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Question Booklet Series

Question Booklet

A

MECHANICAL ENGINEERING/TECHNOLOGY

(Objective)

Time Allowed : 2 Hours

Maximum Marks : 50

Read the following instructions carefully before you begin to answer the questions.

IMPORTANT INSTRUCTIONS

1. This Question Booklet contains **100** questions in all.
2. All questions carry equal marks.
3. Attempt all questions.
4. Immediately after commencement of the examination, you should check up your Question Booklet and ensure that the Question Booklet Series is printed on the top right-hand corner of the Booklet. The Booklet contains 20 printed pages and no page or question is missing or unprinted or torn or repeated. If you find any defect in this Booklet, get it replaced immediately by a complete Booklet of the same series.
5. You must write your Roll Number in the space provided on the top of this page. Do not write anything else on the Question Booklet.
6. An OMR Answer Sheet will be supplied to you separately by the Invigilator to mark the answers. You must write your Name, Roll No. and other particulars on the first page of the OMR Answer Sheet provided, failing which your OMR Answer Sheet will not be evaluated.
7. You will encode your Roll Number and the Question Booklet Series A, B, C or D as it is printed on the top right-hand corner of this Question Booklet with Black/Blue ballpoint pen in the space provided on Page-2 of your OMR Answer Sheet. If you do not encode or fail to encode the correct series of your Question Booklet, your OMR Answer Sheet will not be evaluated correctly.
8. Questions and their responses are printed in English only in this Booklet. Each question comprises four responses—(A), (B), (C) and (D). You are to select ONLY ONE correct response and mark in your OMR Answer Sheet. In case you feel that there are more than one correct response, mark the response which you consider the best. In any case, choose ONLY ONE response for each question. Your total marks will depend on the number of correct responses marked by you in the OMR Answer Sheet.
9. In the OMR Answer Sheet, there are four circles—(A), (B), (C) and (D) against each question. To answer the questions you are to mark with Black/Blue ballpoint pen ONLY ONE circle of your choice for each question. Select one response for each question in the Question Booklet and mark in the OMR Answer Sheet. If you mark more than one answer for one question, the answer will be treated as wrong. Any erasure or change is not allowed.
10. You should not remove or tear off any sheet from the Question Booklet. You are not allowed to take this Question Booklet and the OMR Answer Sheet out of the Examination Hall during the examination. After the examination has concluded, you must hand over your OMR Answer Sheet to the Invigilator. Thereafter, you are permitted to take away the Question Booklet with you.
11. Failure to comply with any of the above instructions will render you liable to such action or penalty as the Commission may decide at their discretion.

SEAL

1. If the matrix

$$\begin{bmatrix} 1 & 3 & \lambda+2 \\ 2 & 4 & 8 \\ 3 & 5 & 10 \end{bmatrix}$$

is singular, then λ equals

- (A) -2
(B) 2
(C) 4
(D) -4

2. If ω is a cube root of unity, then a root of the equation

$$\begin{vmatrix} x+1 & \omega & \omega^2 \\ \omega & x+\omega^2 & 1 \\ \omega^2 & 1 & x+\omega \end{vmatrix} = 0$$

is

- (A) $x = \omega$
(B) $x = 0$
(C) $x = 1$
(D) $x = \omega^2$

3. The system of equations

$$\begin{cases} \lambda x + y + z = 1 \\ x + \lambda y + z = \lambda \\ x + y + \lambda z = \lambda^2 \end{cases}$$

has no solution, if λ equals

- (A) 0
(B) -2
(C) 1
(D) -1

4. The eigenvalues of the matrix

$$A = \begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix}$$

are

- (A) $1+i, 1-i$
(B) $1+i, 1+i$
(C) $1, -1$
(D) $1-i, 1-i$

5. The eigenvalues of a Hermitian matrix are

- (A) complex
(B) purely imaginary
(C) real
(D) None of the above

6. If

$$f(x) = x^5 - 20x^3 + 240x$$

then $f(x)$ is

- (A) monotonically decreasing everywhere
(B) monotonically decreasing on $(0, \infty)$
(C) monotonically increasing only in $(-\infty, 0)$
(D) monotonically increasing everywhere

7. If the function $\sqrt{x^2-4} \ln(2,4)$ satisfies the Lagrange's mean value theorem, then there exists some $c \in [2, 4]$. The value of c is

- (A) 12
(B) 6
(C) $\sqrt{2}$
(D) $\sqrt{6}$

8. The function

$$f(x) = \begin{cases} \frac{1}{x^2}, & x \neq 0 \\ 0, & x = 0 \end{cases}$$

has

- (A) removable discontinuity at $x=0$
(B) irremovable discontinuity at $x=0$
(C) continuity at $x=0$
(D) None of the above

9. Given integral

$$\int_0^{\pi} \frac{\sin x}{x} dx$$

Then the integral

- (A) is not convergent
(B) converges
(C) converges absolutely
(D) converges but not absolutely

10. Let

$$f(x, y) = \begin{cases} \frac{xy}{\sqrt{x^2+y^2}}, & x^2+y^2 \neq 0 \\ 0, & x=y=0 \end{cases}$$

Then

- (A) $f(x, y)$ is not differentiable at the origin
(B) $f(x, y)$ is continuous at the origin
(C) $f_x(0, 0) = f_y(0, 0)$
(D) $f_x(0, 0) = f_y(0, 0)$

11. By applying Stokes' theorem, the value of

$$\oint_C [(x+y)dx + (2x-z)dy + (y+z)dz]$$

where C is boundary of the triangle with vertices $(2, 0, 0)$, $(0, 3, 0)$ and $(0, 0, 6)$, is

- (A) 0
(B) 12
(C) 21
(D) 13

12. If $\text{div } \vec{V} = 0$, then $\vec{V}$ is called

- (A) rotational
(B) solenoidal
(C) irrotational
(D) None of the above

13. Using Green's theorem, the value of the integral $\oint_C (xy \, dy - y^2 \, dx)$, where C is the square, cut from the first quadrant by the lines $x=1$ and $y=1$, will be

(A) 1
(B) $\frac{1}{2}$
(C) $\frac{5}{3}$
(D) $\frac{3}{2}$

14. Let $\vec{a} = \hat{i} - \hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + \hat{j} - \hat{k}$, then unit vector perpendicular to the plane containing $\vec{a}$ and $\vec{b}$ is

(A) $\frac{\hat{j} + \hat{k}}{\sqrt{2}}$
(B) $\sqrt{2}(\hat{j} + \hat{k})$
(C) $\sqrt{2}(\hat{j} - \hat{k})$
(D) $\frac{\hat{j} - \hat{k}}{\sqrt{2}}$

15. The maximum value of the directional derivative of the function $\phi = 2x^2 + 3y^2 + 5z^2$ at a point $(1, 1, -1)$ is

(A) 5
(B) 152
(C) $\sqrt{152}$
(D) -10

16. The differential equation

$$2y \, dx - (3y - 2x) \, dy = 0$$

is

(A) exact and homogeneous but not linear
(B) exact, homogeneous and linear
(C) exact and linear but not homogeneous
(D) homogeneous and linear but not exact

17. The solution of the differential equation

$$\frac{d^3 y}{dx^3} - 9 \frac{dy}{dx} = \cos x$$

is

(A) $y(x) = C_1 e^{3x} + C_2 e^{-3x} + C_3 - \frac{1}{10} \sin x$
(B) $y(x) = C_1 e^{3x} + C_2 e^{-3x} + C_3 + \frac{1}{10} \cos x$
(C) $y(x) = C_1 e^{3x} + C_2 e^{-3x} + C_3 + \frac{1}{10} \sin x$
(D) $y(x) = C_1 e^{3x} + C_2 e^{-3x} + C_3 - \frac{1}{10} \cos x$

18. One-dimensional wave equation is

(A) $\frac{\partial^2 u}{\partial y^2} = \frac{1}{c^2} \frac{\partial^2 u}{\partial x^2}$
(B) $\frac{\partial^2 u}{\partial x^2} = \frac{1}{c^2} \frac{\partial^2 u}{\partial t^2}$
(C) $\frac{\partial^2 u}{\partial t^2} = \frac{1}{c^2} \frac{\partial^2 u}{\partial x^2}$
(D) $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$

19. The solution of the differential equation

$$\frac{d^2 y}{dx^2} - 3 \frac{dy}{dx} + 2y = e^x, y = 3$$

and $\frac{dy}{dx} = 3$, when $x = 0$

is

(A) $y = 2e^x + e^{2x} - xe^x$
(B) $y = e^x - e^{2x} + xe^x$
(C) $y = 2e^x + e^{-2x} - xe^{-x}$
(D) $y = e^x + 2e^{2x} - x^2 e^x$

20. The solution of the differential equation

$$y = px + \sqrt{4 + p^2}$$

is

(A) $(y - Cx)^2 + C^2 = 0$
(B) $(y - Cx)^2 + 4C^2 = 0$
(C) $(y - Cx)^2 - C^2 = 4$
(D) $(y - Cx)^2 - 4C^2 = 0$

21. The degree of the differential equation

$$\left[5 + \left(\frac{dy}{dx} \right)^3 \right]^2 = \frac{d^2 y}{dx^2}$$

is

(A) 3
(B) 1
(C) 2
(D) 6

22. If $f(z)$ is analytic in domain D , then $f(z)$ is

(A) continuous in D
(B) continuous but not necessarily differentiable in D
(C) not both continuous and differentiable in D
(D) differentiable in D

23. If the complex valued function $f(z) = \log z$, then

(A) $f(z)$ satisfies Cauchy-Riemann equation
(B) $f(z)$ is analytic
(C) $f(z)$ is not analytic
(D) None of the above

24. If $f(z)$ is analytic in a simply connected domain D , then for every closed path C in D

(A) $\oint_C f(z) dz = 1$

(B) $\oint_C f(z) dz = 0$

(C) $\oint_C f(z) dz \neq 0$

(D) $\oint_C f(z) dz = 1$

25. Given

$$f(z) = \frac{z^2}{z^2 + a^2}$$

Then

- (A) $z - ia$ is a simple pole and $\frac{1}{2}ia$ is a residue at $z = ia$ of $f(z)$

- (B) $z = ia$ is a simple pole and ia is a residue at $z = ia$ of $f(z)$

- (C) $z = ia$ is a simple pole and $-\frac{ia}{2}$ is a residue at $z = ia$ of $f(z)$

- (D) None of the above

26. If the principal part of the Laurent's series vanishes, then the Laurent's series reduces to

- (A) Cauchy's series

- (B) Maclaurin's series

- (C) Taylor's series

- (D) None of the above

27. If three unbiased coins are tossed, then the probabilities of getting at least two tails and at most two tails are

(A) $\frac{1}{2}$ and $\frac{5}{8}$

(B) $\frac{1}{2}$ and $\frac{3}{8}$

(C) $\frac{1}{2}$ and $\frac{7}{8}$

(D) $\frac{7}{8}$ and $\frac{1}{2}$

28. Box A contains 2 black and 3 red balls while box B contains 3 black and 4 red balls. Out of these two boxes one is selected at random and the probability of choosing box A is double that of box B. If a red ball is drawn from the selected box, then the probability that it has come from box B is

(A) $\frac{21}{31}$

(B) $\frac{12}{31}$

(C) $\frac{13}{41}$

(D) $\frac{10}{31}$

29. The second moment about the origin is μ_2' and the mean is μ , then the variance is given by

(A) $\sigma^2 = \frac{2\mu_2'}{\mu^2}$

(B) $\sigma^2 = \mu_2' - \mu^2$

(C) $\sigma^2 = \mu_2' + \mu^2$

- (D) None of the above

30. What is the probability of getting seven heads in 12 flips of a unbiased coin?

(A) 0.19

(B) 0.49

(C) 0.29

(D) 0.91

31. If X is a Poisson random variate with mean 3, then $P(|X - 3| < 1)$ will be

(A) $\left(\frac{99}{8}\right)e^{-3}$

(B) $\frac{9}{2}e^{-3}$

(C) $\frac{3}{2}e^{-3}$

(D) $\frac{1}{3}e^{-3}$

32. A coin is tossed 5 times. The probability of head is $\frac{1}{2}$. The probability of exactly 2 heads is

(A) $\frac{1}{16}$

(B) $\frac{3}{10}$

(C) $\frac{5}{16}$

(D) $\frac{7}{16}$

33. In a batch of 15 students, 5 students failed in a test. The marks of 10 students who passed were 9, 6, 8, 8, 7, 7, 9, 6, 5, 4. What was the median of all the 15 students?

(A) 7

(B) 5

(C) 8

(D) 6

34. A root $x^3 - 3x + 1 = 0$ needs to be found using the Newton-Raphson method. If the initial guess x_0 as 0, then the new estimate x_1 after the first iteration is

(A) -3

(B) $\frac{1}{3}$

(C) 3

(D) $-\frac{1}{3}$

35. By Simpson's $\frac{1}{3}$ rd rule, the value of $\int_1^7 \frac{dx}{x}$ is

- (A) 1.958
(B) 1.458
(C) 1.658
(D) 1.358

36. The approximate value of a root of $x^3 - 13 = 0$, with 3.5 as initial value, after one iteration using Newton-Raphson method, is

- (A) 3.667
(B) 3.668
(C) 3.607
(D) 3.597

37. The value of $\int_0^2 \frac{dx}{1+x}$ using trapezoidal rule with $n=4$, is

- (A) 1.1176
(B) 1.1167
(C) 1.119
(D) 1.1012

38. Let $f(0) = 1$ and $f(1) = 2.72$, then the trapezoidal rule gives the approximate value of $\int_0^1 f(x) dx$ as

- (A) 3.72
(B) 1.76
(C) 0.86
(D) 1.86

39. Which one of the following functions $f: R \rightarrow R$ is injective?

- (A) $f(x) = |x|, x \in R$
(B) $f(x) = -x, x \in R$
(C) $f(x) = x^2, x \in R$
(D) $f(x) = e, x \in R$

40. The range of the function $f(x) = \cos 2x - \sin 2x, x \in R$ is

- (A) $[-\sqrt{2}, \sqrt{2}]$
(B) $[-\sqrt{2}, 2]$
(C) $[-1, 1]$
(D) $[0, 1]$

41. The stress distribution in a curved beam, when subjected to pure bending couple, is

- (A) linear
(B) non-linear and hyperbolic
(C) non-linear and parabolic
(D) None of the above

42. Splined shaft means a shaft with

- (A) Woodruff key
(B) feather key
(C) key integral with the shaft
(D) None of the above

43. The bearing characteristic number of a hydrodynamic journal bearing depends on

- (A) length, width and speed
(B) viscosity, load and speed
(C) viscosity, speed and bearing pressure
(D) None of the above

45. Gas turbine used in an aircraft is

- (A) close-cycle turbine
(B) open-cycle turbine
(C) constant-volume turbine
(D) None of the above

46. If $f(x, y) = xy$, then the differential df is equal to

- (A) $x dx + y dy$
(B) $y dx + x dy$
(C) $dx + dy$
(D) $dx - dy$

47. Which of the following materials can be used for making pattern?

- (A) Stainless steel
(B) Lead alloys
(C) Sand
(D) All of the above

44. Gantt chart involves with

- (A) production schedule
(B) drawing and design of a component
(C) maximizing the profit
(D) All of the above

48. Blade of power saw is made from

- (A) lead alloys
(B) aluminium alloys
(C) high-speed steel
(D) cast iron

49. Rake angle may be

- (A) positive
- (B) negative
- (C) zero
- (D) All of the above

50. Kinematic viscosity is expressed in

- (A) stoke
- (B) m^2/sec
- (C) cm^2/sec
- (D) All of the above

51. Reynolds number is the ratio of

- (A) inertia force and viscous force
- (B) gravity force and inertia force
- (C) pressure force and inertia force
- (D) None of the above

52. A force F acts on a particle for a short time t . The product $F \cdot t$ will be equal to the change of

- (A) kinetic energy
- (B) impact energy
- (C) momentum
- (D) None of the above

53. A block of mass M , supporting another block of mass m , is moved horizontally with an increasing acceleration from zero. If μ is the coefficient of static friction between the blocks, the acceleration a at which the upper block slips on the lower block is



- (A) $\mu m/g$
- (B) μg
- (C) $\mu m/(m+M)$
- (D) None of the above

54. A two-cylinder in-line engine with identical cylinders has cranks at 180° to each other. When the engine runs, the unbalanced forces are

- (A) both the primary and secondary forces
- (B) only the secondary force
- (C) only the primary force
- (D) Both forces are balanced

55. Two columns of different lengths having circular cross-sections have the same L/d ratio as 100. Both have hinged ends and the material is the same. The compressive stress P/A at the critical buckling load for the larger column will be

- (A) less
- (B) equal
- (C) greater than that for the smaller column
- (D) None of the above

56. In a damped free vibration of a mass supported on a spring and a damper, where the damping force is proportional to the velocity, the ratio of two successive amplitudes

- (A) remains constant
- (B) gradually decreases and varies linearly with time
- (C) gradually decreases and varies exponentially with time
- (D) None of the above

57. Two rotors supported by a shaft has a natural frequency ω_n . If one of the rotors is fixed, the natural frequency

- (A) increases
- (B) decreases
- (C) remains same
- (D) becomes zero

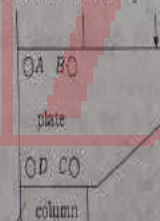
58. For power screw applications, a square thread can be preferred to trapezoidal thread for

- (A) easier manufacture
- (B) better strength
- (C) better efficiency
- (D) more available standards

59. The uniform wear theory for disc clutches states that

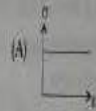
- (A) frictional force per unit area is uniform all over the disc surface
- (B) pressure is proportional to the velocity of sliding
- (C) pressure is inversely proportional to radius
- (D) None of the above

60. A plate, connected to a column by 4 rivets, carries a load P . If the centres of the rivets form a square and if they are designed on the basis of shear stresses, then the load carried by



- (A) the rivets A and B is maximum
- (B) the rivets A and D is maximum
- (C) the rivets B and C is maximum
- (D) the rivets C and D is maximum

61. The stress-strain relationship for the perfectly rigid material is



(D) None of the above

62. The Lewis form factor of gear tooth depends on

- (A) the elastic modulus of the tooth
- (B) the module
- (C) the number of teeth
- (D) the pitch circle diameter

63. For two geometrically similar shafts of the same material, having diameter ratio 2:1, if the smaller one has a torque capacity of 1 kg-m, then the larger one will carry

- (A) 2 kg-m
- (B) 4 kg-m
- (C) 8 kg-m
- (D) 1 kg-m because of similarity

64. A rod of length L and diameter D is subjected to a tensile load P . Which of the following is sufficient to calculate the resulting change in diameter?

- (A) Young's modulus
- (B) Shear modulus
- (C) Poisson's ratio
- (D) Both Young's modulus and Shear modulus

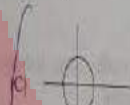
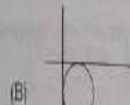
65. The flywheels of moments of inertia I_1 and I_2 are fixed to two ends of a uniform shaft, and they form a torsional vibration system. If I_1 is greater than I_2 , then the node point will be

- (A) nearer to I_1
- (B) nearer to I_2
- (C) at the mid-point of the shaft
- (D) None of the above

66. An elastic beam, simply supported at the ends, carries a concentrated mass at the middle of its length. If the natural frequency of the beam neglecting the weight is ω_n , considering the weight of the beam the natural frequency of the system will be

- (A) greater than ω_n
- (B) less than ω_n
- (C) zero
- (D) equal to ω_n , as the natural frequency is independent of concentrated load

67. The state of stress in a plane element is shown in figure below. Which one of the following figures is the correct sketch of Mohr's circle of the state of stress?



68. A cylinder of mass m rolls down an inclined plane from a height h above a horizontal level. If the velocity of the axis of the cylinder is v when it reaches the lower level, then

- (A) $v = gh$
- (B) $v = mgh$
- (C) $v = \sqrt{2gh}$
- (D) $v < \sqrt{2gh}$

69. The area-moment theorem with respect to bending of beams states that the area of the M/EI diagram between two sections of a beam gives

- (A) the difference in slopes between those two sections
- (B) the difference in the maximum bending strains between those two sections
- (C) the difference in deflections between those two sections
- (D) the difference in strain energies between those two sections

70. In helical compression spring design formula

$$\tau = 8PCR / (\pi d^3)$$

where

F = load

τ = shear stress

C = spring index

d = wire dia.

K = Wahl factor

The Wahl factor takes into account

- (A) the bending stress due to helix of the spring
- (B) the direct shear and the curvature of the spring
- (C) the elastic constants (modulus of rigidity and Poisson's ratio) of the spring
- (D) the effect of the inactive number of coils at the ends of the spring

71. The linear momentum of a system of rigid bodies will be conserved, if

- (A) the system is in a gravitational field
- (B) no external forces act on the system
- (C) kinetic energy is conserved
- (D) None of the above

72. Undercut of a gear tooth can be avoided by

- (A) decreasing the pressure angle
- (B) improving the heat treatment
- (C) using smaller rake angle for the cutter
- (D) None of the above

73. A rigid body is very slowly dropped on another body and a deflection δ_n occurs in the second body. If the body be placed suddenly, the value of the impact factor will be

- (A) 0
- (B) 1.0
- (C) ∞
- (D) 2.0

74. A dynamometer is used for measuring

- (A) speed of a machine
- (B) torque exerted by or on a machine
- (C) kinetic energy of the system in which it is used
- (D) None of the above

75. The upper critical temperature for steel

- (A) is constant
- (B) depends upon the rate of heating
- (C) varies with carbon-content of the steel
- (D) None of the above

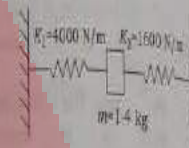
76. Chasing dial is an element of

- (A) capstan lathe
- (B) centre lathe
- (C) milling machine
- (D) drilling machine

77. Chiplets are made of

- (A) graphite
- (B) plastic
- (C) same metal as the cast metal
- (D) None of the above

78. The natural frequency of the spring mass system shown in the figure is closest to



- (A) 8 Hz
- (B) 10 Hz
- (C) 12 Hz
- (D) 14 Hz

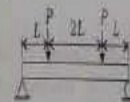
79. Carbon content of common HSS material ranges from

- (A) 0.2% to 0.4%
- (B) 0.4% to 0.6%
- (C) 0.6% to 0.8%
- (D) 0.8% to 1.0%

80. In blanking operation, the angle of shear is provided on

- (A) die
- (B) punch
- (C) both punch and die
- (D) Can be on either

81. The strain energy stored in the beam with flexural rigidity EI and loaded as shown in the figure is



- (A) $\frac{P^2 L^3}{3EI}$
- (B) $\frac{2P^2 L^3}{3EI}$
- (C) $\frac{4P^2 L^3}{3EI}$
- (D) $\frac{8P^2 L^3}{3EI}$

82. The amperage used in arc welding depends upon

- (A) work thickness
- (B) electrode rod thickness
- (C) arc gap
- (D) other considerations

83. For a long slender column of uniform cross-section, the ratio of critical buckling load for the case with both ends clamped to the case with both ends hinged is

- (A) 1
- (B) 2
- ☒ (C) 4
- (D) 8

84. In metal cutting at moderate speed, the maximum heat is carried by

- (A) work
- (B) tool
- ☒ (C) chip
- (D) Almost equally by all of the above

85. In the signature of cutting tools, nose radius is indicated

- (A) in the beginning
- ☒ (B) in the end
- (C) somewhere in the middle
- (D) Nose radius not included in tool signature

86. Two identical ball-bearings P and Q are operating at loads 30 kN and 45 kN respectively. The ratio of the life of the bearing P to the life of the bearing Q is

- (A) $\frac{81}{16}$
- (B) $\frac{27}{8}$
- ☒ (C) $\frac{9}{4}$
- (D) $\frac{3}{2}$

87. A hole is of dimension $\phi 9^{+0.015}_{-0}$ mm. The corresponding shaft is of dimension $\phi 9^{+0.010}_{-0.001}$ mm. The resulting assembly has

- (A) loose running fit
- (B) close running fit
- ☒ (C) transition fit
- (D) interference fit

88. In EDM process, the workpiece is connected to

- ☒ (A) positive
- (B) negative
- (C) earth
- (D) None of the above

89. Standard time is defined by

- (A) normal time + allowance
- ☒ (B) normal time + idle time + allowance
- (C) normal time + idle time
- (D) only normal time

90. Laser is produced by

- (A) graphite
- (B) diamond
- ☒ (C) ruby
- (D) emerald

91. Basic hole means

- (A) upper deviation is zero
- ☒ (B) lower deviation is zero
- (C) Both (A) and (B)
- (D) None of the above

92. Constraints in linear programming model represent

- (A) requirements
- ☒ (B) limitations
- (C) balancing requirements and limitations
- ☒ (D) All of the above

93. Autocollimator is used to check

- (A) roughness
- (B) angle
- ☒ (C) flatness
- (D) None of the above

94. The connecting rod of an IC engine is made from

- (A) cast iron
- (B) cast steel
- ☒ (C) forged steel
- (D) stainless steel

95. The float of a carburettor controls

- (A) fuel flow rate
- (B) fuel and air mixture flow rate
- (C) air flow rate
- (D) level of fuel

96. In CGS unit, dynamic viscosity is expressed as

- (A) poise
- (B) Pa-s
- (C) stoke
- (D) None of the above

97. A rotameter is used to measure

- (A) discharge
- (B) velocity
- (C) temperature
- (D) viscosity

98. The most suitable bearing for carrying very heavy loads at slow speed is

- (A) hydrodynamic bearing
- (B) ball-bearing
- (C) roller bearing
- (D) hydrostatic bearing

99. Newton's law of viscosity depends upon

- (A) shear stress, pressure and velocity
- (B) shear stress and strain in the fluid
- (C) shear stress and rate of strain
- (D) viscosity and shear stress

100. To take a longest possible jump, an athlete should make an angle of

- (A) 90 degree with the ground
- (B) 60 degree with the ground
- (C) 45 degree with the ground
- (D) 30 degree with the ground

SPACE FOR ROUGH WORK