This Question Booklet contains 16 printed pages

PGME

Total Marks : 100
Time : 100 Minutes

Question Booklet Code : **A**

A
Seal Sticker

Candidate's Seat No. :

Candidate's Signature _____ **Block Supervisor's Signature** _____

DO NOT OPEN QUESTION BOOKLET UNTIL INSTRUCTED.

INSTRUCTIONS FOR CANDIDATE:

1. Check Number printed on your OMR SHEET and Question Paper with your SEAT No. before answering the questions. Consult block supervisors in case the above mentioned numbers do not match with your seat number.
2. There are total 100 questions. For answer of each question A, B, C, D, E options are given in OMR SHEET. In OMR SHEET, there is "E" option. "E" option is for "Not Attempted". If candidate do not wish to answer the question he/she should select "E" option (Not Attempted). All questions are compulsory.

   For Example:

   Which state of India has the longest sea shore ?

   A ○ B ○ C ● D ○ E ○

   (A) Maharashtra (B) Tamilnadu

   (C) Gujarat (D) Andhra Pradesh

   In this example, the right answer is (C). Therefore, the Circle of (C) has been darkened (encoded). Candidate should not give the answer "Gujarat" in writing.

   The options once darkened/answered by candidate cannot be changed.
3. Candidates are not permitted to leave examination hall during examination.
4. Candidates must strictly enter SEAT NO. in the designated space provided in OMR SHEET as well as Question Paper neatly as soon as they receive the OMR SHEET & Question Paper.
5. Candidates must not write name or put any identification sign/symbol on OMR SHEET. In such case strict disciplinary action will be taken against candidate & will be considered disqualified/ineligible. Only Seat No. must be entered at designated space provided in OMR SHEET.
6. Both, Candidate's & Supervisor's signature must be done on Certificate of OMR SHEET. Unsigned OMR SHEET would not be considered for evaluation.
7. Candidates are not permitted to use or carry with them any kind of literature, guide, hand written notes, or printed books, mobile phone, pagers, smart watches, camera or any electronic gadgets to examination hall.
8. Use of only Non-scientific / Non-programmable calculator shall allow during examination.
9. Candidates are not permitted to talk/discuss in the Examination Hall. Any candidate found violating supervisor's instructions will be disqualified.
10. Candidates must fully darken circle A, B, C, D and E accordingly with Blue / Black ball pen. If answers are marked with any other coloured ball pen, pencil, white ink (whitner), any corrections are done by candidate by means of blade or rubber or whitner will not be considered for evaluation.
11. Candidates may carry QP with them after Examination.
12. **For correct answer 1 (One) marks will be given.**

    If candidate gives more than one option as answer for one question in answer sheet (OMR SHEET), or gives wrong answer then the candidate will be allotted Zero (0) marks.

    If candidate does not want to answer a particular question and marks (E) or leave the option without encoding on OMR sheet, then no minus marks will be given.

Submit the OMR SHEET to the block supervisor after completion of examination without fail before leaving examination hall, failure to do so will result in disqualification of the candidature for the examination and disciplinary action will be taken against such candidate.

SPACE FOR ROUGH WORK / રફ કામ માટેની જગ્યા

1. Two forces A and B are acting at an angle θ and their resultant R makes an angle α with the force A, then

(A) $\tan\alpha = \frac{B\sin\theta}{B + A\cos\theta}$ (B) $\tan\alpha = \frac{A\sin\theta}{A + B\cos\theta}$

(C) $\tan\alpha = \frac{B\sin\theta}{A + B\cos\theta}$ (D) $\tan\alpha = \frac{A\sin\theta}{B + A\cos\theta}$

2. The number of members (n) and number of joints (j) in a perfect frame is given by

(A) n = (3j – 2) (B) n = (2j – 3)

(C) j = (2n – 3) (D) j = (3n – 2)

3. The bending moment on a section is maximum where shearing force is

(A) Minimum (B) Maximum

(C) Zero (D) Equal

4. A cantilever of length 'l' carries a uniformly distributed load 'w' N per unit length for the whole length. Point of contra-flexure is at

(A) the free end (B) the fixed end

(C) the middle of the beam (D) no where

5. The time taken by a ball of weight 500 N to return back to earth, if it is thrown vertically upwards with a velocity 4.9 m/s is equal to

(A) 0.5 s (B) 1 s

(C) 2 s (D) 3 s

6. The modulus of elasticity (E) and bulk modulus (K) are related by (1/m = Poisson's ratio)

(A) $K = \frac{mE}{3(m-2)}$ (B) $K = \frac{mE}{3(m+1)}$

(C) $K = \frac{3(m-2)}{mE}$ (D) $K = \frac{2(m+1)}{mE}$

7. The work done in producing strain on a material per unit volume is called

(A) resilience (B) ductility

(C) elasticity (D) plasticity

8. Polar modulus of a shaft section is equal to

(A) product of polar moment of inertia and maximum radius of the shaft

(B) ratio of polar moment of inertia to maximum radius of the shaft

(C) sum of polar moment of inertia and maximum radius of the shaft

(D) difference of polar moment of inertia and maximum radius of the shaft

9. The buckling load for given material depends upon

(A) Poisson's ratio and slenderness ratio

(B) Poisson's ratio and modulus of elasticity

(C) Poisson's ratio and cross-sectional area

(D) Slenderness ratio and modulus of elasticity

10. Euler crippling load for both ends hinged is given by

(A) $\frac{\pi^2 EI}{l^2}$ (B) $\frac{2\pi^2 EI}{l^2}$

(C) $\frac{4\pi^2 EI}{l^2}$ (D) $\frac{\pi^2 EI}{4l^2}$

11. Initial hoop stress in a thin cylinder when it is wound with a wire under tension is

(A) Zero (B) Tensile

(C) Compressive (D) Bending

12. When a slider moves on a fixed link having curved surface, their instantaneous centre lies

(A) on their point of contact (B) at the centre of curvature

(C) at the centre of circle (D) at the pin joint

13. A point 'B' on a rigid link 'AB' moves with respect to 'A' with angular velocity ω rad/s. The radial component of the acceleration of 'B' with respect to 'A',

(V_{BA} = Linear velocity of 'B' with respect to 'A' = $\omega \times AB$)

(A) $V_{BA} \times AB$ (B) $V_{BA}^2 \times AB$

(C) V_{BA} / AB (D) V_{BA}^2 / AB

14. In a clock mechanism, the gear train used to connect minute hand to hour hand is

(A) epicyclic gear train (B) reverted gear train

(C) compound gear train (D) simple gear train

15. A circular solid disc of uniform thickness 20 mm, radius 200 mm and mass 20 kg, is used as a flywheel. If it rotates at 600 rpm, the kinetic energy of the flywheel

(A) 395 J (B) 790 J

(C) 1580 J (D) 3160 J

16. If a number of forces act on a rigid body, each force may be replaced by an equal and parallel force acting through a fixed point, together with a couple. For the rigid body to be in equilibrium,

(A) the resultant force at the fixed point must be zero

(B) the resultant couple on the body must be zero

(C) both resultant force and couple must be zero

(D) none of the above need be zero

17. A rotor which is balanced statically but not dynamically is supported on two bearings 'L' apart and at high speed of the rotor, reaction of the left bearing is 'R'. The right side of the bearing is shifted to a new position '2L' apart from the left bearing. At the same rotor speed, dynamic reaction on the left bearing in the new arrangement will

(A) remain same as before (B) become equal to 2R

(C) become equal to 1/2 R (D) become equal to 1/4 R

18. A mass of 1 kg is attached to the end of a spring with a stiffness 0.7 N/mm. The critical damping coefficient of this system is

(A) 1.40 Ns/m (B) 52.22 Ns/m

(C) 52.92 Ns/m (D) 529.20 Ns/m

19. Consider the following statements regarding the differential of an automobile

1. The speed of the crown wheel will always be the mean of the speeds of the two road wheels
2. The road wheel speeds are independent of the number of teeth on the planets
3. The difference between the speed of the road wheels depends on the number of teeth on the planets
4. The ratio of speeds of the road wheels depends upon the number of teeth on the gear wheels attached to them and on the crown wheel of these statements

(A) 1 and 2 are correct
(B) 3 and 4 are correct
(C) 1 and 3 are correct
(D) 2 and 4 are correct

20. A uniform, slender cylindrical rod is made of a homogeneous and isotropic material. The rod rests on a frictionless surface. The rod is heated uniformly. If the radial and longitudinal thermal stresses are represented by σ_r and σ_z respectively, then

(A) $\sigma_r = 0, \sigma_z = 0$
(B) $\sigma_r \neq 0, \sigma_z = 0$
(C) $\sigma_r = 0, \sigma_z \neq 0$
(D) $\sigma_r \neq 0, \sigma_z \neq 0$

21. Which one of the following is criterion in the design of hydrodynamic journal bearings?

(A) Sommerfeld number
(B) Rating life
(C) Specific dynamic capacity
(D) Rotation factor

22. In the assembly of pulley, key and shaft

(A) pulley is made the strongest
(B) key is made the weakest
(C) key is made the strongest
(D) all the three are designed for equal strength

23. Carburized machine components have high endurance limit because carburization,

(A) raises the yield point of the material
(B) produces a better surface finish
(C) introduces a compressive layer on the surface
(D) suppresses any stress concentration produced in the component

24. The strength of a riveted joint is equal to

(A) Tearing strength of plate (Pt)
(B) Shearing strength of rivet (Ps)
(C) Crushing strength of rivet (Pc)
(D) Least value of Pt, Ps and Pc

25. A stress that varies in sinusoidal manner with respect to time from tensile to compressive (or vice versa) and which has zero mean is called

(A) Reversed stress
(B) Fluctuating stress
(C) Repeated stress
(D) Varying stress

26. The approximate relationship between endurance limit of rotating beam specimen (S_e') and ultimate tensile strength (S_{ut}), in case of cast iron and cast steel components is

(A) $S_e' = 0.4\ S_{ut}$
(B) $S_e' = 0.75\ S_{ut}$
(C) $S_e' = 0.577\ S_{ut}$
(D) $S_e' = 0.5\ S_{ut}$

27. A set of 'n' identical spherical drops of radius 'r' of a liquid (surface tension = σ) combine to form a single large spherical drop of radius 'R'. An expression for R is

(A) $R = rn^{1/2}$
(B) $R = rn^{1/3}$
(C) $R = rn$
(D) $R = n^2r$

28. The maximum diameter of a metallic (density = ρ) spherical ball that can float in a constant temperature liquid (surface tension = σ) bath is proportional to

(A) $\sqrt{\rho\sigma}$ (B) $\sqrt{\frac{1}{\rho\sigma}}$

(C) $\sqrt{\frac{\rho}{\sigma}}$ (D) $\sqrt{\frac{\sigma}{\rho}}$

29. For which of the following fluids, the apparent viscosity can be considered to be independent of the rate of shear strain and equal to the fluid's viscosity?

(A) Ketchup (B) Water

(C) Cornstarch solution (D) Blood

30. A sphere having a uniform density throughout and submerged in a liquid

(A) is always stable (B) is always unstable

(C) always neutrally stable (D) could be stable or unstable

31. Assuming constant temperature condition and air to be an ideal gas, the variation in atmospheric pressure with height calculated from fluid static is

(A) Linear (B) Exponential

(C) Quadratic (D) Cubic

32. An orificemeter having an orifice of diameter d is present in a pipe of diameter D. Generally, the coefficient of discharge of the orificemeter

(A) is independent of d/D and Reynolds number of flow

(B) depends on d/D and Reynolds number of flow

(C) depends only on d/D

(D) depends only on Reynolds number of flow

33. Power developed by hydraulic turbine is directly proportional to

(A) $\sqrt{H}$ (B) $H^{\frac{3}{2}}$

(C) $H^{\frac{5}{4}}$ (D) $H^{\frac{3}{4}}$

34. As convective heat transfer coefficient increases the efficiency of rectangular fin

(A) increase

(B) decrease

(C) remains same

(D) may increase or decrease depend upon temperature

35. Thermal conductivity of water _____ with rise in temperature

(A) increase

(B) decrease

(C) remains same

(D) may increase or decrease depend upon temperature

36. In a composite slab, the temperature at the interface (T_{inter}) between two materials is equal to the average of the temperature at the two ends. Thickness of slab 1 is twice of that of slab 2. Assuming steady one-dimensional heat conduction, which of the following statements is true about the respective thermal conductivities?

(A) $2\ k_1 = k_2$ (B) $k_1 = k_2$

(C) $2\ k_1 = 3\ k_2$ (D) $k_1 = 2k_2$

37. In a counter-flow heat exchanger, hot fluid enters at 60°C and cold fluid leaves at 30°C. Mass flow rate of the hot fluid is 2 kg/s and that the cold fluid is 4 kg/s. Specific heat of the hot fluid is 4 kJ/kg K and that of the cold fluid is 2 kJ/kg K. The LMTD for the heat exchanger in °C is

(A) 15 (B) 30

(C) 35 (D) 45

38. From a metallic wall at 250°C, a metallic rod protrudes to the ambient air. The temperature at the tip of the metallic rod will be minimum when the rod is made of

(A) aluminium (B) steel

(C) copper (D) silver Question

39. In a long cylindrical rod of radius R and a surface heat flux of q_0, the uniform internal heat generation rate is

(A) $2q_0/R$ (B) $2q_0$

(C) q_0/R (D) q_0/R^2

40. In a radiative heat transfer, a gray surface is one

(A) which appears gray to the eye

(B) whose emissivity is independent of wavelength

(C) which has reflectivity equal to zero

(D) which appears equally bright from all directions

41. At room temperature, the ratio of radiation heat transfer coefficient and the surface emissivity is about

(A) 1.5 (B) 2.0

(C) 3.0 (D) 6.0

42. Torr is a unit of

(A) Temperature (B) Volume

(C) Pressure (D) Energy

43. A mixture of air and liquid air is

(A) a pure substance

(B) not a pure substance

(C) homogeneous and invariable in chemical composition throughout its mass

(D) one having relative proportions of oxygen and nitrogen constant in gas and liquid phases

44. The work done by a closed system will increase when the value of the polytropic index

(A) decreases (B) increases

(C) first increases and then decreases (D) first decreases and then increases

45. An evacuated bottle is fitted with valve through which air from the atmosphere at 760 mm Hg, 25°C is allowed to flow slowly to fill the bottle. If no heat is transferred to or from the air in the bottle, what will be its temperature when the pressure in the bottle reaches 760 mm Hg?

(A) 25°C (B) 50°C

(C) 80.2°C (D) 144.2°C

46. The continual motion of a movable device in complete absence of friction

(A) violates the first law of thermodynamics

(B) violates the second law of thermodynamics

(C) is the perpetual motion machine of third kind

(D) is the perpetual motion machine of second kind

47. $dq = du + pdv$ is true for

(A) any process and any system (B) any process and closed system

(C) reversible process and closed system (D) any process and open system

48. When the gas undergoes free expansion, the change of internal energy during the process

(A) is positive (B) is negative

(C) is zero (D) cannot be predicted

49. If thermal efficiency of Carnot engine is 50% the coefficient of performance of a Carnot refrigerator working between same temperature limit is

(A) 0.5 (B) 1

(C) 2 (D) 4

50. The effect of increasing the boiler pressure in a Rankine cycle, by keeping the maximum temperature as well as the exhaust pressure constant, on thermal efficiency and quality of steam leaving the turbine is

(A) to decrease the quality but to increase the efficiency

(B) to increase both the quality and the efficiency

(C) to increase quality but to decrease efficiency

(D) to decrease both the quality and the efficiency

51. For the same compression ratio, the efficiency of Diesel cycle

(A) is equal to that of Otto cycle (B) is more than that of Otto cycle

(C) is less than that of Otto cycle (D) cannot be predicted

52. Air having 45°C DBT and 20°C dew point temperature is passing over a coil which is maintained at 25°C. The process will be

(A) cooling and dehumidification (B) cooling and humidification

(C) adiabatic saturation (D) sensible cooling

53. Propeller turbine is best suited for

(A) medium head application from 20 to 180 m

(B) low head installation up to 30 m

(C) high head installation above 180 m

(D) all type of heads

54. In a variable speed SI engine, the maximum torque occurs at the maximum

(A) Speed (B) Brake power

(C) Indicated power (D) Volumetric efficiency

55. In spheroidizing process, the steel is

(A) Heated above upper critical temperature and cooled in still air

(B) Heated up to lower critical temperature and cooled in still air

(C) Heated slightly above the lower critical temperature and cooled in the furnace

(D) Heated below lower critical temperature and quenched in water

56. Lattice parameter of metal of FCC lattice having atomic radius 0.144 nm is

(A) 0.14 nm (B) 0.407 nm

(C) 0.333 nm (D) 0.567 nm

57. The 'Jominy test' is used to find

(A) Young's modulus (B) hardenability

(C) yield strength (D) thermal conductivity

58. Misrun is a casting defect which occurs due to

(A) very high pouring temperature of the metal

(B) insufficient fluidity of the molten metal

(C) absorption of gases by the liquid metal

(D) improper alignment of the mould flasks

59. Which of the following engineering materials is the most suitable candidate for hot chamber die casting?

(A) Low carbon steel (B) Titanium

(C) Copper (D) Tin

60. An expendable pattern is used in

(A) Slush casting (B) Squeeze casting

(C) Centrifugal casting (D) Investment casting

61. In a rolling process, the state of stress of the material undergoing deformation is

(A) Pure compression (B) Pure shear

(C) Compression and shear (D) Tension and shear

62. The maximum possible draft in cold rolling of sheet increases with the

(A) Increase in coefficient of friction (B) Decrease in coefficient of friction

(C) Decrease in roll radius (D) Increase in roll velocity

63. In a two-stage wire drawing operation, the fractional reduction (ratio of change in cross-sectional area to initial cross-sectional area) in the first stage is 0.4. The fractional reduction in the second stage is 0.3. The overall fractional reduction is

(A) 0.24 (B) 0.58

(C) 0.60 (D) 1.0

64. The strain hardening exponent 'n' of stainless-steel SS 304 with distinct yield and UTS values undergoing plastic deformation is

(A) $n < 0$ (B) $n = 0$

(C) $0 < n < 1$ (D) $n = 1$

65. Which one of the following is a solid-state joining process?

(A) Gas tungsten arc welding (B) Resistance spot welding

(C) Friction stir welding (D) Submerged arc welding

66. The operation in which oil is permeated into the pores of a powder metallurgy product is known as

(A) Mixing (B) Sintering

(C) Impregnation (D) Infiltration

67. Within the heat affected zone in a fusion welding process, the work material undergoes

(A) Microstructural changes but does not melt

(B) Neither melting nor microstructural changes

(C) Both melting and microstructural changes after solidification

(D) Melting and retains the original microstructure after solidification

68. The welding process which uses a blanket of fusible granular flux is

(A) Tungsten inert gas welding (B) Submerged arc welding

(C) Electroslag welding (D) Thermit welding

69. Which two of the following joining processes are autogenous?

i. Diffusion welding

ii. Electroslag welding

iii. Tungsten inert gas welding

iv. Friction welding

(A) i and iv (B) ii and iii

(C) ii and iv (D) i and iii

70. The machining process that will be most appropriate to drill a rectangular hole in a ceramic material

(A) Drilling (B) Ultrasonic Machining

(C) Electric Discharge Machining (D) Chemical machining

71. Ceramic cutting tools should be used

(A) With cutting fluid

(B) With low cutting speeds because of their brittleness

(C) With very high cutting speeds

(D) With old machine tools

72. Facing operation in a lathe is used for producing

(A) a cylindrical surface (B) a plane surface

(C) a tapered surface (D) a hole

73. The machining process that will be most appropriate to machine a turbine blade with an aerofoil cross section in a high strength material

(A) Electro Chemical Machining
(B) Ultrasonic Machining
(C) Electric Discharge Machining
(D) Chemical machining

74. The length standard that is most commonly used in the machine shops is

(A) Meter rod
(B) Precision scale
(C) Slip gauge
(D) None of the above

75. Which one of the following instruments is widely used to check and calibrate geometric features of machine tools during their assembly?

(A) Ultrasonic probe
(B) Coordinate Measuring Machine (CMM)
(C) Laser interferometer
(D) Vernier callipers

76. In a CAD package, mirror image of a 2D point P(5,10) is to be obtained about a line which passes through the origin and make an angle of 45° counterclockwise with the x-axis. The coordinates of the transformed point will be

(A) (7.5, 5)
(B) (10,5)
(C) (7.5, – 5)
(D) (10, – 5)

77. The function of interpolator in a CNC machine controller is to

(A) control spindle speed
(B) perform miscellaneous functions
(C) control tool rapid approach speed
(D) coordinate feed rates of axes

78. Which of the following forecasting methods take a fraction of forecast error into account for the next period forecast?

(A) simple average method
(B) moving average method
(C) weighted moving average method
(D) exponential smoothening method

79. The word 'kanban' is most appropriately associated with

(A) economic order quantity
(B) just-in-time production
(C) capacity planning
(D) product design

80. If there are 'm' sources and 'n' destinations in a transportation matrix, the total number of basic variables in a basic feasible solution is

(A) m + n
(B) m + n + 1
(C) m + n – 1
(D) m

81. The eigen values of the following matrix

$$\begin{bmatrix} 10 & -4 \\ 18 & -12 \end{bmatrix}$$

(A) 4, 9
(B) 6, –8
(C) 4, 8
(D) –6, 8

82. The value of $\lim_{n \to \infty}\left(1+\frac{1}{n}\right)^n$ is

(A) ln 2 (B) 1.0

(C) e (D) ∞

83. A box contains 25 parts of which 10 are defective. Two parts are being drawn simultaneously in a random manner from the box. The Probability of both the parts being good is

(A) 7/20 (B) 42/125

(C) 25/29 (D) 5/9

84. Which one of the following is first order linear differential equation

(A) $\frac{dy}{dx}+xy=e^{-x}$ (B) $\frac{dy}{dx}+xy=e^{-y}$

(C) $\frac{d^2y}{dx^2}+2\frac{dy}{dx}+y=0$ (D) $\frac{d^2y}{dx^2}+3\frac{dy}{dx}+y=\cos x$

85. The value of $\oint_c \frac{\sin z}{z}dz$, where the contour of the integration is a simple closed curve around the origin is

(A) 0 (B) 2πi

(C) ∞ (D) 1/2πi

86. The Newton - Raphson iteration $x_{n+1}=\frac{1}{2}\left(x_n+\frac{N}{x_n}\right)$ can be used to compute

(A) square roof of *N* (B) reciprocal of *N*

(C) Square of *N* (D) logarithm of *N*

87. Given a system of equations

$x + 2y + 2z = b_1$

$5x + y + 3z = b_2$

Which of the following is true its solutions ?

(A) The system has unique solution for any given values of b_1 & b_2

(B) The system will have infinitely many solution for any values of b_1 & b_2

(C) Whether or not a solution exists depends on given b_1 & b_2

(D) The system would have no solution for any values of b_1 & b_2

88. The total derivative of the function *xy* is

(A) *xdy* + *y dx* (B) *xdx* + *y dy*

(C) *dx* + *dy* (D) *dxdy*

89. Consider a poission distribution for the tossing of a biased coin. The mean for this distribution is μ. The standard deviation for this distribution is given by

(A) $\sqrt{\mu}$ (B) μ^2

(C) μ (D) $1/\mu$

90. The solution of the initial Value problem $\frac{dy}{dx}=2xy; y(0)=2$ is

(A) $1+e^{-x^2}$ (B) $2e^{-x^2}$

(C) $1+e^{x^2}$ (D) $2e^{x^2}$

91. $\oint \frac{z^2}{z^2-1}dz$ in the counterclock wise $|z-1|=1$ direction around $|z-1|=1$ is

(A) $-\pi i$ (B) 0

(C) πi (D) $2\pi i$

92. Numerical integration using trapezoidal rule gives the best result for a single variable function which is

(A) Linear (B) parabolic

(C) logarithmic (D) hyperbolic

93. Using Euler method Find $y(0.3)$, for $\frac{dy}{dx}=2xy+1; y(0)=0$ with step size $h = 0.1$

(A) 0.3101 (B) 0.3142

(C) 0.6202 (D) 4.0800

94. For the function $\frac{\sin z}{z^3}$ of a complex variable Z, the point Z = 0 is

(A) a pole of order 3 (B) a pole of order 2

(C) a pole of order 1 (D) not a singularity

95. Laplace transform of $\cos wt=\frac{s}{s^2+w^2}$ Then Laplace transform of $e^{-2t}\cos 4t$ is

(A) $(S-2)/(S-2)^2+16$ (B) $(S+2)/(S-2)^2+16$

(C) $(S-2)/(S+2)^2+16$ (D) $(S+2)/(S+2)^2+16$

96. Consider the data set 14, 18, 14,14, 10, 29, 33, 31, 25. If you add 20 to each of the values then

(A) both mean and Variance change

(B) both mean and Variance unchanged

(C) the mean is unchanged, variance changes

(D) the mean is changed, the variance is unchanged

97. The function $f(x) = 2x^3 - 3x^2 - 36x + 2$ has its maxima at

(A) $x = -2$ only

(B) $x = 0$ only

(C) $x = 3$ only

(D) both x = –2 and $x = 3$

98. The sum of Eigen values of the matrix

$$A = \begin{bmatrix} 215 & 650 & 795 \\ 655 & 150 & 835 \\ 485 & 355 & 550 \end{bmatrix}$$

(A) 915

(B) 1355

(C) 1640

(D) 2180

99. Divergence of the vector field $x^2z\,\bar{i} + xy\,\bar{j} - yz^2\,\bar{k}$ at (1, –1, 1) is

(A) 0

(B) 3

(C) 5

(D) 6

100. The partial differential equation $\frac{\partial y}{\partial t} = \propto \frac{\partial^2 y}{\partial x^2}$ where $\propto$ is a positive constant, is

(A) Circular

(B) Parabolic

(C) Elliptic

(D) Hyperbolic

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