[SET-III]

GROUP: MECHANICAL

Marks: 150 **Time:** 2:30 hours

NOTE:

(i) Attempt all questions. Each question carries ONE mark. There will be negative marking. Every wrong answer will result in deduction of 1/4 marks.

(ii) There are 150 questions in this booklet. Against each question four alternative choices (A), (B), (C) and (D) are given, out of which only one is correct. Indicate your choice of answer by Darkening the suitable circle with Black/Blue Ball Pen in the OMR answer sheet supplied to you separately.

[ENGLISH/GK/MENTAL APTITUDE]

1. Maximum Oxygen is available from
   (A) Deserts
   (B) Green Forests
   (C) Grass Lands
   (D) Phytoplanktons

2. Which of the following is a renewable resource?
   (A) Coal
   (B) Mineral Oil
   (C) Natural Gas
   (D) Forests

3. Which of the following countries is fast moving towards a cashless economy?
   (A) Denmark
   (B) Sweden
   (C) Iceland
   (D) Norway

4. Which country recently detonated its first hydrogen bomb?
   (A) South Korea
   (B) North Korea
   (C) Pakistan
   (D) Iran

5. Which city will host the 2022 Asian Games?
   (A) Manila
   (B) Hangzhou
   (C) Sana
   (D) Osaka

6. Who among the following is the first Indian woman mountaineer to reach the summit of Mount Everest?
   (A) Premlata Agarwal
   (B) Arunima Sinha
   (C) Bachendri Pal
   (D) Tashi Malik

7. Whose army did Alexander, the Greek ruler confront on the banks of the river Jhelum?
   (A) Chandragupta Maurya
   (B) Ambi
   (C) Dhanananda
   (D) Porus

8. In EMI, 'E' stands for
   (A) Earned
   (B) Economics
   (C) Easy
   (D) Equated

9. Who propounded the theory of 'Economic Drain of India' during British imperialism?
   (A) W. C. Bannerji
   (B) Dadabhai Naoroji
   (C) Gopalkrishna Gokhale.
   (D) Gandhiji

10. The Election Commissioner can be removed by the
    (A) Chief Election Commissioner
    (B) Prime Minister
    (C) President on the recommendation of the Chief Election Commissioner
    (D) Chief Justice of India

11. Consider the following events connected with Indian National Movement and find the correct chronological order of the events from the codes given below

i. Demise of B. G. Tilak
ii. Passing of Rowlatt Bill as an Act
iii. Jalianwala Bagh Massacre
iv. Amritsar Session of Indian National Congress, 1919

Codes
(A) ii, iii, iv, i
(B) iv, iii, ii, i
(C) iii, iv, ii, i
(D) i, ii, iii, iv

12. If H = 8, HE = 13, Then 'HEN' will be equal to
(A) 22
(B) 24
(C) 25
(D) 27

In each of the following Questions, an idiomatic expression/ a proverb has been given, followed by some alternatives. Choose the one which best expresses the meaning of given idiom/proverb

13. A pipe dream
(A) A pleasant dream
(B) A bad dream
(C) An impracticable plan
(D) A foolish idea

14. To spill the beans
(A) To reveal secret information
(B) To misbehave
(C) To keep secrets
(D) To talk irrelevant

Fill in the blanks with suitable tense from the alternatives in the following questions:

15. _____ adequate pre-emptive action to avert this tragedy?
(A) Would you not be taking
(B) Would you have not taken
(C) Shall you not have Taken
(D) Should you not have taken

16. Had she known about it, she _____ have stayed longer.
(A) would
(B) might
(C) may
(D) should

In each of the following questions, a sentence has been given in Direct/ Indirect Speech. Out of the four alternatives suggested select the one which best expresses the same sentence in Indirect/ Direct Speech.

17. The Sage said, "God helps those who help themselves."
(A) The Sage said that God helps those who help themselves.
(B) The Sage said that God helped those who helped themselves
(C) The Sage said that God helps those who helped themselves
(D) The Sage said that God helped those who help themselves

18. He asked his teacher, "Need I read this chapter?"
(A) He asked his teacher whether there was a need to read that chapter.
(B) He asked his teacher whether there he needed to read this chapter.
(C) He asked his teacher if it was necessary to read this chapter.
(D) He asked his teacher if he had to read that chapter.

Fill in the blanks with suitable words from the alternatives in the following questions:

19. If you drink too much, it will _____ your judgement.
(A) impede
(B) impair
(C) impose
(D) impel

20. The Chairman treated the employees to a _____lunch at an expensive hotel.
(A) precious
(B) sumptuous
(C) thriving
(D) stupendous

[CHEMISTRY]

21. Which of the following has highest mass
(A) 50 gm Iron
(B) 5 moles of N_2
(C) 0.1 mol atom of Ag
(D) 10^{23} atoms of carbon

22. The oxidation number of osmium in OsO_4 is
(A) + 7
(B) + 5
(C) + 4
(D) + 8

23. An oxide of metal (M) has 40% by mass of oxygen. If, the atomic mass of M is 24, the empirical formula of its oxide will be?
(A) M_2O
(B) M_2O_3
(C) MO
(D) M_3O_4

24. Which of the following ions has the smallest radius?
(A) Li^+
(B) Na^+
(C) Be^{2+}
(D) K^+

25. Which of the following elements show zero valency?
(A) Pt
(B) Au
(C) S
(D) Ne

26. The atomic numbers of vanadium (V), chromium (Cr), manganese (Mn) and iron (Fe) are 23, 24, 25 and 26 respectively. Which of these will show the highest 2nd ionization enthalpy ?
(A) Fe
(B) V
(C) Cr
(D) Mn

27. BCl_3 molecule is planer whereas NCl_3 is pyramidal because
(A) B-Cl bond is more polar than N-Cl bond
(B) N-Cl bond is more covalent than B-Cl bond
(C) Nitrogen atom is smaller than boron atom
(D) BCl_3 has no lone pair of electrons whereas NCl_3 has one lone pair of electrons

28. Which of the following has the highest dipole moment?
(A) AsH_3
(B) SbH_3
(C) PH_3
(D) NH_3

29. The hybridization of carbon in 1,3-butadiene is
(A) sp
(B) sp^3
(C) sp^2
(D) sp^2 and sp^3

30. If A= tetracyanomethane; B= CO_2; C= benzene; D= 1,3-butadiene. The ratio of σ and π bonds will be in the order
(A) A=B<C<D
(B) A=B<D<C
(C) A=B=C=D
(D) C<D<A<B

31. The frequency of a wave of light is $12 \times 10^{14}\ s^{-1}$. The wave number associated with this light is
(A) 5×10^{-7} m
(B) $4 \times 10^{-8}\ cm^{-1}$
(C) $2 \times 10^{-7}\ m^{-1}$
(D) $4 \times 10^{4}\ cm^{-1}$

32. An electron jumps from 6th energy level to 3rd energy level in H-atom. How many lines belong to the visible region?
(A) 1
(B) 2
(C) 3
(D) zero

33. The orbital angular momentum for a *d-electron* is
(A) $\sqrt{6}\ (h/2\pi)$
(B) $\sqrt{2}\ (h/2\pi)$
(C) $(h/2\pi)$
(D) zero

34. The number of nodal planes in a p_x orbital is
(A) 1
(B) 2
(C) 3
(D) zero

35. Which of the following has maximum number of unpaired electrons (At. no. of Fe = 26)?
(A) Fe
(B) Fe (II)
(C) Fe (III)
(D) Fe (IV)

[PHYSICS]

36. A particle revolves around a circular path. The acceleration of the particle is
(A) along the circumference of the circle
(B) along the tangent
(C) along the radius
(D) zero

37. A heavy and a light body have equal kinetic energies. Which one has a greater momentum?
(A) Light body
(B) heavy body
(C) both have equal momentum
(D) information is insufficient

38. Cream gets separated out of milk when it is churned, it is due to
(A) Gravitational force
(B) Centripetal force
(C) Centrifugal force
(D) Frictional force

39. Torque is analogous to force, and moment of inertia is analogous to
(A) mass
(B) momentum
(C) impulse
(D) none of these

40. The radius of gyration is independent of the
(A) location of axis of rotation
(B) distribution of mass
(C) shape of body
(D) mass of body

41. The moment of inertia of a thin uniform circular disc about one of its diameter is J. The moment of inertia about an axis perpendicular to the circular surface and passing through its center is
(A) $(2J)^{1/2}$
(B) 2J
(C) J/2
(D) $J/(2)^{1/2}$

42. In the equation, pV=RT, V stands for the volume of
(A) any amount of gas
(B) one gram of gas
(C) one gram molecule of gas
(D) one liter of gas

43. A gas behaves as an ideal gas at
(A) very low pressure and high temperature
(B) high pressure and low temperature
(C) high pressure and high temperature
(D) low pressure and low temperature

44. If p is the pressure of the gas then kinetic energy per unit volume of the gas is
(A) p/2
(B) p
(C) 3p/2
(D) 2p

45. Angular momentum is
(A) scalar
(B) an axial vector
(C) a polar vector
(D) none of these

46. Energy of electromagnetic waves is due to their
(A) Wavelength
(B) frequency
(C) electric and magnetic field
(D) none of these

47. Out of the following phenomena, the one which cannot be explained on the basis of wave theory is
(A) Polarization
(B) Diffraction
(C) Photoelectric effect
(D) Interference

48. The difference between soft and hard X-rays is of
(A) velocity
(B) frequency
(C) intensity
(D) polarization

49. Nuclear fusion requires high temperature because
(A) all nuclear reactions absorb heat
(B) particles cannot come closer unless they are moving rapidly
(C) binding energy must be supplied from an external source
(D) mass deficit must be supplied

50. If the radiation from a radioactive material is passed through an electric field
(A) all the three kind of rays will be deflected
(B) only gamma ray is deflected
(C) only alpha and beta rays are deflected
(D) only the alpha ray is deflected

[MATHEMATICS]

51. The value of k, so that the equation $2x^2 + kx - 5 = 0$ and $x^2 - 3x - 4 = 0$ may have one root in common is
(A) –6
(B) –27/4
(C) 6
(D) None of the above.

52. If each term of an infinite G. P. is twice the sum of terms following it, then the common ration of G. P. is
(A) 1/3
(B) 3
(C) 2
(D) None of the above.

53. The sum of n terms of the series $1^2 + 3^2 + 5^2 + \cdots$ is
(A) $\frac{n(n+1)(2n+1)}{6}$
(B) $\frac{n(4n-1)(2n-1)}{3}$
(C) $\frac{n(2n-1)(2n+1)}{3}$
(D) None of the above.

54. General solution of the equation $\tan 5A = \cot 2A$ is
(A) $A = \frac{n\pi}{7} + \frac{\pi}{2}$
(B) $A = \frac{n\pi}{7} - \frac{\pi}{14}$
(C) $A = \frac{n\pi}{7} + \frac{\pi}{14}$
(D) None of the above.

55. If cos x=-1/3 and x lies in third quadrant, then sin x/2 is equal to
(A) $\sqrt{\frac{2}{3}}$
(B) $\frac{\sqrt{2}}{3}$
(C) $-\frac{\sqrt{2}}{3}$
(D) None of the above.

56. First negative term in the expansion $(1+x)^{7/2}$ is
(A) 5th term
(B) 6th term
(C) 7th term
(D) None of the above.

57. $tan^{-1}\left(\frac{x}{y}\right) - tan^{-1}\left(\frac{x-y}{x+y}\right)$ is equal to
(A) $\frac{\pi}{2}$
(B) $\frac{\pi}{3}$
(C) $\frac{\pi}{4}$
(D) None of the above.

58. The area of a triangle formed by co-ordinate axes and a line is 6 square units and the length of hypotenuse is 5 units. Equation of the line is
(A) $3x - 4y = 12$
(B) $3x + 4y = 12$
(C) $3x + 2y = 6$.
(D) None of the above.

59. The angle between the lines $x = a$ and $by + c = 0$ is
(A) $\frac{\pi}{2}$
(B) $0°$
(C) $\frac{\pi}{4}$
(D) None of the above.

60. The tangents to the circle $x^2 + y^2 = 169$ at the points (5, 12) and (12, −5) are
(A) parallel
(B) perpendicular
(C) coincident
(D) None of the above.

61. The equation of directrix of parabola $y^2 + 4y + 4x + 2 = 0$ is
(A) $x = -1$
(B) $x = 1$
(C) $x = -3/2$
(D) $x = 3/2$.

62. If $f(x) = \begin{cases} k\frac{\sin x}{x} + \cos x, x \le 0, \\ 4\left(\frac{1-\sqrt{1-x}}{x}\right), x > 0 \end{cases}$ is continuous at $x = 0$, then the value of k is
(A) 1
(B) 3
(C) −1
(D) None of the above.

63. The value of $\frac{d}{dx}\left(cos^{-1}(\sin x)\right)$ is equal to
(A) −1
(B) 1
(C) $\frac{\pi}{2}$
(D) None of the above.

64. If $e^x + e^y = e^{x+y}$, then $\frac{dy}{dx}$ at (2,2) is
(A) 2
(B) 1
(C) −1
(D) None of the above.

65. The real number x when added to its inverse gives the minimum value of the sum at x equal to
(A) 1
(B) −1
(C) −2
(D) 2.

66. The normal to the curve $x = a(1 + \cos\theta), y = a\sin\theta$ at a point θ always passes through the fixed point
(A) (a,0)
(B) (0,a)
(C) (0,0)
(D) (a,a).

67. The value of $\int_{-1}^{1} log\left(\frac{2-x}{2+x}\right) dx$ is equal to
(A) ½
(B) 1
(C) −1
(D) 0.

68. The value of $x > 1$ satisfying the equation $\int_1^x t \log t\, dt = \frac{1}{4}$ is
(A) $\sqrt{e}$
(B) e
(C) e^2
(D) $e - 1$.

69. $\int sec^3\theta\, d\theta$ is equal to
(A) $\frac{1}{2}(sec\theta\, tan\theta + \log|sec\theta + \tan\theta|) + c$
(B) $sec\theta\, tan\theta + \log|sec\theta + \tan\theta| + c$
(C) $\frac{1}{3}(sec\theta\, tan\theta + \log|sec\theta + \tan\theta|) + c$
(D) None of the above.

70. If the roots of the equation $(b - c)x^2 + (c - a)x + (a - b) = 0$ are equal, then a, b and c are in
(A) A.P.
(B) G.P.
(C) H.P.
(D) None of these.

[MECHANICAL ENGINEERING]

71. The law which states that heat and work are mutually convertible is known as;
(A) Zeroth law of thermodynamics
(B) first law of thermodynamics
(C) second law of thermodynamics
(D) third law of thermodynamics

72. Which of the following is not a point function
(A) enthalpy
(B) entropy
(C) heat
(D) pressure

73. Second law of thermodynamics defines
(A) enthalpy
(B) entropy
(C) heat
(D) work

74. Kelvin-Planck statement deals with
(A) conversion of work into heat
(B) conversion of heat into work
(C) conversion of work
(D) conversion of heat

75. Isentopic flow is
(A) reversible adiabatic flow
(B) irreversible adiabatic flow
(C) frictionless fluid flow
(D) rotational flow

76. Heat flows from cold substance to hot substance with the aid of external work. This statement is given by
(A) Kelvin
(B) Joule
(C) Gay Lussac
(D) Clausius

77. The isentropic process, on a Mollier diagram, is represented by
(A) horizontal line
(B) vertical line
(C) inclined line
(D) curved line

78. The statement that molecular weights of all gases occupy the same volume at NTP is known as
(A) Dalton's law
(B) Avogadro's hypothesis
(C) Joule's law
(D) Charle's law

79. The entropy of an isolated system increases during a
(A) reversible process
(B) irreversible process
(C) ideal process
(D) polytropic process

80. When a perfect gas is expanded through an aperture of minute dimensions, the process is
(A) isothermal
(B) adiabatic
(C) isentropic
(D) throttling

81. In Carnot cycle heat is rejected at constant
(A) volume
(B) pressure
(C) temperature
(D) entropy

82. An engine operates between temperatures of 900K and T_2 and another engine between T_2 and 400K. For both to do equal work, value of T_2 will be
(A) 650K
(B) 600K
(C) 625K
(D) 700K

83. The efficiency of Diesel cycle approach Otto cycle efficiency with
(A) increase in cut-off
(B) decrease in cut-off
(C) zero cut-off
(D) constant cut-off

84. The characteristic gas constant (R) and universal gas constant (R_0) is related through molecular weight (M) as follows;
(A) $R = MR_0$
(B) $R = R_0/M$
(C) $R_0 = R+M$
(D) $R = R_0-M$

85. The statement that the entropy of a pure substance in complete thermodynamic equilibrium becomes zero at the absolute zero of temperature is known as
(A) zeroth law of thermodynamics
(B) first law of thermodynamics
(C) second law of thermodynamics
(D) third law of thermodynamics

86. Combustion in compression ignition engine is
(A) homogeneous
(B) heterogeneous
(C) turbulent
(D) laminar

87. The amount of heat absorbed to evaporate 1 kg of water from its saturation temperature without change of temperature is called
(A) sensible heat of water
(B) enthalpy of steam
(C) latent heat of vaporization
(D) entropy of steam

88. A simply supported beam of span (l) carries a point load (W) at the centre of the beam. The shear force diagram will be
(A) a rectangle
(B) a triangle
(C) two equal and opposite rectangles
(D) two equal and opposite triangles

89. The ratio of maximum shear stress to the average shear stress in a rectangular beam subjected to torsion is
(A) 3/2
(B) 4/3
(C) 7/4
(D) 2

90. A kinematic chain having N links will have
(A) (N-1) inversion
(B) N inversion
(C) (N-2) inversion
(D) (N-3) inversion

91. The product of circular pitch and the diametral pitch is equal to
(A) 2π
(B) π
(C) $\pi/2$
(D) 1

92. The path of the point of contact between the involute teeth profile gears is
(A) circle
(B) straight line
(C) complex curve
(D) parabola

93. The difference between the upper limit and lower limit of a dimension is known as
(A) basic size
(B) nominal size
(C) tolerance
(D) actual size

94. Which one of the following threads is having smallest included angle?
(A) acme thread
(B) BSW thread
(C) buttress thread
(D) unified thread

95. If the tearing efficiency of a riveted joint is 60%, then the ratio of pitch to diameter of rivet is
(A) 0.2
(B) 0.33
(C) 0.4
(D) 0.5

96. According to principle of transmissibility of forces, the effect of a force upon a body is
(A) maximum when it acts at the centre of gravity of a body
(B) different at different points in its line of action
(C) the same at every point in its line of action
(D) minimum when it acts at the CG of the body

97. Centre of gravity of a thin hollow cone lies on the axis at a height of
(A) one-fourth of the total height above base
(B) one-third of the total height above base
(C) one-half of the total height above base
(D) three-eighth of the total height above the base

98. If a suspended body is struck at the centre of percussion, then the pressure on the axis passing through the point of suspension will be
(A) maximum
(B) minimum
(C) zero
(D) infinity

99. Moment of inertia of a thin circular ring of radius r and mass M about an axis perpendicular to plane of ring is
(A) Mr^2
(B) $\frac{2}{5}Mr^2$
(C) $\frac{2}{3}Mr^2$
(D) $\frac{Mr^2}{2}$

100. When trying to turn a key into a lock, the following is applied
(A) coplanar force
(B) non-coplanar force
(C) lever
(D) couple

101. A transversely loaded beam will be unstable, if the end supports are
(A) one fixed other hinge
(b) one fixed other roller
(C) one roller other hinge
(D) both roller

102. The designation M 33×2 of a bolt means
(A) metric threads of 33 nos in 2 cm
(B) metric threads of 33 mm outside diameter with 2 mm pitch
(C) metric threads with cross-section of 33 mm^2
(D bolt of 33 mm nominal diameter having two threads per cm

103. A shaft subjected to combined bending and torsion can be designed by the following stress theory
(A) maximum stress theory
(B) maximum normal stress theory
(C) maximum resultant stress theory
(D) maximum compression theory

104. For a shaft subjected to a torque T and bending moment M, the equivalent twisting moment is
(A) $\sqrt{\frac{T^2+M^2}{2}}$
(B) $\sqrt{M^2-T^2}$
(C) $\frac{M}{2}+\sqrt{M^2+T^2}$
(D) $\sqrt{M^2+T^2}$

105. The flexural rigidity of the deflection of beams is expressed as
(A) $\frac{I}{E}$
(B) $\frac{E}{I}$
(C) EI
(D) $\frac{1}{EI}$

106. The torsional rigidity of a shaft is defined as the torque required to produce
(A) maximum twist in the shaft
(B) maximum shear stress in the shaft
(C) minimum twist in the shaft
(D) a twist of one radian per unit length of the shaft

107. Maximum range of a projectile motion in a plane land is possible for angle of inclination
(A) 0°
(B) 90°
(C) 23.5°
(D) 45°

108. For cantilever beam loaded by uniform distributed load, BM at free end is given by
(A) $-wL$
(B) $-\frac{wL}{2}$
(C) $-\frac{wL^2}{2}$
(D) $-\frac{wL^2}{4}$

109. A light and heavy body, both have same kinetic energy. Which one has higher linear momentum?
(A) light body
(B) heavy body
(C) both have same momentum
(D) unpredictable

110. Which of the following parameters has the same units?
(A) shear force and bending moment
(B) linear impulse and momentum
(C) linear impulse and moment
(D) shear force and momentum

111. Engines used for ships are normally
(A) four-stroke SI engine of very high power
(B) two-stroke CI engines of very high power
(C) four-stoke CI engines of high speed
(D) two-stroke SI engines of high power

112. The capillary rise at 20°C in a clean glass tube of 1 mm bore containing water is approximately
(A) 5 mm
(B) 10 mm
(C) 20 mm
(D) 30 mm

113. The total pressure on a horizontally immersed surface (of surface area A) with its c.g. at a depth $\bar{x}$ from liquid surface in a liquid of specific weight w is given by
(A) $w \times \bar{x}$
(B) $\frac{w \times A}{\bar{x}}$
(C) $w \times \bar{x} \times A$
(D) $\frac{w \times \bar{x}}{A}$

114. Rotameter is used to measure
(A) rotation
(B) flow
(C) pressure
(D) velocity

115. If the angle of repose is 30^0, the maximum efficiency of inclined plane for motion up the plane is
(A) 50%
(B) 33.3%
(C) 75%
(D) 90%

116. A body floats in stable equilibrium when
(A) its meta-centric height is zero
(B) meta-center is above centre of gravity
(C) its centre of gravity is below its centre of buoyancy
(D) meta-center has nothing to do with position of centre of gravity for determining stability

117. Buoyant force is
(A) the resultant force on a floating body
(B) the resultant force on a body due to the fluid surrounding it
(C) equal to the volume of liquid displaced
(D) the force necessary to maintain equilibrium of a submerged body

118. Which of the following manometer has highest sensitivity
(A) U tube with water
(B) inclined U tube
(C) U tube with mercury
(D) micro-manometer with water

119. Working principle of dead weight pressure gauge tester is based on
(A) Pascal's law
(B) Dalton"s law of partial pressure
(C) Newton"s law of viscosity
(D) Avogadr"s hypothesis

120. Piezometer is used to measure
(A) pressure in pipe and channels etc.
(B) atmospheric pressure
(C) very low pressure
(D) difference of pressure between two points

121. Falling drops of water become spheres due to the property of
(A) adhesion
(B) cohesion
(C) surface tension
(D) viscosity

122. Kinematic viscosity is dependent upon
(A) pressure
(B) distance
(C) flow
(D) density

123. The stress-strain relation of the Newtonian fluid is
(A) linear
(B) parabolic
(C) hyperbolic
(D) inverse type

124. Gauge pressure is equal to
(A) absolute pressure + atmospheric pressure
(B) absolute pressure – atmospheric pressure
(C) atmospheric pressure – absolute pressure
(D) atmospheric pressure – vacuum

125. The locations of atoms and their particular arrangement in a given crystal are described by means of
(A) potential energy
(B) space lattice
(C) intermolecular bond
(D) diffusion

126. The ability of a material to withstand bending without fracture is known as
(A) mechanical strength
(B) stiffness
(C) toughness
(D) ductility

127. The process of growing large molecules from small molecules is known as
(A) polymerization
(B) polymorphism
(C) hysterisis
(D) allotropy

128. The process involving the heating of steel above upper critical temperature and then quenching in a medium such as brine, water or oil is known as
(A) annealing
(B) normalizing
(C) tempering
(D) hardening

129. Hyper-eutectoid steel is a steel containing carbon
(A) less than 0.8%
(B) equal to 0.8%
(C) from 0.8 to 2%
(D) zero percent

130. A test used to determine the behavior of materials when subjected to high rates of loading is known as
(A) hardness test
(B) impact test
(C) fatigue test
(D) torsion test

131. To increase the corrosion resistance of steel
(A) vanadium is added as an alloying element
(B) chromium is added as an alloying element
(C) nickel is added as an alloying element
(D) copper is added as an alloying element

132. The first product in the process of converting iron ore into useful metal from a blast furnace is known as
(A) cast iron
(B) wrought iron
(C) pig iron
(D) steel

133. When carbon in the cast iron is mostly in free state, the cast iron is known as
(A) molted cast iron
(B) white cast iron
(C) grey cast iron
(D) black cast iron

134. The process of introducing carbon and nitrogen into a solid ferrous alloy is known as
(A) carbonitriding
(B) nitriding
(C) carburizing
(D) cyaniding

135. In oblique cutting system, the chip flows over the tool face and the direction of the chip flow velocity is
(A) normal to the cutting edge
(B) parallel to cutting edge
(C) inclined with the normal to the cutting edge
(D) axial to cutting edge

136. The only angle on which the strength of the tool depends, is
(A) clearance angle
(B) rake angle
(C) cutting angle
(D) lip angle

137. The relationship between tool life (T) and cutting speed (V) is expressed as
(A) $V^nT = C$
(B) $\frac{V}{T} = C$
(C) $VT^n = C$
(D) $\frac{T}{V} = C$

138. A device which holds and locates a work piece during an inspection or for a manufacturing operation, is known as
(A) fixture
(B) jig
(C) lathe
(D) template

139. In which milling operation, the cutting force tends to lift the work piece
(A) climb
(B) down
(C) conventional
(D) face

140. A leaf spring in automobile is used to
(A) apply forces
(B) measure force
(C) absorb shock
(D) store strain energy

141. When a helical compression spring is subjected to an axial compressive load, the stress in the wire is
(A) tensile stress
(B) compressive stress
(C) shear stress
(D) bending stress

142. In GANTT CHART (closing bracket) symbol signifies
(A) planned progress of an activity
(B) change over time
(C) planned completion of a production activity
(D) planned start of a production activity

143. Which type of pattern is used for producing piston rings of I.C engines?
(A) match plate pattern
(B) loose piece pattern
(C) gated pattern
(D) sweep pattern

144. Gray cast iron is usually welded by
(A) gas welding
(B) resistance welding
(C) furnance brazing
(D) laser welding

145. Which one of the following statements is correct?
(A) non consumable electrode is used in gas metal arc welding
(B) coated electrodes are used in shielded metal arc welding
(C) AC can be used for gas tungsten arc welding process
(D) laser beam welding employs a vacuum chamber and thus avoids use of a shielding method

146. The most economic order quantity in terms of total item consumed per year (A), procurement cost (P) per order and the annual inventory carrying cost (C) per item is given by
(A) $\frac{AP}{2C}$
(B) $\frac{2AP}{C}$
(C) APC
(D) $\sqrt{\frac{2AP}{C}}$

147. The activities in a network diagram are represented by a
(A) circle
(B) square
(C) rectangle
(D) simple arrow drawn from left to right

148. The square of standard deviation is also called
(A) skewnes
(B) variance
(C) medium
(D) mode

149. The ratchet mechanism in a micrometer screw gauge serves to
(A) check wear out
(B) ensure a uniform measuring force
(C) eliminate play
(D) use it as a snap gauge

150. Time taken to drill a hole through a 25 mm thick plate at 300 rpm at a feed rate of 0.25 mm/revolution will be
(A) 10 sec
(B) 20 sec
(C) 25 sec
(D) 40 sec

SET II (Mechanical Engineering)

1	D	51	B	101	D
2	D	52	A	102	B
3	B	53	C	103	B
4	B	54	C	104	D
5	B	55	A	105	C
6	C	56	B	106	D
7	D	57	C	107	D
8	D	58	B	108	C
9	B	59	A	109	A
10	C	60	B	110	B
11	A	61	D	111	B
12	D	62	A	112	D
13	C	63	A	113	C
14	A	64	C	114	B
15	D	65	B	115	B
16	A	66	A	116	B
17	A	67	D	117	B
18	A	68	A	118	D
19	B	69	A	119	A
20	B	70	A	120	C
21	B	71	B	121	C
22	D	72	C	122	D
23	C	73	B	123	A
24	C	74	B	124	B
25	D	75	A	125	B
26	C	76	D	126	C
27	D	77	B	127	A
28	D	78	B	128	D
29	C	79	B	129	C
30	A	80	D	130	B
31	D	81	C	131	B
32	D	82	A	132	C
33	A	83	C	133	C
34	A	84	B	134	A
35	C	85	D	135	C
36	C	86	B	136	B
37	B	87	C	137	C
38	C	88	C	138	A
39	A	89	A	139	C
40	D	90	B	140	C
41	B	91	B	141	C
42	C	92	B	142	C
43	A	93	C	143	A
44	C	94	A	144	A
45	B	95	C	145	B
46	C	96	C	146	D
47	C	97	B	147	D
48	B	98	C	148	B
49	B	99	A	149	B
50	C	100	D	150	B