

81/26

Question Booklet Alpha Code

A

Question Booklet Sl. No.

A

Total Number of Questions : 100

Time : 90 Minutes

Maximum Marks : 100

INSTRUCTIONS TO CANDIDATES

1. The Question Paper will be given in the form of a Question Booklet. There will be four versions of Question Booklets with Question Booklet Alpha Code viz. **A, B, C & D**.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the Question Booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a Question Booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your Question Booklet is un-numbered, please get it replaced by new Question Booklet with same alpha code.
6. The Question Booklet will be sealed at the middle of the right margin. Candidate should not open the Question Booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the Question Booklet supplied to him/her contains all the 100 questions in serial order. The Question Booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the Question Booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices **(A), (B), (C)** and **(D)** having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

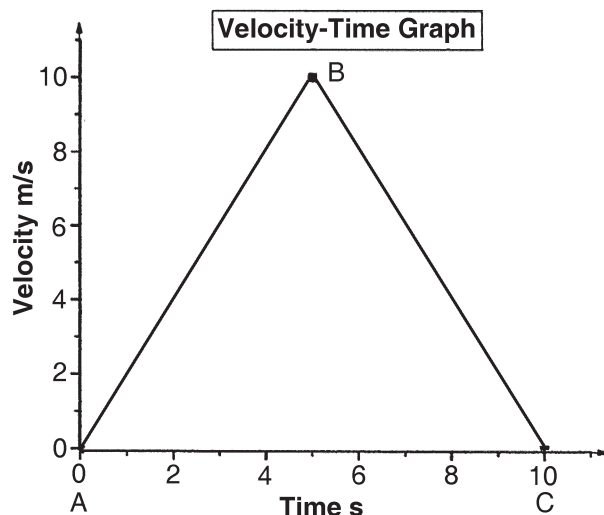
A

1. Digital voltmeter has a read out range from 0 to 999 counts. Find resolution of the meter if full scale reading is 9.999 V is
 A) 1 V B) .01 V C) 1 mV D) 10 mV
2. Degree at which an instrument indicates the changes in measured variable without dynamic error is called
 A) Speed of response B) Fidelity
 C) Threshold D) Reproducibility
3. The function of shunt in an ammeter is to
 A) by pass the current B) increase the resistance of the ammeter
 C) increase the sensitivity of ammeter D) none of the above
4. A PMMC meter has an internal resistance of 100 Ω ohm and the current required for its full scale deflection is 50 μ A. The maximum voltage meter can measure is
 A) 20 mV B) 10 mV C) 5 mV D) 50 μ V
5. The multiplier and the meter coil in a voltmeter are in
 A) Series B) Parallel
 C) Series-Parallel D) None of the above
6. Which bridge circuit is to be used for measurement of inductance having high value ?
 A) Maxwell's bridge B) Maxwell Wein bridge
 C) Hay's bridge D) None of the above
7. The most suitable method of measuring the resistance of a pure copper wire of length 10 cm and diameter 1 mm is
 A) Two wire method B) Three wire method
 C) Four wire method D) Ellipsometry
8. The sweep generator of a CRO is used to produce
 A) Sinusoidal voltage for the horizontal deflection of electron beam
 B) Saw tooth voltage for the vertical deflection of electron beam
 C) Sinusoidal voltage for the vertical deflection of electron beam
 D) Saw tooth voltage for the horizontal deflection of electron beam

9. Sinusoidal voltage is applied to CRO, vertical distance between positive and negative peak is 10 cm. Scale of the CRO is kept at 2 mV/cm, then the peak voltage is
A) 20 mV
B) 10 mV
C) 5 mV
D) 40 mV
10. A CRO screen has ten division on horizontal scale, if a voltage signal of $10 \sin(314t + 45^\circ)$ is examined with a time base setting of 10 msec/div, the number of cycle of signal displayed on the screen will be
A) 1 cycle
B) 2 cycles
C) 5 cycles
D) 10 cycles
11. Which of the following is not a moral dimension of ethical, social and political issues in an information society ?
A) Accountability and Control
B) Quality of Life
C) System Security
D) System Quality
12. In India, the duration of registration of trademark is
A) 20 Years
B) 10 Years
C) 15 Years
D) 12 Years
13. Which of the following is not related to network security ?
A) Spooling
B) Spoofing
C) Phishing
D) Sniffing
14. Which property of network security is used to protect data from unauthorized modification deletion or addition ?
A) Confidentiality
B) Authenticity
C) Integrity
D) Non-Repudiation
15. In which type of DoS attack, the attacker send a forged packet with the same source IP address and destination IP address to drive the target system crazy ?
A) PoD attack
B) ICMP flood attack
C) Smurf IP attack
D) Land attack

16. Which of the following are displayed at the top of the Windows Explorer to issue commands in file management tasks or to link to an internet site ?
- A) Menu bar, Status bar, Address bar, Links bar
 - B) Menu bar, Tool bar, Task bar, Links bar
 - C) Menu bar, Task bar, Address bar, Status bar
 - D) Menu bar, Tool bar, Address bar, Links bar
17. In MS word, hyphenation option is placed under _____ menu.
- A) Page Layout
 - B) View
 - C) Insert
 - D) Review
18. The short cut keys used to find and replace a text in a word document is
- A) Ctrl + X
 - B) Ctrl + H
 - C) Ctrl + R
 - D) Ctrl + F
19. In MS Excel _____ chart is used when you have only one data series and all values are positive.
- A) Column Chart
 - B) Line Chart
 - C) Scatter Chart
 - D) Pie Chart
20. Which of the following function is used in MS Excel to count the number of cells in a range that are non empty ?
- A) COUNTIF
 - B) COUNTA
 - C) COUNTIFS
 - D) COUNTBLANK
21. The pitch of a screw gauge is 1 mm and there are 100 divisions on the circular scale. Is it possible to measure thickness of a human hair having diameter 0.005 mm using this screw gauge ?
- A) Yes
 - B) No
 - C) Not enough data
 - D) Depend on the operator
22. Unit of relative permittivity is
- A) C/m
 - B) C/m²
 - C) V/m²
 - D) No unit

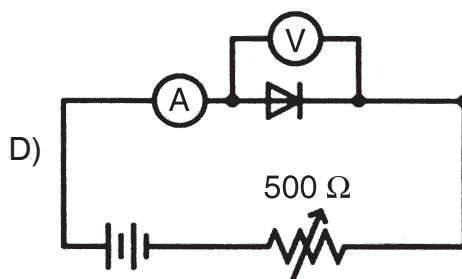
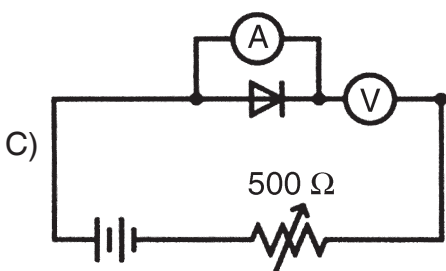
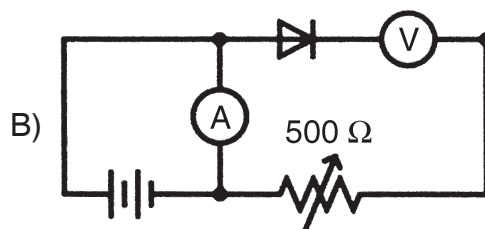
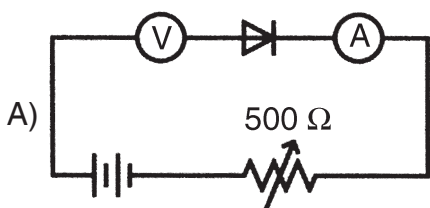
23. Velocity time graph of a particle moving in a fixed direction is shown in the figure. What is the average velocity of the particle between A and C ?



- A) 4 m/s B) 5 m/s C) 6 m/s D) 10 m/s
24. Which is not a unit of weight ?
- A) Kilogram (Kg) B) Newton (N)
C) Kg m/s² D) None of these
25. If the kinetic energy of a moving body becomes four times of its initial value. The new linear momentum will be
- A) Eight times of the initial value B) Four times of the initial value
C) Two times of the initial value D) Remains the same
26. Total energy of a pendulum performing simple harmonic motion is
- A) Same at every point B) Maximum at extreme points
C) Maximum at mean position D) Minimum at mean position
27. The Young's modulus for perfectly rigid body is
- A) Zero B) 1 Pascal C) 3 Pascal D) Infinity
28. A soap film formed on a rectangular wire frame has length of 4 cm and breadth of 3 cm. It has to be stretched to length of 5 cm and breadth of 4 cm. Surface tension of the liquid is 0.1 N/m. Calculate the work required for the expansion.
- A) 1.2×10^{-5} J B) 16×10^{-5} J C) 2.1×10^{-5} J D) 4×10^{-5} J

29. A weightlifter holds a weight of 180 kg on his shoulders for 1 minute. Calculate the work done.
 A) 180 N B) 180 J C) 0 J D) None of these
30. The door of a running refrigerator is kept opened in a room. Temperature of the room
 A) Decreases B) Increases
 C) Remains constant D) May increase or decrease
31. The colour of a star is an indication of its
 A) Size B) Density
 C) Temperature D) Distance from earth
32. 200 J of heat is added to a working substance. Internal energy is raised from 30 J to 70 J during the process. The amount of external work done is
 A) 40 J B) 100 J C) 130 J D) 160 J
33. If the speed of light in a medium is 1×10^8 m/s. What is the refractive index of the medium ?
 A) 3 B) 5 C) 20 D) 10
34. A convex lens has a focal length of 10 cm. What is the power of the lens in diopter ?
 A) 1D B) 2D C) 5D D) 10D
35. When light travels from one medium to other which property remains constant ?
 A) Frequency B) Wavelength C) Velocity D) None of these
36. Which of the following is not conserved during Raman scattering ?
 A) Energy B) Momentum C) Kinetic Energy D) Mass
37. Which of the following is not an electromagnetic wave ?
 A) Beta rays B) Gamma rays C) X rays D) Light rays
38. The radius of a spherical Gaussian surface is doubled, what will be the change for electric flux through the surface ?
 A) Increases two times B) Increases four times
 C) Decreases two times D) No change

39. If current through a wire is increased 4 times what will be the change in heat produced ?
 A) Decreases four times B) Increases four times
 C) Increases sixteen times D) No change
40. An electric lamp having resistance $10\ \Omega$ is connected in series with a resistance of $40\ \Omega$ and to a battery of 10 V . Calculate the current through the circuit.
 A) 0.2 A B) 1.2 mA C) 2 A D) 2.2 A
41. The horizontal and the vertical components of earth's magnetic field at a place is equal. The angle of dip at that place will be
 A) 0° B) 30° C) 45° D) 90°
42. Which is a possible value of horizontal component of earth's magnetic field ?
 A) $0.38 \times 10^{-4}\text{ T}$ B) 3.8 T
 C) $0.38 \times 10^4\text{ T}$ D) 3 T
43. Voltage and frequency of domestic power supply in India is
 A) 220 kV , 50 Hz B) 220 V , 100 Hz
 C) 220 kV , 50 kHz D) 220 V , 50 Hz
44. Instantaneous value of current in an AC circuit is $I = 4 \cos(\omega t + \phi)$ amperes. RMS value will be
 A) 2 A B) $2\sqrt{2}\text{ A}$ C) $2/\sqrt{2}\text{ A}$ D) $3/2\sqrt{2}\text{ A}$
45. Which of the following diagram can be used to find the characteristics of a diode ?



46. Which of the following is a universal gate ?
 A) OR gate B) XOR gate C) NOR gate D) AND gate
47. Output of an electronic Oscillator will be a _____ signal.
 A) AC B) DC
 C) Either AC or DC D) None of these
48. Voltage gain of an amplifier is 100. What will be the gain in dB ?
 A) 5 B) 10 C) 20 D) 40
49. Collector-Base junction of a Common Emitter Amplifier is
 A) Forward biased B) Reverse biased
 C) Not biased D) None of these
50. Which of the hydrogen spectrum series is in the visible region ?
 A) Lyman series B) Balmer series
 C) Bracket series D) Pfund series
51. Barium has BCC lattice structure. Calculate the number of unit cells in one mole of the crystal.
 A) 6.023×10^{23} B) 3.012×10^{23} C) 12.046×10^{23} D) 6.023×10^{24}
52. If the angle of contact between the liquid and container is 90 degrees then ?
 (C is the cohesive and A is the Adhesive force)
 A) $C > A$ B) $C = A$ C) $C < A$ D) C is not equal to A
53. For distribution of molecular velocities of gases, decreasing order of V_{mp} , V_{av} , V_{rms} is
 A) $V_{rms} > V_{av} > V_{mp}$ B) $V_{mp} > V_{rms} > V_{av}$
 C) $V_{av} > V_{rms} > V_{mp}$ D) None of the above
54. Calculate the molarity of the solution obtained on mixing 100 mL of 0.1M HCl with 50 mL of 0.1M HNO_3 .
 A) 0.2M B) 0.01M C) 0.1M D) 0.05M
55. A solution of sodium sulfate contains 92 g of Na^+ ions per kilogram of water. The molality of Na^+ ions in that solution in $mol\ kg^{-1}$ is
 A) 16 B) 8 C) 4 D) 12

56. Elevation in the boiling point for 1 molal solution of glucose is 2 K. The depression in the freezing point of 2 molal solutions of glucose in the same solvent is 2 K. The relation between K_b and K_f is

- A) $K_b = 0.5 K_f$ B) $K_b = 2 K_f$ C) $K_b = 1.5 K_f$ D) $K_b = K_f$

57. Read the following Assertion (A) and Reason (R) and choose the correct option.

Assertion (A) : Molar conductivity increases with decrease in concentration.

Reason (R) : Conductivity always decreases with decrease in concentration.

- A) Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation for Assertion (A).
 B) Both Assertion (A) and Reason (R) are correct and Reason (R) is not the correct explanation for Assertion (A).
 C) Both Assertion (A) and Reason (R) are incorrect.
 D) Assertion (A) is correct, but Reason (R) is incorrect.

58. Which of the following is not a secondary cell ?

- A) Leclanche cell B) Lead storage cell
 C) Mercury cell D) Nickel-cadmium cell

59. Metal ions that form soluble carbonates in presence of NH_4Cl

- A) Ba B) Ca C) Mg D) Sr

60. The correct match between Item – I and Item – II is

Item – I

Item – II

- | | |
|--------------------|-----------------|
| i. Salicylaldehyde | P. Mobile phase |
| ii. Alumina | Q. Adsorbent |
| iii. Acetonitrile | R. Adsorbate |
- A) i – Q ii – R iii – P
 B) i – P ii – R iii – Q
 C) i – Q ii – P iii – R
 D) i – R ii – Q iii – P

61. Assume the solubility of PbCl_2 in water 1SmolL^{-1} and its solubility product is K_{sp} . The relation between K_{sp} and S is represented as $S = \sqrt[3]{K_{sp}/x}$. The value of x is

- A) 1 B) 2 C) 3 D) 4

62. Monomers of Dacron polymer is
- A) Ethylene glycol and terephthalic acid
 - B) Ethylene oxide and phthalic acid
 - C) Ethylene glycol and benzoic acid
 - D) Benzamide and terephthalic acid
63. Which of the following is/are thermosetting polymer/s ?
- i. Teflon
 - ii. Bakelite
 - iii. Polypropylene
 - iv. Polystyrene
- A) i and ii B) iii and iv C) Only i D) Only ii
64. Epoxy resins are used as
- A) Detergents
 - B) Insecticides
 - C) Adhesives
 - D) Moth repellents
65. Which one of the following is used as a binder in paints ?
- A) Titanium dioxide
 - B) Novolac
 - C) Phthalocyanine
 - D) Silicones
66. Which among the following is a non-permitted colour ?
- A) Ponceau
 - B) Brilliant blue FCF
 - C) Tartrazine
 - D) Rhodamine
67. Which of the following statement is true ?
- A) Soaps and detergents both are used only in soft water
 - B) Soaps and detergents both are used in soft water as well as hard water
 - C) Soap is used only in soft water while detergent can be used in soft water as well as hard water
 - D) Detergent is used only in soft water while soap is used in soft water and hard water both
68. Liquified Petroleum Gas consists of
- A) Nonane and octane
 - B) Propane and butane
 - C) Hexane and benzene
 - D) Nitrogen and ethane

69. Which of the following explosives is known as Nobel's oil ?
A) CTT B) TNT C) TNG D) RDX
70. How many pentagonal and hexagonal faces are present in C_{70} ?
A) 12 and 20 B) 12 and 25 C) 20 and 12 D) 25 and 12
71. Nano sized polymers built from branched units are called
A) Dendrimers B) Composites
C) Carbon-based materials D) Metal-based materials
72. What's the procedure in Top-down fabrication method ?
A) Nano-particles $\rightarrow$ Powder $\rightarrow$ Bulk
B) Powder $\rightarrow$ Bulk $\rightarrow$ Nano-particles
C) Bulk $\rightarrow$ Powder $\rightarrow$ Nano-particles
D) Nano-particles $\rightarrow$ Bulk $\rightarrow$ Powder
73. An organic compound (Molecular formula = $C_8H_{10}O$) exhibited the following 1H NMR spectral data : δ 2.5 (3H, s), 3.8 (3H, s), 6.8 (2H, d, $J = 8Hz$), 7.2 (2H, d, $J = 8Hz$) ppm. The compound among the choices is
A) 4-ethylphenol B) 2-ethylphenol
C) 4-methylanisole D) 4-methylbenzyl alcohol
74. On increasing pH, phenol shows
i. Bathochromic shift
ii. Blue shift
iii. Red shift
iv. Hypsochromic shift
A) i and iv B) i and iii C) ii and iv D) ii and iii
75. Why Monomeric saturated aliphatic carboxylic acids show carbonyl stretching frequency near 1760 cm^{-1} , while saturated aliphatic ketones near 1720 cm^{-1} ?
A) Mesomeric (M) effect is dominant in acids over the inductive (I) effect
B) I effect is dominant in carboxylic acids over the mesomeric effect
C) I effect on ketones is dominant over the M effect
D) M effect in ketones is dominant

76. What is the number of vibrational degrees of freedom in Toluene ?
 A) 39 B) 15 C) 18 D) 40
77. As per the Central Pollution Control Board of India, BOD of treated sewage should be
 A) Less than 25 mg/l B) Less than 15 mg/l
 C) Less than 10 mg/l D) Less than 20 mg/l
78. Wheezing is the most important health hazard caused by
 A) Carbon monoxide B) Carbon dioxide
 C) Nitrogen dioxide D) Sulphur dioxide
79. Which of the following statements are correct regarding Minamata disease ?
 i. It is an infectious disease.
 ii. It was caused by consumption of fish containing lead.
 iii. It was caused by consumption of fish containing mercury.
 iv. It was caused by consumption of fish containing cadmium.
 v. It affects the central nervous system.
 vi. It affects respiratory system.
 A) iii and vi are correct B) iii and v are correct
 C) i and ii are correct D) ii and vi are correct
80. Which of the following is a green solvent used for bleaching clothes ?
 A) Hydrogen peroxide B) Benzene
 C) Water D) Liquified carbon dioxide
81. In a code language, SMART is written as MACKO. How will CROWN be written in the same language ?
 A) FKETB B) GKETB C) GKESB D) GKETC
82. Suppose a bus covers a distance at 40 kmp/h and an equal distance at 60 kmp/h. Then what is the average speed during the whole journey ?
 A) 55 B) 45 C) 48 D) 50
83. In what time will Rs. 20,000 becomes Rs. 21,632 at 4% per annum interest compounded yearly ?
 A) 5 B) 4 C) 3 D) 2

84. What is the area of a triangle having sides 6 cm, 8 cm and 10 cm ?
 A) 8 cm^2 B) 10 cm^2 C) 12 cm^2 D) 14 cm^2
85. The total surface area of a hemisphere is $108 \pi \text{ cm}^2$. Then what is its volume ?
 A) $288 \pi \text{ cm}^3$ B) $144 \pi \text{ cm}^3$ C) $108 \pi \text{ cm}^3$ D) $72 \pi \text{ cm}^3$
86. The equation $x^2 + kx + 9 = 0$ has two equal roots, then the value of k is
 A) ± 6 B) ± 3 C) ± 0 D) ± 9
87. The graph of the equation $y = ax^2 + bx + c = 0$, a, b, c are real numbers completely lies in the upper half plane. Then
 A) $b^2 - 4ac = 0$ B) $b^2 - 4ac < 0$
 C) $b^2 - 4ac > 0$ D) None of these
88. If $A = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$, then the value of A^{13} is
 A) $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ B) $\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$ C) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ D) $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$
89. The matrix $\begin{bmatrix} 2 & x \\ 2-x & 1 \end{bmatrix}$ has determinant 1. Then its inverse is
 A) $\begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix}$ B) $\begin{bmatrix} -1 & 1 \\ 1 & -2 \end{bmatrix}$ C) $\begin{bmatrix} -1 & -1 \\ -1 & -2 \end{bmatrix}$ D) $\begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$
90. The rank of the matrix $\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \end{bmatrix}$ is
 A) 4 B) 3 C) 2 D) 1
91. The system of equations $\begin{cases} 3x - 5y + z = 1 \\ 4x - 2y + 2z = 8 \\ x + 3y + z = 2 \end{cases}$ has
 A) one solution B) no solutions
 C) two solutions D) infinitely many

92. For what value of k the following system $\begin{cases} 4x - 4y = 5 \\ (k+1)x - 2y = 8 \end{cases}$ has no solution ?
 A) 1 B) 2 C) 3 D) 4
93. In how many ways can we select 5 books out of 10, of which a particular book is not included ?
 A) 108 B) 120 C) 124 D) 126
94. The coefficient of x^7 in the expansion of $(1-x)^{-2}$
 A) -6 B) 6 C) -8 D) 8
95. The tangent to the curve $y = \sqrt{1-x^2}$ at $\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ meets the x axis at
 A) $(0, -\sqrt{2})$ B) $(0, \sqrt{2})$
 C) $(0, 1)$ D) $(0, -1)$
96. Maximum value of $-x^2 + 6x - 8$ is
 A) 3 B) 2 C) 1 D) 0
97. What is the area of the region bounded by the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$?
 A) 6π sq. units B) $\frac{3}{2}\pi$ sq. units C) 4π sq. units D) 8π sq. units
98. Find the volume of the solid obtained by revolving the region enclosed by the curves $y = x$ and $y = x^2$ about the x axis
 A) $4\pi/15$ B) $2\pi/15$ C) $\pi/15$ D) 0
99. The solution of the differential equation $\sin y dx + x \cos y dy = 0$ is
 A) $y \cos x = c$ B) $x \cos y = c$ C) $x \sin y = c$ D) $y \sin x = c$
100. The general solution of the differential equation $y'' + y' + y = 0$ is
 A) $e^{\frac{-3}{2}x} \left(A \cos \frac{1}{2}x + B \sin \frac{1}{2}x \right)$ B) $e^{\frac{3}{2}x} \left(A \cos \frac{1}{2}x + B \sin \frac{1}{2}x \right)$
 C) $e^{\frac{-1}{2}x} \left(A \cos \frac{3}{2}x - B \sin \frac{3}{2}x \right)$ D) $e^{\frac{1}{2}x} \left(A \cos \frac{3}{2}x - B \sin \frac{3}{2}x \right)$
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Space for Rough Work

