[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. **Find the smallest number which when divided by 25, 40 and 56 has in each case 13 as a remainder.**
   (A) 1413
   (B) 1400
   (C) 1439
   (D) 1426

2. **The audible range of sound is:**
   (A) 20 Hz to 20 MHz
   (B) 20 Hz to 20 kHz
   (C) 20 kHz to 20 MHz
   (D) 20 Hz to 2000 Hz

3. **The branch of science dealing with the improvement of human race is :**
   (A) Genealogy
   (B) Eugenics
   (C) Euphenics
   (D) Cloning

4. **Select the odd from the group of letters:**
   (A) IOU
   (B) AEI
   (C) OUG
   (D) EOI

5. **Which of the following capital of the country is all set to become the world's first city to have 5G NETWORK by 2018?**
   (A) Russia
   (B) Spain
   (C) Canada
   (D) Sweden

6. **Which of the following has won the India's first ever auction of a gold mine?**
   (A) Vedanta Ltd.
   (B) Anglo American
   (C) BHP Billiton
   (D) Rio Tinto

7. **Speak Up! I can't hear you because your dog ..... too much noise.**
   (A) has made
   (B) makes
   (C) is making
   (D) made

8. **Humans ..... apply knowledge of genetics in prehistory with the domestication and breeding of plants and animals.**
   (A) are beginning
   (B) began
   (C) will begin
   (D) begin

9. **Who among the following pioneered Khilafat Movement?**
   (A) Mahatama Gandhi
   (B) M.A. Jinnah
   (C) Sir Syed Ahmed Khan
   (D) Ali Brothers

10. **The birth and death years of Dr. B. R. Ambedkar are:**
    (A) 1889, 1961
    (B) 1886, 1951
    (C) 1877, 1961
    (D) 1891, 1956

11. Who proposed the Preamble before the drafting committee of the constitution?
(A) Jawahar Lal Nehru
(B) B.R. Ambedkar
(C) B.N. Rao
(D) Mahatama Gandhi

12. Indian Economy is:
(A) Capitalistic Economy
(B) Free Economy
(C) Mixed Economy
(D) Socialistic Economy

13. At one's wit's end
(A) Clear up
(B) Explain
(C) Enlighten
(D) Perplexed

14. Black and Blue
(A) To put things in order
(B) To beat very badly
(C) To put things in disorder
(D) To trust someone

15. Rahul said to me , " we are mortal".
(A) Rahul said to me that we are mortal.
(B) Rahul said to me that we all are mortal.
(C) Rahul said to me that he and I are mortal.
(D) Rahul says to me that we are mortal.

16. I said to her, " Could you please help me?"
(A) I requested her to help me.
(B) I asked her to help me.
(C) I told her if she can help.
(D) I asked her if she can help.

17. Delhi became the capital of India in:
(A) 1913
(B) 1916
(C) 1911
(D) 1917

18. Goa was captured by Portugese in:
(A) 1479 AD
(B) 1600 AD
(C) 1575 AD
(D) 1510 AD

19 ..... studies ancient societies.
(A) Anthropology
(B) History
(C) Archaeology
(D) Ethnology

20. I am a .....
(A) Working hard
(B) Hard worker
(C) Hardly working
(D) Works harder

[CHEMISTRY]

21. If N_A is Avogadro number then number of valance electrons in 4.2 gm og nitride ions (N^{3-}) is
(A) 4.2 N_A
(B) 2.4 N_A
(C) 1.6 N_A
(D) 3.2 N_A

22. 60 gm of organic compound on analysis gave the following results: C = 24 gm; H = 4 gm and O = 32 gm. The empirical formula of the compound is
(A) CH_2O
(B) CHO
(C) C_2H_2O
(D) $C_2H_2O_2$

23. The following equation is a completely balanced equation:

$$2Sn + 12HCl + 4HNO_3 \longrightarrow 3SnCl_2 + 8H_2O + 4NO$$

In the above reaction, number of equivalents per formula weight of HNO_3 is
(A) 3
(B) 4
(C) 1
(D) 2

24. The oxidation state of S in $H_2S_2O_8$ is
(A) +10
(B) +8
(C) +6
(D) +4

25. Aufbau principle does not give correct arrangement of filling up of atomic orbitals in
(A) Cu and Zn
(B) Co and Zn
(C) Mn and Cr
(D) Cu and Cr

26. The experimental value of dipole moment of HCl is 1.03 D. The length of H-Cl bond is 1.275 Å. The percentage of ionic character in H-Cl is
(A) 7
(B) 17
(C) 43
(D) 21

27. Which of the following statement about covalent bond is NOT TRUE?
(A) The electrons are shared between atoms
(B) The bond is non-directional
(C) Bond strength depends upon the extent of overlapping
(D) Bond formed may or may not be polar

28. Which of the following have maximum number of unpaired electrons?
(A) Fe^{3+}
(B) Fe^{2+}
(C) Co^{2+}
(D) Co^{3+}

29. The number of bonds in SO_2 is
(A) two σ and 2 π
(B) two σ and 1 π
(C) two σ and 2 π and 1 lone pair
(D) None of these

30. The correct order of electron affinity among the following is
(A) F > Cl > Br
(B) Br > Cl > F
(C) Cl > F > Br
(D) F > Br > Cl

31. Which of the following has correct increasing basic strength
(A) MgO < BeO < CaO < BaO
(B) BeO < MgO < CaO < BaO
(C) BaO < CaO < MgO < BeO
(D) CaO < BaO < BeO < MgO

32. Ionic radii will be maximum in which of the following ions
(A) C^{4-}
(B) N^{3-}
(C) O^{2-}
(D) Mg^{2+}

33. Which of the following will show lowest degree of *paramagnetism* per mole of the compound at 298 K?
(A) $MnSO_4 . 4 H_2O$
(B) $CuSO_4 . 5 H_2O$
(C) $FeSO_4 . 6 H_2O$
(D) $NiSO_4 . 6 H_2O$

34. Trimethylamine $[(CH_3)_3N]$ is a pyramidal molecule and foramide $[HCONH_2]$ is a planer molecule. The hybridization of Nitrogen in both is
(A) sp^2, sp^3
(B) sp^3, sp^2
(C) sp^3, sp^3
(D) sp^2, sp

35. de-Brogalie wavelength associated with a particle of mass 10^{-6} kg moving with a velocity of 10 ms^{-1} is
(A) 6.63×10^{-7} m
(B) 6.63×10^{-16} m
(C) 6.63×10^{-21} m
(D) 6.63×10^{-29} m

[PHYSICS]

36. When a mass is rotating in a plane about a fixed point, its angular momentum is directed along
(A) The radius
(B) The tangent to orbit
(C) The axis of rotation
(D) Line at an angle of 60^0 to the plane of rotation

37. A uniform sphere of mass 2 kg and radius 10 cm is released from rest on an inclined plane makes an angle of 30^0 with the horizontal, its angular acceleration and kinetic energy as it travels 2 m along the plane are,
(A) 25 radians/cm^2 and 19.6 joules
(B) 35 radians/cm^2 and 19.6 joules
(C) 35 radians/cm^2 and 29.6 joules
(D) 25 radians/cm^2 and 99.6 joules

38. The centre of mass of a system of particles of masses 1 kg, 2 kg and 3 kg, placed at the corners of an equilateral triangle of side 1.0 metre is,

(A) $\frac{3.5}{6}, \frac{\sqrt{3}}{4}$

(B) $\frac{5}{6}, \frac{\sqrt{3}}{4}$

(C) $\frac{3.5}{8}, \frac{\sqrt{3}}{4}$

(D) $\frac{3.5}{6}, \frac{\sqrt{3}}{7}$

39. The moment of inertia of a circular ring about its diameter is 100 gm cm^2, then the moment of inertia about an axis passing through its centre and normal to its plane is,
(A) 300 gm cm^2
(B) 100 gm cm^2
(C) 200 gm cm^2
(D) 250 gm cm^2

40. A particle is projected vertically upward from the ground at time $t=0$ and reaches a height h and $t=T$. The greatest height of the particle is,

(A) $\frac{(gT^2+6h)^2}{8T^2}$

(B) $\frac{(gT^2+2h)^2}{2T^2}$

(C) $\frac{(gT^2+2h)^2}{8T^2}$

(D) $\frac{(gT^2+2h)^2}{4T^2}$

41. Two bodies move in the same straight line at the same instant of time from the same origin. The first body moves with a constant velocity of 40 m/sec and second starts with a constant acceleration of 4 m/sec^2. The time that elapses before the second body catches the first body is,
(A) 10 sec
(B) 20 sec
(C) 30 sec
(D) 15 sec

42. A rope has a length of 12 m amd a mass of 16 kg. The rope hangs from a rigid support. A man whose mass is 80 kg slides down the rope at a constant speed of 0.8 m/sec. The tension in the rope at a point 6 m from the top when the man has slide to this point is,
(A) 762.4 N
(B) 862.4 N
(C) 726.2 N
(D) 826.4 N

43. A body moving in a straight line with a constant acceleration 'a' loses ¾ of its initial velocity 'u'. The distance covered by the body during this time is,
(A) 825 m
(B) 285 m
(C) 725 m
(D) 635 m

44. The average kinetic energy of a molecule of a perfect gas is,
(A) $\frac{2}{3}KT$
(B) 1.5 KT
(C) 2.5 KT
(D) 1.66 KT

45. The average translational kinetic energy of the molecule at 27^0 C is 13.6 x 10^3 kg/m^3. The number of molecules in 1 cm^3 of an ideal gas at 27^{0}C and a pressure of 10 mm of mercury is,
(A) 3.2×10^{17}
(B) 6.2×10^{17}
(C) 1.2×10^{17}
(D) 5.2×10^{12}

46. The half-life of a Cobalt radio-isotope is 5.3 years. The strength of this one milli-curie after a period of one year will be,
(A) 1 milli-curie
(B) 0.77 milli-curie
(C) 0.87 milli-curie
(D) 0.62 milli-curie

47. When the number of nucleons in nuclei increases, the binding energy per nucleon
(A) Increases continuously with mass number
(B) Decreases continuously with mass number
(C) First decreases and then increases with increase in mass number First increases and then decreases with increase in mass number
(D) First increases and then decreases with increase in mass number

48. In photoelectric effect the electrons are not emitted by photosensitive material unless
(A) The wavelength of the incident light exceeds a certain minimum wavelength
(B) The frequency of the incident light exceeds a certain minimum frequency
(C) The velocity of the incident light exceeds a certain minimum velocity
(D) All the above

49. Light quanta with energy of 4.9 eV eject photoelectrons from metal with work function 4.5 eV. The maximum impulse transmitted to the surface of the metal when each electron flies out is,
(A) $3.45 \times 10^{-25}\ kg\ m/sec$
(B) $4.45 \times 10^{-25}\ kg\ m/sec$
(C) $2.45 \times 10^{-25}\ kg\ m/sec$
(D) $1.45 \times 10^{-25}\ kg\ m/sec$

50. X-rays and gamma-rays are both electromagnetic waves. Which of the following statement is false?
(A) Velocity of X-rays and gamma-rays is equal to velocity of light
(B) X-rays have larger wavelength than that of gamma-rays
(C) X-rays have smaller wavelength than that of gamma-rays
(D) None of the above

[MATHEMATICS]

51. If sin α, cos α are the roots of the equation $ax^2 + bx + c = 0$, then
(A) $a^2 + 2ac - b^2 = 0$.
(B) $(a+c)^2 = (b^2 + c^2)^2$.
(C) $a^2 - 2ac + b^2 = 0$.
(D) None of these.

52. If ABCD is a square whose side length is a and AB and AD are axes, then equation of the circle circumscribing the square is given by
(A) $x^2 + y^2 + ax + ay = a^2$.
(B) $x^2 + y^2 - ax - ay = 0$.
(C) $x^2 + y^2 + ax + ay = 0$.
(D) None of these.

53. Which of the following functions is not derivable at x=0 but continuous at x=0?
(A) $f(x) = \begin{cases} x \sin\frac{1}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$
(B) $f(x) = \begin{cases} \sin\frac{1}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$
(C) $f(x) = x \sin x$
(D) None of these

54. The focus of the parabola $y = 2x^2 + x$ is
(A) (0, 0)
(B) (1/2, 1/4)
(C) (-1/4, 0)
(D) None of these

55. If x_1, x_2, x_3 as well as y_1, y_2, y_3 are in G. P. with same common ratio, then the points (x_1, y_1), (x_2, y_2) and (x_3, y_3)
(A) are the vertices of a triangle.
(B) lie on a straight line.
(C) lie on a circle.
(D) None of these

56. If the sum of first 2n terms of an A.P. 2,5,8,.....is equal to the sum of first n terms of the A.P. 57,59,61,....., then n equals
(A) 10
(B) 12
(C) 11
(D) 13

57. The equation formed by decreasing each root of $ax^2 + bx + c = 0$ by 1 is $x^2 + 4x + 1 = 0$, then
(A) $a = -b$.
(B) $b = -c$.
(C) $a = -c$.
(D) $a + c = b$

58. Let α, β be the roots of equation $x^2 - x + p = 0$ and γ, δ be the roots of equation $x^2 - 4x + q = 0$. If $\alpha, \beta, \gamma, \delta$ are in G.P., then the integral values of p and q are
(A) $-2, -32$
(B) $-2, 3$
(C) $-6, 3$
(D) $-6, -32$

59. The solution of the equation $cos^2\theta + sin\theta + 1 = 0$ lies in the interval

(A) $\left(-\frac{\pi}{4}, \frac{\pi}{4}\right)$.

(B) $\left(\frac{\pi}{4}, \frac{3\pi}{4}\right)$.

(C) $\left(\frac{3\pi}{4}, \frac{5\pi}{4}\right)$.

(D) $\left(\frac{5\pi}{4}, \frac{7\pi}{4}\right)$

60. If the latus rectum of an ellipse is one half of its minor axis, then its eccentricity is

(A) ½.

(B) $1/\sqrt{2}$.

(C) $\sqrt{3}/2$.

(D) None of these

61. The triangle PQR is inscribed in the circle $x^2 + y^2 = 25$. If Q and R have coordinates (3, 4) and (-4, 3), then $\angle QPR$ is equal to

(A) $\frac{\pi}{2}$

(B) $\frac{\pi}{3}$

(C) $\frac{\pi}{4}$

(D) None of these

62. The normal at the point (1, 1) on the curve $2y + x^2 = 3$ is

(A) $x + y = 0$

(B) $x - y = 0$

(C) $x + y + 1 = 0$

(D) None of these

63. The function $f(x) = 2\cos x + x$ has a maxima or minima at x=

(A) $\frac{\pi}{6}$

(B) $\frac{\pi}{3}$

(C) $\frac{\pi}{2}$

(D) None of these

64. The number of parallelograms that can be formed from a set of four parallel lines intersecting another set of three parallel lines is

(A) 6

(B) 9

(C) 12

(D) 18

65. The derivative of $(sin^{-1}x + cos^{-1}x)$ with respect to x is

(A) -1

(B) 0

(C) 1

(D) None of these

66. The value of λ for which $f(x) = \begin{cases} \lambda x^2 + 3x, x \leq 2 \\ 2x + 6, x > 2 \end{cases}$ is continuous at x = 2 is

(A) 0

(B) 2.

(C) 3

(D) 1

67. If $e^x + e^y = e^{x+y}$, then $\frac{dy}{dx}$ at (2, 2)

(A) 2

(B) 1

(C) -1

(D) e

68. The solution x of the equation $\int_2^x \frac{dt}{t\sqrt{t^2-1}} = \pi/2$ is

(A) π

(B) $\sqrt{3}/2$

(C) $2\sqrt{2}$

(D) None of these

69. $\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}\, dx$ equals

(A) $\frac{\pi}{4}$

(B) $\frac{\pi}{2}$

(C) 0

(D) 1

70. $\int_0^{10\pi} |\sin x|\, dx$ is equal to

(A) 20

(B) 8

(C) 10

(D) None of these

[MECHANICAL ENGINEERING]

71. A system comprising of a single phase is known as
(A) Open system
(B) Closed system
(C) Homogeneous system
(D) Heterogeneous system

72. Control volume refers to a
(A) Specified mass
(B) Fixed region in space
(C) Closed system
(D) None of these

73. Thermal equilibrium between two or more bodies exists. When they are brought together, there is no change in
(A) Density
(B) Pressure
(C) Temperature
(D) All of these

74. Kelvin Planck's law deals with
(A) Conversion of work into heat
(B) Conversion of heat into work
(C) Conservation of work
(D) Conservation of heat

75. Specific heat of a gas at $C_p = C_v$ at
(A) Absolute zero
(B) Critical temperature
(C) Triple point
(D) All of above

76. Isentropic flow is
(A) Reversible adiabatic flow
(B) Irreversible adiabatic flow
(C) Frictionless fluid flow
(D) None of above

77. In a reversible isothermal process undergoes by an ideal gas
(A) Heat transfer is zero
(B) Change in internal energy is zero
(C) Work transfer is zero
(D) Heat transfer is equal to work transfer

78. A mixture of gases expands from 0.03 m^3 at constant pressure of 1 MPa and absorbs 84 KJ of heat during process. The change in internal energy of mixture is
(A) 30 KJ
(B) 54 KJ
(C) 84 KJ
(D) 114 KJ

79. Otto cycle consists of sets of processes
(A) Adiabatic and constant volume
(B) Adiabatic and constant pressure
(C) Isothermals and constant pressure
(D) Isothermals and constant volume.

80. With decrease in cut off, the efficiency of diesel cycle
(A) Increases
(B) Decreases
(C) Remains constant
(D) None of above

81. Match the list-I with list –II and select correct answer using code given below

	LIST-I		LIST-II
a	Work done in polytrophic process	1	$-\int Vdp$
b	Work done in steady flow process	2	zero
c	Heat transfer in a reversible adiabatic process	3	$p_1V_1 - p_2V_2/\gamma - 1$
d	Work done in isentropic process	4	$p_1V_1 - p_2V_2/n - 1$

Codes:	a	b	c	d
(A)	4	1	3	2
(B)	1	4	2	3
(C)	4	1	2	3
(D)	1	2	3	4

82. For a maximum specific output of a constant volume cycle
(A) Working fluid should be air
(B) Speed should be high
(C) Suction temperature should be high
(D) Temperature of working fluid at end of compression and expansion should be equal

83. A heat engine receives 100KW of heat at constant temperature of 285 degree centigrade and rejects 492 KW at 5°C, consider following thermodynamic cycles in this regard
1. Carnot cycle 2. Reversible cycle 3. Irreversible cycle

(A) 1
(B) 3
(C) 1 and 2
(D) 1,2 and 3

84. Which of following cycle is more efficient for same max pressure and heat input
(A) Otto cycle
(B) Dual combustion cycle
(C) Diesel cycle
(D) Rankine cycle

85. Heat absorbed or rejected during polytrophic process is equal to
(A) $(\gamma-n/n-1)$ x work done
(B) $(\gamma-n/n-1)^2$ x work done
(C) $(\gamma-n/n-1)^{1/2}$ x work done
(D) $(\gamma-n/\gamma-1)$ x work done

86. Which one is not a mechanical property of material?
(A) hardness
(B) Poisson ratio
(C) Endurance limit
(D) Yield strength

87. A body of mass 10 kg moving with a velocity of 1m/s is acted upon by a force of 50 N for 2 seconds, the final velocity will be
(A) 22m/s
(B) 10m/s
(C) 50m/s
(D) 11m/s

88. Two blocks with mass M and m are in contact with each other and are resting on a horizontal frictionless floor. When horizontal force is applied to heavier block, the block accelerates to right. The force between two block is
(A) (M+m) F /m
(B) MF/ m
(C) mF/M
(D) mF (M+m)

89. A ball impinges directly upon another ball at rest and itself comes to rest due to impact.aif half of the kinetic energy is destroyed in collision, the coefficient of restitution will be
(A) 1
(B) 0.5
(C) 0.25
(D) 0.35

90. If the distance between center of gravity of masses, M_1 & M_2 is L then distance of CG of composite system from mass M_1 will be
(A) $M_1L / M_1 + M_2$
(B) $M_2L / M_1 + M_2$
(C) $(M_1 - M_2) L / (M_1 + M_2)$
(D) $M_1/(M_1 + M_2) L$

91. Ratio of moment of inertia of circle and that of square having same area about their centriodal axis is
(A) $3/\pi$
(B) $3/2\pi$
(C) $4/\pi$
(D) $5/4\pi$

92. Two bodies of mass M and m are moving in concentric orbits of radii R and r such that their periods are same. The ratio between their angular velocity is
(A) R:r
(B) mR : Mr
(C) 1:1
(D) R/r : m/M

93. The maximum bending moment for simply supported beam carrying a uniformly distributed which varies from zero at each end to w per unit length at mid span is given by
(A) $wl^2/8$
(B) $wl^3/12$
(C) $wl^2/12$
(D) $wl^2/24$

94. Two shafts A and B are made of same material. The diameter of shaft B is twice that of A. the ratio of power which can be transmitted by shaft A to that of shaft B is
(A) 1/2
(B) ¼
(C) 1/8
(D) 1/16

95. The buckling load in a steel column is
(A) Related to length
(B) Directly proportional to slenderness ratio
(C) Inversely proportional to slenderness ratio
(D) No relation to slenderness ratio

96. If the value of Poisson ratio is zero then it means
(A) Material is rigid
(B) Material is perfectly plastic
(C) There is no longitudinal strain in material
(D) None of these.

97. A shaft subjected to maximum bending stress of 80 MPa and max shear stress is 30 MPa at a particular section. If yield point in tension of material is 280 MPa and maximum shear stress theory of failure is used the factor of safety will be
(A) 2.5
(B) 2.8
(C) 3.0
(D) 3.5

98. Design of shaft made of brittle material is based upon Guest Theory
(A) Rankine theory
(B) St Venents theory
(C) Von Misses theory
(D) Guests theory

99. Three beams have lengths, bending moments and allowable stresses. The cross section of beams is square, rectangle with depth twice the width and a circle. The ratio of weight of square beam to weight of rectangular beam is
(A) 0.859
(B) 0.95
(C) 0.756
(D) 1.259

100. A steel rod 2m long is heated through a temp of 100 ^{0}C. the coefficient of linear expansion is $\alpha = 6.6 \times 10^{-6}/^{0}C$ and $E = 2 \times 10^{6}$ N/m^2.the increase in length will be
(A) 1.3×10^{-3} m
(B) 1.0×10^{-3} m
(C) 1.2×10^{-3} m
(D) 1.4×10^{-3} m

101. The normal stress at a point are $\sigma_x = 10$ MPa, $\sigma_y = 2$ MPa and shear stress 4MPa. The maximum principal stress at this point is
(A) 16 MPa
(B) 14 MPa
(C) 11 MPa
(D) 106 MPa

102. The piezo metric head is expressed by
(A) $\gamma Z + P$
(B) $Z + P / \gamma$
(C) $g Z + P / \rho$
(D) $\rho Z + P/g$

103. Mercury is used in manometers for measuring
(A) Low pressure accurately
(B) Large pressure only
(C) All pressure except smaller uses
(D) Very low pressure

104. Absolute pressure is measured by
(A) Bourdon gauge
(B) Aneroid barometer
(C) Vacuum gage
(D) manometer

105. Absolute pressure in a flow system
(A) Is always above local atmospheric pressure
(B) Is a vacuum pressure
(C) may be above or equal to local atmospheric pressure
(D) Is also called negative pressure

106. The point though which the resultant hydrostatic force act is called
(A) Metacentre
(B) Centre of pressure
(C) Centre of buoyancy
(D) Centre of gravity

107. Force on horizontal plane surface within liquid is
(A) F = w h
(B) F = PA
(C) F = 0
(D) F = ρ g A h

108. The line of action of buoyant force acts through
(A) CG of any submerged body
(B) Centroid of volume of any floating body
(C) Centroid of displaced volume of fluid
(D) Centroid of horizontal projection of body

109. A body floats in stable equilibrium
(A) when metacentric height is zero
(B) when CG is below centre of buoyancy
(C) when meta centre is above CG
(D) none of above

110. For a Newtonian fluid shear stress is proportional to
(A) Density gradient
(B) Velocity gradient
(C) Pressure gradient
(D) None of above

111. Falling drop of rain acquires spherical shape because of
(A) Vapour pressure
(B) Surface tension
(C) Viscosity tension
(D) Compressibility

112. Sensitiveness of a ordinary U-Tube manometer is measured by
(A) Changing fluid having higher density
(B) Increasing temperature of environment
(C) Setting it inclined
(D) Coloring of fluid

113. A vertical triangular area of altitude h has one side in free surface of a liquid. Its vertex is downward. The depth of its pressure is
(A) h /3
(B) 0.5 h
(C) 0. 75 h
(D) 0.8 h

114. The point on immersed body through which resultant pressure of liquid acts is called
(A) Centre of gravity
(B) Centre of pressure
(C) Centre of buoyancy
(D) Metacenter

115. The ratio of width of a rectangular key to diameter of a shaft on which key is fitted is
(A) 1/4
(B) 4
(C) 1/2
(D) 1/8

116. Which of following key transmit power through frictional resistance only?
(A) Round key
(B) Square key
(C) Taper key
(D) Saddle key

117. A shaft used for distribution of power is called
(A) Line shaft
(B) Jack shaft
(C) Axle
(D) Counter shaft

118. The approximate efficiency of a single riveted lap joint is of the order of
(A) 30 %
(B) 50 %
(C) 80 %
(D) 40 %

119. Heat treatment involving heating of steel above critical temperature and then cooling in air is called
(A) Austempering
(B) Tempering
(C) Annealing
(D) Normalizing

120. Pig iron is produced by reduction of iron ore in a
(A) Blast furnace
(B) Cupola
(C) Open hearth furnace
(D) None of these

121. Bearing material should have
(A) High hardness
(B) Hard core
(C) High tensile strength
(D) High compressive strength

122. The property by which an amount of energy is absorbed bay material without plastic deformation is called

(A) Ductility
(B) Toughness
(C) Impact strength
(D) Resilience

123. Arc blow is more pronounced in
(A) AC welding with bare electrode
(B) DC welding with bare electrode
(C) AC welding
(D) Dc welding with reverse polarity

124. In manual metal arc welding (SMAW) the power source should have dropping characteristics in order to maintain
(A) Constant temperature in arc
(B) Constant voltage when arc length change
(C) Constant current when arc length change
(D) Weld pool red hot

125. Oxyacetylene reducing flame is used for welding on
(A) Mild steel
(B) Grey cast iron
(C) High carbon steel
(D) Alloy steel

126. The phenomenon of weld decay occurs in
(A) Cast iron
(B) Brass
(C) Bronze
(D) Stainless steel

127. The temperature produced in oxy hydrogen flame as compared to oxy acetylene flame is
(A) Same
(B) More
(C) Less
(D) None of above

128. Narrow groove can be produced on a work pieces by a milling operation is called
(A) End milling
(B) Helical milling
(C) Saw milling
(D) Face milling

129. Gang milling is a
(A) Milling operation combined with turning
(B) Process of gear cutting
(C) Process using two or more cutter simultaneously
(D) Process of generating hexagonal surface

130. Of a flat drill varies/relief, cutting edge angle is
(A) 3-8 degree
(B) 90-118 degree
(C) 70-90 degree
(D) 45-60 degree

131. Which one is not a part of shaper machine?
(A) Ram
(B) Tool head
(C) Clapper box
(D) Compound slide

132. Single point thread cutting tool should ideally have
(A) Positive rake
(B) Negative rake
(C) Zero rake
(D) Normal rake

133. Which one of the following material is the hardest cutting tool material next to diamond?
(A) Cemented carbide
(B) Silicon
(C) Ceramics
(D) Cubic boron nitride

134. For cutting brass with single point cutting tool on a lathe machine, the tool should have
(A) Zero side relief angle
(B) Positive rake angle
(C) Zero rake angle
(D) Negative rake angle

135. In arc welding process intense heat is developed between electrode and work piece due to
(A) High voltage
(B) High current
(C) Time of current flow
(D) Contact resistance

136. A turret lathe is useful for
(A) Small scale production
(B) Medium scale production
(C) Large scale production
(D) None of above

137. Sintering temperature is approximately equal to
(A) 25% of the melting temperature
(B) 50% of the melting temperature
(C) 75% of the melting temperature
(D) 100% of the melting temperature

138. Powder metallurgy uses
(A) Pressure
(B) Heat
(C) Pressure & heat both
(D) No pressure

139. Hybrid layout is
(A) combination of product layout & fixed layout
(B) combination of process layout & fixed layout
(C) combination of product layout & process layout
(D) None of above

140. Inventory cost includes
(A) Purchase cost and storage cost
(B) Purchase cost
(C) Order cost and storage cost
(D) Purchase cost, storage cost and order cost

141. Total cost curve is
(A) S-shaped
(B) O-shaped
(C) L-shaped
(D) U-shaped

142. Which of following material requires least shrinkage allowance?
(A) Grey CI
(B) Aluminum
(C) Steel
(D) Brass

143. Metal pattern are cast from
(A) Plastic pattern
(B) Wax pattern
(C) Wooden pattern
(D) Plaster pattern

144. A Muller is used to
(A) Wet molding sand
(B) Mix molding sand
(C) Ram molding sand
(D) Dry molding sand

145. Expendable molds are made of
(A) Plaster of Paris
(B) Sand
(C) Ceramics
(D) All of above

146. Surface hardening is used for
(A) Cast iron
(B) High carbon steel
(C) Low carbon steel
(D) None of above

147. Inserts are made up of
(A) HSS
(B) High carbon steel
(C) Cemented carbide
(D) Stellites

148. CBN tools can withstand a temperature of about
(A) 5000^0C
(B) 4000^0C
(C) 2500^0C
(D) 2000^0C

149. Face sand used in foundry work consist of
(A) Silica & clay
(B) Clay & alumina
(C) Silica & alumina
(D) Clay & dust

150. The ratio between the pattern shrinkage allowance of steel & cast iron is about
(A) 1:1
(B) 2:1
(C) 1:2
(D) 1:1.5