa
B. 3.313 kPa
C. 0.1333 kPa
D. 1.333 kPa
ANSWER: C

120. Which of the following does not belong to the group?
A. Class A Fire – fire caused by light combustible material like paper and wood
B. Class B Fire – fire caused oil and other hydrocarbon
C. Class C Fire – fire caused electrical fire
D. Class D Fire – fire caused by LPG
ANSWER: D

121. What is the color of steam pipe?
A. Red
B. Green
C. Silver gray
D. Violet
ANSWER: C

122. Color for water pipes
A. Green
B. Orange
C. Violet
D. Ultra – red
ANSWER: A

123. An increase in heat enthalpy of a substance when it undergoes a change of phase at constant pressure and temperature
A. Heat of fusion
B. Heat of crystallization
C. Heat of vaporization
D. Heat of transformation
ANSWER: C

124. The ideal reversible Carnot Cycle involves for basic processes. They are
A. Two isentropic
B. All isentropic
C. All isothermal
D. Two isentropic and two isothermal
ANSWER: D

125. The origin of the energy conservation equation used in flow system
A. 1st law of thermodynamics
B. 2nd law of thermodynamics
C. Newton's 2nd law of motion
D. Newton's 1st law of motion
ANSWER: A

126. Coefficient of friction for dry surfaces
A. Does not depend on the material
B. Depends only on the finish condition of the surface
C. Depends on the material and on the finish condition of the surface
D. Depends on the composition of the material only
ANSWER: C

127. For an existing boiler installation, the lowest factor of safety permissible shall be
A. 3.0
B. 3.5
C. 4.0
D. 4.5
ANSWER: D

128. Ratio between the average load and total available capacity
A. Capacity factor
B. Load factor
C. Demand factor
D. Diversity fact
ANSWER: A

129. Ratio between the average load and the peak load
A. Load factor
B. Use factor
C. Demand factor
D. Capacity factor
ANSWER: A

130. Ratio between the actual demanded load to the connected load
A. Use factor
B. Demand factor
C. Capacity factor
D. Utilization factor
ANSWER: B

131. The new Mechanical Engineering Law which was signed last February 12, 1998 is known
A. RA 8491
B. RA 8495
C. RA 8499
D. RA 8492
ANSWER: B

"Nothing is impossible. The word itself says 'I'm possible!"— Audrey Hepburn