1. Match List I with List II and select the correct answer using the code given below :

List I		List II
(a)	CO	1. Acid rain
(b)	CO_2	2. Acute toxicity
(c)	SO_2	3. Ozone Liberation
(d)	NO_x	4. Green house effect

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

(E) Answer not known

2. The IPCC estimate that rising CO_2 emission mostly from

(A) Decaying vegetation
(B) Deforestation
(C) Refrigerator
(D) Burning of fossil fuels
(E) Answer not known

3. Match the following :

List I	List II
(a) Aerosol	1. Made up of metal vapour
(b) Flyash	2. Concentration of smoke and fog
(c) Fume	3. Emitted by coal burning
(d) Smog	4. Minute particles with water

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

(E) Answer not known

4. The option for removing heavy metals from soil is

(1) Nurchi's method

(2) Phyto extraction

(3) Acid leaching

(4) Phytovolatilization

(A) (1), (2), (3) (B) (3), (4), (2)

(C) (2), (3) (D) (1), (2), (3), (4)

(E) Answer not known

5. The objective of Environmental education is

(A) To raise consciousness about environmental conditions

(B) To increase economical growth

(C) To encourage urbanization and industrialization

(D) None of the above

(E) Answer not known

6. Eco system functions through ———————— and ————————.

(A) Atmospheric carbon and Biomass

(B) Biogeochemical and Energy transfer mechanism

(C) (A) and (B)

(D) Food web and food chain

(E) Answer not known

7. Why public Awareness is required for environment?

(A) Encourage the food habits

(B) Reduce the carbon emission

(C) Educate the people to develop relationship between environment and development

(D) (B) and (C)

(E) Answer not known

8. A biome is defined as

(A) Ecological unit

(B) Biogeographic zone

(C) Biotic province

(D) Land region

(E) Answer not known

9. The main Raw material for production of hydrogen energy is ———————— and ————————.

(A) Waste material, food materials

(B) Water and green plants

(C) Organic materials and Agricultural waste

(D) Both (A) and (C)

(E) Answer not known

10. Match the following :

List I (Types of geothermal resources)	List II Temp. in °C
(a) Hydrothermal resources	1. 200
(b) Geo Pressured resources	2. 180
(c) Hot dry rock resources	3. 1600
(d) Volcanic eruption resources	4. 650

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

(E) Answer not known

11. Hydrogen energy is obtained from

(A) Photosynthesis process (B) Aerobic process

(C) Decomposition process (D) Both (A) and (C)

(E) Answer not known

12. The Ocean Thermal Energy Plant should be located at

(A) < 25 km from shore (B) < 10 km from shore

(C) < 30 km from shore (D) < 20 km from shore

(E) Answer not known

13. Match the power requirement in % :

List I		List II
(a)	Hydro power plant	1. 24.7
(b)	Nuclear power plant	2. 2.9
(c)	Thermal power plant	3. 64.6
(d)	Renewable energy	4. 7.7

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

(E) Answer not known

14. Environmental Economics involves ———————— and ———————— studies.

(A) Empirical and theoretical

(B) Country and job opportunities

(C) Production and GDP

(D) Experimental and analytical

(E) Answer not known

15. The precautionary principal was first introduced in

(A) The Earth Summit

(B) The First International Conference on protection of the north sea

(C) Kyoto protocol

(D) Vienna convention

(E) Answer not known

16. An Environmental Impact Assessment is intended to identify the Environmental social and economic impacts of a proposed development.

(A) Prior to the decision to sanction a project is taken
(B) During the execution of a project
(C) After the execution of a project to assess its beneficiaries
(D) Pre-assess its adverse impacts on human and environment
(E) Answer not known

17. Life cycle Assessment is the method of

(A) Specification Tool
(B) Calculation of Eco indicator
(C) Rating of green building
(D) Both (A) and (C)
(E) Answer not known

18. Sustainability is divided into

(A) Social, Ecological and Economic
(B) Social, Ethics, Environment
(C) Economic, Energy requirement, Quality
(D) Development, Employment, Environment
(E) Answer not known

19. Identify the correct statement

(A) GDP is an accounting of manmade capital

(B) GDP is performance and people living standard

(C) GDP is the contribution of both manmade and environmental services

(D) GDP considered only for environmental and Ecosystem

(E) Answer not known

20. The ozone strongly absorbs UV light in the region having wave length in the range of

(A) 360 – 460 nm

(B) 135 – 200 nm

(C) < 290 nm

(D) < 100 nm

(E) Answer not known

21. The warming of the Earth atmosphere due to increasing concentration of green house gases is not likely to cause

(A) Severe climate change

(B) Increased heat conditions leading to warmer weather and long summers on Earth

(C) Melting of snow glaciers and of the pole and raise in sea levels

(D) None of the above

(E) Answer not known

22. How to reduce carbon foot print

(A) Choose energy-Efficient lighting and transition

(B) Encourage to use composting material

(C) Switch over to renewable energy technology

(D) All of the above

(E) Answer not known

23. Which of the following is not correct?

(i) $L\left[e^{-at}\sin bt\right]=\dfrac{b}{(s+a)^2+b^2}$

(ii) $L\left[e^{-at}\cos bt\right]=\dfrac{s}{(s+a)^2+b^2}$

(iii) $L[t\sin at]=\dfrac{2as}{\left(s^2+a^2\right)^2}$

(iv) $L[t\cos at]=\dfrac{s^2-a^2}{\left(s^2+a^2\right)^2}$

(A) (i)

(B) (ii)

(C) (iii)

(D) (iv)

(E) Answer not known

24. The initial value theorem states that $\lim_{t \to 0} [f(t)]$ is

(A) $\lim_{s \to 0} [S L\{f(t)\}]$

(B) $\lim_{s \to \infty} [S L\{f(t)\}]$

(C) $\lim_{s \to -\infty} [S L\{f(t)\}]$

(D) $\lim_{t \to 0} [S L\{f(t)\}]$

(E) Answer not known

25. The Laplace transform of $\frac{\sin t}{t}$ is

(A) $\sin^{-1}(s)$

(B) $\cos^{-1}(s)$

(C) $\tan^{-1}(s)$

(D) $\cot^{-1}(s)$

(E) Answer not known

26. Find $L(\sin t)$

(A) $\frac{1}{s^2 + a^2}$

(B) $\frac{1}{s^2 - a^2}$

(C) $\frac{1}{s^2 + 1}$

(D) $\frac{1}{s^2 - 1}$

(E) Answer not known

27. Find the Laurent's series representation for $\exp\left(\frac{-1}{z^2}\right)$ centered at $\alpha=0$

(A) $\sum_{n=0}^{\infty}\frac{(-1)^n}{n!z^{2n}}$ valid for $|z|>0$

(B) $\sum_{n=0}^{\infty}\frac{(-1)^{2n}}{n!z^{2n}}$ valid for $|z|<0$

(C) $\sum_{n=0}^{\infty}\frac{(-1)^{2n}}{(2n)!z^{n}}$ valid for $|z|>0$

(D) $\sum_{n=0}^{\infty}\frac{(-1)^{n}}{n!z^{2n}}$ valid for $|z|<0$

(E) Answer not known

28. The Laurent's series expansion of $\frac{1}{z(z-1)}$ valid in $|z|>1$ is

(A) $1+\frac{1}{z}+....$

(B) $1-\frac{1}{z}+\frac{1}{z^2}-...$

(C) $\frac{1}{z^2}+\frac{1}{z^3}+...$

(D) $\frac{1}{z^2}-\frac{1}{z^3}+\frac{1}{z^4}-....$

(E) Answer not known

29. The bilinear map which maps the points $z=1, i, -1$ onto the points $w=i, 0, -i$ is

(A) $w=\frac{z+i}{z-i}$

(B) $w=\frac{i-z}{i+z}$

(C) $w=\frac{-(z+i)}{z-i}$

(D) $w=\frac{i}{z}$

(E) Answer not known

30. Evaluate $\int_C \frac{z^2-z+1}{z-1}dz$, where C is the circle $|z|=\frac{1}{2}$

(A) 0 (B) 1

(C) –1 (D) ±1

(E) Answer not known

31. The function $\frac{z^2-4}{z^2+1}$ is not analytic at

(A) $z=\pm i$

(B) $z=\pm 1$

(C) $z=\pm 2$

(D) $z=\pm 2i$

(E) Answer not known

32. The value of the integral $\int_C \{(3x-8y^2)dx+(4y-6xy)dy\}$, where C is the boundary of the region given by $x=0, y=0, x+y=1$ when applying Green's theorem in the XY plane, is

(A) 5/3 (B) 1/3

(C) 3/5 (D) 1/5

(E) Answer not known

33. The value of $\iint_R x^2\,dx\,dy$ where R is the region in the first quadrant bounded by the lines $x=y,\ y=0, x=8$ and the curve $xy=16$ is

(A) 848 (B) 525

(C) 610 (D) 448

(E) Answer not known

34. If $\nabla^2\phi=0$, then $\nabla\phi$ is

(A) Solenoidal but not irrotational

(B) Irrotational but not solenoidal

(C) Not solenoidal and not irrotational

(D) Both solenoidal and irrotational

(E) Answer not known

35. The value of $\int x\,e^x\,dx$ is

(A) $e^x(x-1)+c$ (B) e^x

(C) $e^x(x+1)^2+c$ (D) $(x+1)^2+c$

(E) Answer not known

36. The particular integral of the Euler-Cauchy's equation $\left(x^2D^2-xD-3\right)y=x^2.\log x$ is

(A) $\frac{-x^2}{3}(\log x+2/3)$ (B) $\frac{x}{2}(x\log x-1/3)$

(C) $\frac{x^2}{4}\left(x^3-1/2\right)$ (D) $x\log x+\frac{3x^2}{2}$

(E) Answer not known

37. The general solution of $9\frac{d^2y}{dt^2}-24\frac{dy}{dt}+16y=0$ is

(A) $y=(At+B)e^{\frac{4}{3}t}$ (B) $y=(A+Bt)e^{\frac{3}{4}t}$

(C) $y=Ae^{\frac{4}{3}t}+Be^{\frac{4}{3}t}$ (D) $y=Ae^{\frac{4}{3}t}+Be^{\frac{2}{3}t}$

(E) Answer not known

38. If $f(x, y)$ is a homogeneous functions of x and y of degree n then

(A) $\frac{\partial f}{\partial x}+\frac{\partial f}{\partial y}=n$ (B) $x\frac{\partial f}{\partial x}+y\frac{\partial f}{\partial y}=f$

(C) $x\frac{\partial f}{\partial x}+y\frac{\partial f}{\partial y}=nf$ (D) $\frac{\partial f}{\partial x}+\frac{\partial f}{\partial y}=n^2$

(E) Answer not known

39. If $u=2xy; v=x^2-y^2; x=r\cos\theta; y=r\sin\theta$ then $\frac{\partial(u,v)}{\partial(r,\theta)}$ is

(A) $-4r^3$ (B) $-4r^2$

(C) $-4r$ (D) $-4+r$

(E) Answer not known

40. The particular integral of the equation $\left(D^2+4\right)y=\cos^2 x$

(A) $1+x\sin 2x$ (B) $1/8(x\sin 2x)$

(C) $1/8(1+x\sin 2x)$ (D) $1/8(1+x\cos 2x)$

(E) Answer not known

41. The eigenvector corresponding to the eigenvalue $\lambda = 2$ for the matrix $A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ is

(A) $\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$ (B) $\begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$

(C) $\begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix}$ (D) $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$

(E) Answer not known

42. The matrix $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ satisfies the equation

(A) $A^2 + 5A + 7I = 0$ (B) $A^2 + 5A - 7I = 0$

(C) $A^2 - 5A - 7I = 0$ (D) $A^2 - 5A + 7I = 0$

(E) Answer not known

43. If $A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$ then the eigenvalues of A^2 are

(A) 1, 6 (B) 1, 36

(C) 2, 12 (D) 2, 30

(E) Answer not known

44. If eigenvalues and their corresponding eigenvectors of a 2×2 matrix are given by $\lambda_1 = 8$, $x_1 = \begin{pmatrix}1\\1\end{pmatrix}$ and $\lambda_2 = 4$, $x_2 = \begin{pmatrix}1\\-1\end{pmatrix}$ then the matrix is

(A) $\begin{pmatrix}4 & 6\\6 & 4\end{pmatrix}$ (B) $\begin{pmatrix}6 & 2\\2 & 6\end{pmatrix}$

(C) $\begin{pmatrix}2 & 4\\4 & 2\end{pmatrix}$ (D) $\begin{pmatrix}4 & 8\\8 & 4\end{pmatrix}$

(E) Answer not known

45. The workdone by the force is given by

(A) The cross product of force and displacement

(B) Force divided by time

(C) The dot product of force and displacement

(D) The product of force and time

(E) Answer not known

46. Ultrasonic wave do not show

(A) reflection (B) refraction

(C) absorption (D) polarization

(E) Answer not known

47. The time taken for the sound to fall below the minimum audibility measured from the instant when the source stopped sounding is called

(A) Reverberation (B) Time of Reverberation

(C) Intensity of sound (D) Loudness

(E) Answer not known

48. A metal wire of length L, area of cross section A and young's modulus Y behaves as a spring of spring constant k. Then,

(A) $k = YA/L$ (B) $k = YL/A$

(C) $k = YA/2L$ (D) $k = 2YA/L$

(E) Answer not known

49. Relation between three modulli of elasticity

(A) $\frac{1}{n} = \frac{3}{Y} + \frac{1}{3K}$ (B) $\frac{1}{Y} = \frac{1}{K} + \frac{3}{n}$

(C) $\frac{3}{Y} = \frac{1}{3K} + \frac{1}{n}$ (D) $\frac{1}{3Y} = \frac{1}{K} + \frac{3}{n}$

(E) Answer not known

50. Dimension of thermal conductivity is expressed as

(A) ML^2T^2 (B) $MLT^{-3}\theta^{-1}$

(C) MLT^{-3} (D) $MLT^{-2}T^{-1}$

(E) Answer not known

51. The average time taken by a gas molecule between 2 successive collisions is called mean free time τ. It is given by

(A) $\tau = \frac{\lambda}{c}$ (B) $\tau = \frac{c}{\lambda}$

(C) $\tau = c\lambda$ (D) $\tau = n\lambda$

(E) Answer not known

52. A hot and a cold body are kept in vacuum separated from each other. Which of the following cause decrease in temperature of the hot body?

(A) Radiation
(B) Convection
(C) Conduction
(D) Temperature remains unchanged
(E) Answer not known

53. In Carnot cycle, the first step is

(A) Isothermal expansion
(B) Isothermal compression
(C) Adiabatic expansion
(D) Adiabatic compression
(E) Answer not known

54. The relation of length of axes of unit cell in monoclinic crystal system is

(A) $a = b = c$
(B) $a = b \neq c$
(C) $a \neq b \neq c$
(D) $a \neq b = c$
(E) Answer not known

55. Maglev trains are constructed based on ———————— effect.

(A) Gravitation
(B) Electrical
(C) Meissner
(D) None of the above
(E) Answer not known

56. The ratio of the magnetic induction to the magnetic field is defined as

(A) Intensity of magnetisation
(B) Magnetic susceptibility
(C) Magnetic relativity
(D) Magnetic permeability
(E) Answer not known

57. The temperature at which a metal become superconductor is called

(A) Curie temperature
(B) Debye temperature
(C) Critical temperature
(D) Threshold temperature
(E) Answer not known

58. The susceptibility value of diamagnetic material is

(A) Negative
(B) Positive
(C) Zero
(D) Unity
(E) Answer not known

59. Optical fibers are classified into three categories based on the following criteria :

(a) Raw material of the fibre

(b) Number of modes of propagation

(c) Refractive index profile

(A) (a) alone correct
(B) (b) alone correct
(C) (a) and (b) are correct
(D) (a), (b) and (c) are correct
(E) Answer not known

60. Numerical aperture determines the ———————— of the fibre.

(A) Light gathering ability
(B) Electrical signal
(C) Cosine function
(D) Scattering light
(E) Answer not known

61. A photon of frequency γ is incident on a metal surface of threshold frequency γ_o, the kinetic energy of the emitted photo electron is

(A) $h(\gamma - \gamma_o)$
(B) $h\gamma$
(C) $h\gamma_o$
(D) $h(\gamma + \gamma_o)$
(E) Answer not known

62. In the carbondioxide laser transition takes place between the

(A) Vibrational States
(B) Molecular States
(C) Energy States
(D) Atomic States
(E) Answer not known

63. The uncertainty principle states that

(A) $\Delta x\, \Delta p \geq \frac{h}{2\pi}$
(B) $\Delta x\, \Delta p \geq \frac{h}{4\pi}$
(C) $\Delta x\, \Delta p \leq \frac{h}{2\pi}$
(D) $\Delta x\, \Delta p \leq \frac{h}{4\pi}$
(E) Answer not known

64. Donar type semiconductor is formed by adding impurity of valency

(A) 3
(B) 4
(C) 5
(D) 2
(E) Answer not known

65. The concentration of holes in the valence band is equal to

(A) $P = N_V \exp\left(\frac{E_V + E_F}{2K_T}\right)$ (B) $P = N_V \exp\left(\frac{E_V - E_F}{3K_T}\right)$

(C) $P = N_V \exp\left(\frac{E_V + E_F}{K_T}\right)$ (D) $P = N_V \exp\left(\frac{Eg - E_F}{K_T}\right)$

(E) Answer not known

66. The Fermi level in an intrinsic semiconductors

(A) Lies midway between the valence band and conduction band
(B) Lies towards the conduction band
(C) Lies towards the valence band
(D) Does not exist
(E) Answer not known

67. When a pure semiconductor is heated, its resistance

(A) Goes up (B) Goes down
(C) Remain's the same (D) None of the above
(E) Answer not known

68. Select the compound which possesses highest octane number and highest cetane number respectively, out of n-heptane, n-hexadecane, n-octane and iso-octane

(A) n-octane and iso-octane
(B) n-heptane and n-hexadecane
(C) n-heptane and n-octane
(D) iso-octane and n-hexadecane
(E) Answer not known

69. Spherical fullerenes are otherwise called as

(A) Hydrated fullerenes
(B) Bucky balls
(C) Single walled carbon nanotubes
(D) Multi walled carbon nanotubes
(E) Answer not known

70. Molybdenum disulphide is an example for

(A) Lubricating oil
(B) Anti-Oxidant
(C) Emulsifier
(D) Solid lubricant
(E) Answer not known

71. Oildag and aquadag refer to

(A) Dispersion of graphite in oil and water
(B) Dispersion of grease in oil and water
(C) Dispersion of mineral oil in grease
(D) Dispersion of mica in oil and water
(E) Answer not known

72. Monomers of bakelite polymer

(A) Hexamethylenediamine and Adipic acid
(B) Phenol and formaldehyde
(C) Butadiene and styrene
(D) Ethylene glycol and terephthalic acid
(E) Answer not known

73. A refractory which is easily attacked by an acidic material is known as

(A) Acid refractory
(B) Basic refractory
(C) Neutral refractory
(D) Artificial abrasive
(E) Answer not known

74. The seger cone test is employed to determine the _____ of the refractory material

(A) Thermal conductivity
(B) Porosity
(C) Refractoriness
(D) Thermal spalling
(E) Answer not known

75. A refractory material, obtained from bauxite is

(A) Fireclay
(B) Dolomite
(C) Chromite
(D) Alumina
(E) Answer not known

76. Neoprene is a

(A) Monomer
(B) Polyester
(C) Synthetic rubber
(D) Nanomaterial
(E) Answer not known

77. Decomposition potential is used in

(I) Refining of metals

(II) Electroplating

(III) Osmosis

(IV) Zeolite process

(A) (I), (III) & (IV) (B) (III) & (IV)

(C) (I) & (II) (D) (II), (III) & (IV)

(E) Answer not known

78. Calculate the emf of the following concentration cell at 25°C $Ni\left|Ni^{2+}(0.01M)\right|\left|Ni^{2+}(0.1M)\right|Ni$

(A) – 0.0296 V (B) 0.0592 V

(C) 0.0296 V (D) 0.74 V

(E) Answer not known

79. $2Ag_{(s)} + Zn^{2+}_{(aq)} \longrightarrow Ag^{+}_{(aq)} + Zn_{(s)}$

$E^{\circ}_{L} = 0.80V$ $E^{\circ}_{R} = -0.763V$

Which one of the following statement is true in the above cell reaction?

(A) Cell reaction is feasible

(B) Cell reaction is not feasible

(C) Cell reaction will be in equilibrium

(D) Cell reaction is slower

(E) Answer not known

80. Which of the following statements is false with respect to the characteristics of a fuel cell?

(A) Fuels are pre-loaded in the cell

(B) The efficiency of a fuel cell is more than that of a conventional power plant

(C) The formed products are pollution free

(D) Fuels/oxidants are to be supplied continuously

(E) Answer not known

81. Metal which is not able to displace hydrogen from acid solution is

(A) Zn (B) Ag

(C) Sn (D) Mg

(E) Answer not known

82. Ferritic stainless steel is

(A) Face-centered cubic structure (B) Hexagonal cubic structure

(C) Body-centered cubic structure (D) Tetrahedral cubic structure

(E) Answer not known

83. Argillaceous material is rich in

(A) Lime (B) Silica

(C) Stone (D) Gypsum

(E) Answer not known

84. The bath, which is used to achieve thicker Cu deposition is

(A) Acid Cu-bath (B) Pyrophosphate bath

(C) Cyanide bath (D) Watts bath

(E) Answer not known

85. Shattering power of explosive is

(A) Detonation velocity
(B) Sensitivity
(C) Oxygen balance
(D) Brisance
(E) Answer not known

86. Break-point chlorination refers to

(A) Appearance of free residual chloride
(B) Removal of chlorine
(C) Presence of large excess of chlorine
(D) Stabilization of chlorine
(E) Answer not known

87. Assertion [A] : Rate of metallic corrosion increases with increase in temperature.

Reason [R] : With increase of temperature of the environment, the rate of reaction as well as rate of diffusion increases, thereby corrosion rate increases.

(A) [A] is true, [R] is false
(B) Both [A] and [R] are true but [R] is not the correct explanation of [A]
(C) Both [A] and [R] are true, and [R] is the correct explanation of [A]
(D) [A] is false, [R] is true
(E) Answer not known

88. Acid which generated during the chlorination of water, and acts as a powerful germicide is

(A) HCl
(B) HOCl
(C) H_2SO_4
(D) HNO_3
(E) Answer not known

89. In which of the following cases, chemical corrosion is rapid?

(A) If the metal oxide layer is stable
(B) If the metal oxide layer is volatile
(C) If the metal oxide layer is non-porous
(D) If the metal oxide layer is unstable
(E) Answer not known

90. The process of coating iron with a thin coat of Zinc is called as

(A) Hot dipping
(B) Tinning
(C) Galvanizing
(D) Metal cladding
(E) Answer not known

91. 'Zero Defects' is the contribution of

(A) Joseph Juran
(B) Philip B. Crosby
(C) Kaoru Ishikawa
(D) Taguchi
(E) Answer not known

92. Which of the following dimension is not related to product quality?

(A) Performance
(B) Durability
(C) Empathy
(D) Reliability
(E) Answer not known

93. Match the following dimensions of service quality.

(a)	Tangibles	1.	Willingness to help the customers
(b)	Assurance	2.	Appearance of physical facilities
(c)	Empathy	3.	Knowledge and courtesy of employees
(d)	Responsiveness	4.	Caring, Individualised attention

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

(E) Answer not known

94. TQM Triangles fundamental characteristics involves

(i) Committment

(ii) Scientific knowledge

(iii) Involvement

(iv) Communication

(A) (i) and (ii) are correct, (iii) and (iv) are not correct

(B) (iii) and (iv) are correct, (i) and (ii) are not correct

(C) (i), (ii) and (iii) are correct, (iv) is not correct

(D) (iv) is correct, (i), (ii) and (iii) are not correct

(E) Answer not known

95. A simple method of displaying performance overtime against specific Quality Standards is

(A) Service Quality indices

(B) Root cause analysis

(C) Pareto analysis

(D) Control charts to monitor a single variable

(E) Answer not known

96. Kaizen focuses on

(A) Seiton and Seiso

(B) Simplification by breaking down complex processes into their subprocesses and solving them

(C) Root cause having Maximum number of Quality Practice

(D) QFD having L-shape, T shape only

(E) Answer not known

97. Qualification testing on prototypes activity is

(A) Customer related prevention costs

(B) Design related prevention costs

(C) Purchasing related prevention costs

(D) Operations related prevention costs

(E) Answer not known

98. Which of the following is correct?

1. Juran Trilogy approaches quality improvement from a cost oriented perspective.
2. Shewhart's PDSA cycle approach is engineering scientific method.
3. Kaizen is small incremental improvements.

(A) 1, 2 and 3 are correct
(B) 1 and 2 alone are correct
(C) 1 and 3 alone are correct
(D) 2 and 3 alone are correct
(E) Answer not known

99. _____ includes costs of those activities which remove or prevent any defect from occuring in the first place.

(A) Prevention cost
(B) Appraisal cost
(C) Internal failure cost
(D) External failure cost
(E) Answer not known

100. This method of continuous process improvement is like a mirror reflecting our Attitudes, Behavioural patterns and Tackles the root of the problems.

(A) Juran's Trilogy
(B) 5's practices
(C) PDSA
(D) Affinity and Relationship Diagrams
(E) Answer not known

101. Costs incurred in unplanned machine down time (or) unplanned equipment repair is

(A) Costs of corrective action
(B) Scrap and network cost
(C) Process failure cost
(D) Down grading cost
(E) Answer not known

102. Arrange the following steps for benchmarking in correct order:

1. Plan
2. Decide what to benchmark
3. Study others
4. Understand current performance
5. Use the findings
6. Learn from data

(A) 1, 2, 3, 4, 5, 6
(B) 2, 4, 1, 3, 6, 5
(C) 2, 1, 4, 6, 3, 5
(D) 4, 2, 1, 3, 6, 5
(E) Answer not known

103. The diagram that allows the team to creatively generate a large number of issues/ideas and then logically group them for problem understanding and possible breakthrough solution is:

(A) Forced field analysis

(B) Nominal group techniques

(C) Tree diagram

(D) Affinity diagram

(E) Answer not known

104. The six sigma accuracy means the process is ———— conformances.

(A) 99.9999998 % accurate

(B) 98.9999998 % accurate

(C) 97.9999998 % accurate

(D) 96.9999998 % accurate

(E) Answer not known

105. 1. The quality of a product does not depends on the quality of the process employed.

2. A process flow chart is a non-diagramatic view of the various steps in sequential order that form an overall process.

Assess the statements above and find whether its true or false.

(A) 1 and 2 are True

(B) 1 is true and 2 is false

(C) 1 is false and 2 is true

(D) 1 and 2 are false

(E) Answer not known

106. The Defect factor check sheet is used to ————

(A) Determine Defect Details

(B) Determine occurrence of Defects by Day of week, shift, machine

(C) Determine where Defects occur

(D) Determine Dispersion of Dimensions Hardness

(E) Answer not known

107. ———— is the type of maintenance says to wait until a failure occurs and then recovers the situation as quickly as possible.

(A) Corrective

(B) Scheduled

(C) Preventive

(D) Predictive

(E) Answer not known

108. ————— is used to visualize and evaluate the redesigned process and new processes before pilot project stage.

(A) Inductive Thinking

(B) Process bench marking

(C) Simulation

(D) Reengineering software

(E) Answer not known

109. ———— provides a framework for the development of an environmental management system and the supporting audit program.

(A) ISO-9000
(B) ISO-9004
(C) ISO-14001
(D) ISO-14000
(E) Answer not known

110. The technical descriptors in House of Quality are

(A) Voice of the customer
(B) Voice of the manager
(C) Voice of the owner
(D) Voice of the organisation
(E) Answer not known

111. ———— include doing work incorrectly, work not requested, work in the wrong order (or) working too slowly

(A) Treatment errors
(B) Tangible errors
(C) Task errors
(D) Customer errors
(E) Answer not known

112. Process engineering is an innovative process it involves

(i) Identify the process for re-engineering

(ii) Understand the current process

(iii) Create a new process design

(iv) Implement the Re-engineering process

(A) (i) only correct
(B) (i) and (ii) only correct
(C) (i), (ii) and (iii) only are correct
(D) (i), (ii), (iii) and (iv) are correct
(E) Answer not known

113. Which one of the following is not an element of communication process?

(A) Channel
(B) Measurement
(C) Encoding
(D) Receiver
(E) Answer not known

114. Which one of the following is NOT related to inventory control?

(A) ABC analysis
(B) CPM
(C) EOQ
(D) Safety stock
(E) Answer not known

115. Which form of control is concerned with detecting problems and making necessary adjustments?

(A) Feedback control
(B) Strategic control
(C) Feed forward control
(D) Concurrent control
(E) Answer not known

116. Communication process does not include

(A) Encoding
(B) Channel
(C) Receiver
(D) Measurement
(E) Answer not known

117. The selling price per unit is Rs. 360/- and the variable cost per unit: Rs. 260/- The fixed overhead during the year amount to Rs. 1,60,000/-. What is BEP?

(A) 1400 units
(B) 1500 units
(C) 1600 units
(D) 2000 units
(E) Answer not known

118. "Organisational unit where performance is measured by numerical differences between revenues and expenditures" is called

(A) Cost center
(B) Revenue center
(C) Profit center
(D) Responsibility center
(E) Answer not known

119. Match the following elements of staffing with its functions

Elements		Functions
(a)	Development	1. Selection
(b)	Procurement	2. Job Evaluation
(c)	Maintenance	3. Training
(d)	Compensation	4. Facilities

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

(E) Answer not known

120. For organisations producing a variety of products, departmentation by ———— is most suitable.

(A) Product
(B) Function
(C) Customer
(D) Time
(E) Answer not known

121. From which combination, is a matrix organizational structure created?

(A) Functional and Divisional
(B) Functional and Project
(C) Functional and Line
(D) Divisional and Line
(E) Answer not known

122. In which type of organisation structure, is line and staff authority relationship prevalent?

(A) Virtual Organisation
(B) Functional Organisation
(C) Task Force
(D) Committee
(E) Answer not known

123. Which one of the following, is NOT barrier to effective performance appraisal?

(A) Faulty Assumptions
(B) Psychological Blocks
(C) Technical Pitfalls
(D) Greater Satisfaction
(E) Answer not known

124. Allocation of resources including human and non-human resources to different sections and activities of the department done by

(A) Supervisory Management
(B) Top Management
(C) Middle Management
(D) Both (A) and (B)
(E) Answer not known

125. Consider the following benefits of Management by objectives.

(i) Inflexibility

(ii) Focus on Key Results

(iii) Personnel Satisfaction

Which one is correct?

(A) (i) only correct
(B) (i) and (ii) only correct
(C) (iii) only correct
(D) (iii) and (ii) only correct
(E) Answer not known

126. Scientific management create awareness about

(A) Operational Efficiency
(B) Industrial Efficiency
(C) Social Responsibility of Business
(D) All of the above
(E) Answer not known

127. Statement : Management process is Dynamic.

Reason : Management is the process of getting things done with the aim of achieving organizational objectives.

Consider the following :

(A) Statement correct Reason not correct
(B) Statement not correct Reason correct
(C) Both Statement and Reason correct
(D) Both Statement and Reason not correct
(E) Answer not known

128. The verifiable objective is

(A) To improve communication
(B) To achieve a return on investment of 12% per year
(C) To develop better managers
(D) To install a computer system
(E) Answer not known

129. Match the following with their contribution towards management

(a)	F.W. Taylor	1.	Behavioural
(b)	Henri Fayol	2.	Human relations
(c)	Elton Mayo	3.	Administrative
(d)	Maslow	4.	Scientific

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

(E) Answer not known

130. Which one of the following is correctly paired?

(A) Leadership – Authority
(B) Delegation – Decision making
(C) Incentive – Motivation
(D) Planning – Control
(E) Answer not known

131. Consider the following statements

1. Authority is the right to command
2. Power is the capacity to command

(A) Statement 1 only correct
(B) Statement 2 only correct
(C) Both statements are incorrect
(D) Both statements are correct
(E) Answer not known

132. Select the reason for individuals resisting organisational change.

(A) Obsolescence of Skills
(B) Organizational Politics
(C) Threat to Power
(D) Sunk Cost
(E) Answer not known

133. Which is the main cause for Indiscipline?

(A) Inadequate orientation of the employee
(B) Faster promotion given to employee
(C) To give proper rules and regulation
(D) Quick implementing the award
(E) Answer not known

134. Guiding and Motivating employees comes under which function of Management.

(A) Planning
(B) Controlling
(C) Staffing
(D) Directing
(E) Answer not known

135. Binary 111 represents

(A) Decimal 222
(B) Decimal 8
(C) Decimal 7
(D) Decimal 4
(E) Answer not known

136. A full adder can be made using

(A) Two half adders
(B) Two half adders and a NOR gate
(C) Two half adders and a OR gate
(D) Two half adders and a AND gate
(E) Answer not known

137. A string of four bits is called as a

(A) Nibble
(B) Byte
(C) Both (A) and (B)
(D) None of the above
(E) Answer not known

138. Match the following :

List A	List B
(a) In TV broadcast, the sound signal is modulated in	1. FDM–FM
(b) LOS microwave radio relay links normally use a modulation format which is	2. VSB
(c) The modulator stage in a radio transmitter normally is	3. FM
(d) For TV broadcast, picture signal is modulated in	4. Class C

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

(E) Answer not known

139. In TV, the sound carrier is ———————— modulated and Video carrier is ———————— modulated

(A) Frequency, amplitude
(B) Frequency, frequency
(C) Amplitude, frequency
(D) Amplitude, Amplitude
(E) Answer not known

140. The value of total collector current in a CB circuit of a transistor is

(A) $I_C = \alpha\ I_E$
(B) $I_C = \alpha\ I_E + I_{CO}$
(C) $I_C = \alpha\ I_E - I_{CO}$
(D) $I_C = \beta\ I_E$
(E) Answer not known

141. Which of the following statements are true about Full–Wave Rectifier?

(1) Centre-tap is required on the transformer
(2) Much smaller transformers are required
(3) It is not suitable for high-voltage applications
(4) It has less PIV rating per diode

(A) (1) and (2)
(B) (2) and (3)
(C) (2) and (4)
(D) (1) and (4)
(E) Answer not known

142. When a graph between current through and voltage across a device is a straight line the device is referred to as ————————

(A) Linear
(B) Active
(C) Non linear
(D) Inactive
(E) Answer not known

143. The offset voltage of a germanium diode is

(A) 0.2 V (B) 0.6 V

(C) 0.8 V (D) 0.4 V

(E) Answer not known

144. The input frequency of a full wave rectifier is 100 Hz, then the output frequency will be

(A) 100 Hz (B) 50 Hz

(C) 200 Hz (D) 25 Hz

(E) Answer not known

145. The performance of operational amplifier with negative feedback _____

(A) Increase the input and output impedances

(B) Decrease the output impedance and increase bandwidth

(C) Increase the input impedance and bandwidth

(D) Does not affect the impedance and bandwidth

(E) Answer not known

146. The braking torque of induction type single phase energy meter is

(A) Directly proportional to flux

(B) Directly proportional to square of flux

(C) Inversely proportional to flux

(D) Inversely proportional to square of flux

(E) Answer not known

147. The voltage equation of a dc series motor is

where V = terminal voltage in volts

E_b = back emf of the motor in volts

I_a = armature current in amps

R_a = armature resistance,

R_{se} = series field resistance

(A) $V = E_b - I_a (R_a + R_{se})$ (B) $V = E_b - I_a R_a$

(C) $V = E_b + I_a R_a$ (D) $V = E_b + I_a (R_a + R_{se})$

(E) Answer not known

148. In measurement of real power, voltmeter and ammeter is not sufficient, become

(A) Voltage and current has to be measured simultaneously

(B) Value of power measured will be correct only if it is measured by a single instrument

(C) Phase angle between current and voltage also has to be measured

(D) Both current and voltage should interact to produce a torque, only then the value will be correct

(E) Answer not known

149. The spectrum of the sampled signal may be obtained without overlapping only if ———————— (Given f_s is the sampling rate and w is the highest frequency in the signal)

(A) $f_s \geq 2w$ (B) $f_s > w$

(C) $f_s < 2w$ (D) $f_s < w$

(E) Answer not known

150. In electrodynamometer type wattmeters, current coils designed for carrying heavy currents use standard wire or laminated conductors, to

(A) Reduce iron losses

(B) Reduce hysteresis losses

(C) Reduce eddy current losses in conductors

(D) Reduce iron and hysteresis losses

(E) Answer not known

151. Kirchhoff's point law state that, in any electrical network, the algebraic sum of ———————— is zero.

(A) The currents meeting at a junction

(B) The voltage meeting at a junction

(C) The leaving current at a junction

(D) The entering current at a junction

(E) Answer not known

152. A 3ϕ balanced γ – connected load has 400 V line to line voltage and 10A line current. What is the L–N voltage and phase current?

(A) 231 V, 5 A

(B) 400 V, 10 A

(C) 231 V, 10 A

(D) 400 V, 5 A

(E) Answer not known

153. Find the resistance of copper wire of 200 m long and 25 mm^2 cross section resistivity of copper is $1.72 \times 10^{-8} \Omega m$

(A) 1376 Ω

(B) 0.1376 Ω

(C) 13.76 Ω

(D) 1.376 Ω

(E) Answer not known

154. The real power of a single phase A.C. circuit is given by

(A) $VI \sin \phi$ (B) $VI \cos \phi$

(C) $\sqrt{3}\, VI \sin \phi$ (D) $\sqrt{3}\, VI \cos \phi$

(E) Answer not known

155. Which of the following relation is incorrect? Power factor is defined by

(A) $\dfrac{\text{Real power}}{\text{Apparent power}}$

(B) $\dfrac{\text{Resistance}}{\text{Impedance}}$

(C) $\dfrac{\text{Conductance}}{\text{Susceptance}}$

(D) $\dfrac{\text{KW}}{\text{KVA}}$

(E) Answer not known

156. In delta connection, the relationship between phase to line voltage and current are

(A) $V_p = V_L$ and $I_p = I_L / \sqrt{3}$

(B) $V_p = \sqrt{3}\, V_L$ and $I_p = I_L$

(C) $V_p = V_L$ and $I_p = \sqrt{3} I_L$

(D) $V_p = V_L / \sqrt{3}$ and $I_p = I_L$

(E) Answer not known

157. A device which operates in both the physical and the data link layer.

(A) Routers
(B) Gateways
(C) HUB
(D) Bridges
(E) Answer not known

158. A ———— provides long-distance transmission of data over large geographical areas that may comprise a country or a continent.

(A) Local Area Network
(B) Metropolitan Area Network
(C) Value Added Area Network
(D) Wide Area Network
(E) Answer not known

159. In client/server architecture, the client is also known as ———— and the server is also known as ————

(A) Back-end application, front-end application
(B) Front-end application, Router
(C) Front-end application, back-end application
(D) Router, back-end application
(E) Answer not known

160. In OSI model, the data link layer divides the stream of bits received from the network layer into manageable data units called

(A) Buffers
(B) Multiplexing
(C) Frames
(D) Data streams
(E) Answer not known

161. The IPV6 Protocol uses

(A) 64 bit address
(B) 32 bit address
(C) 128 bit address
(D) 128 byte address
(E) Answer not known

162. A ———— symbol is used to show the processing in the flow chart.

(A) Diamond
(B) Ellipse
(C) Arrow
(D) Rectangle
(E) Answer not known

163. In C language, the multi-line comment starts with ———— and terminates with ————.

(A) */, /*
(B) /*, */
(C) //, //
(D) /*, //
(E) Answer not known

164. ———— statement is used to terminate the execution of the loop in C language.

(A) Continue
(B) Stop
(C) Quit
(D) Break
(E) Answer not known

165. ———— is the lowest level of programming language where the information is represented as 0's and 1's

(A) Assembly language
(B) Machine language
(C) High level language
(D) Natural language
(E) Answer not known

166. An entity set that does not have sufficient attributes to form a primary key is termed as

(A) Strong entity set
(B) Weak entity set
(C) Null entity set
(D) Constrained entity set
(E) Answer not known

167. _____ feature fixes common misspelling as you type in MS-Word.

(A) Auto format
(B) Auto correct
(C) Auto spell
(D) Auto fill
(E) Answer not known

168. The smallest unit of data in a database is a

(A) Table
(B) Record
(C) Field
(D) File
(E) Answer not known

169. The operation performed by the DBMS to make a transactions permanent on a database is

(A) Commit
(B) Update
(C) Store
(D) Encrypt
(E) Answer not known

170. E-Governance is an application that transform

(A) Transparency
(B) Efficiency
(C) Accountability
(D) All of the above
(E) Answer not known

171. Device driver is required in

(A) Register
(B) Main memory
(C) Disk
(D) Cache
(E) Answer not known

172. The last phase of a compiler is

(A) Output analysis
(B) Intermediate code generation
(C) Code optimization
(D) Code generation
(E) Answer not known

173. Lexical analyzer represents the lexemes in the form of

(A) Token
(B) Alphabets
(C) Numbers
(D) String
(E) Answer not known

174. Operating systems, compilers and utilities for managing computer resources fall under the category of

(A) Software
(B) Free ware
(C) System software
(D) Firm ware
(E) Answer not known

175. A ———— is a hand-held device fitted with one or more buttons and shaped to sit conveniently under one's palm.

(A) Touch pad
(B) Keyboard
(C) Mouse
(D) Light pen
(E) Answer not known

176. Which unit of CPU is responsible for fetching instruction from memory?

(A) ALU
(B) Control unit
(C) Cache memory
(D) Register
(E) Answer not known

177. Formatting a disk means

(A) Installing OS on it
(B) Setting up sections on disk to store files in
(C) Cleaning the disk for any dust
(D) Erasing data stored on disk
(E) Answer not known

178. The circuit board in the computer to which the processor or CPU is connected is called as

(A) Hard disk
(B) RAM
(C) Mother board
(D) Ethernet card
(E) Answer not known

179. If a screw has ten threads with a pitch of 10 mm then the screw's lead distance is

(A) 1 mm
(B) 10 mm
(C) 100 mm
(D) 1000 mm
(E) Answer not known

180. A block of weight 100 N is placed on an inclined plane which makes angle of $\theta = 30°$ with the horizontal. The component of weight perpendicular to the inclined plane is

(A) 17.32 N
(B) 25 N
(C) 50 N
(D) 86.6 N
(E) Answer not known

181. Condition for redundant frame is (Notations are as usual)

(A) $M = 2j - 3$
(B) $M > 2j - 3$
(C) $M < 2j - 3$
(D) $M < 2j - 1$
(E) Answer not known

182. Coplanar forces are

(A) Line of action of all forces that are parallel to each other
(B) Line of action of all forces lie on the same plane
(C) Line of action of all force act along the same line
(D) Line of action of all forces pass through a single point
(E) Answer not known

183. In which system of units, length is expressed in metre.

(A) C.G.S. System of Units
(B) M.K.S. System of Units
(C) S.I. System of Units
(D) All these
(E) Answer not known

184. The 'x' and 'y' co-ordinates of the centroid of a quarter circular area of radius 'r' is

(A) $\left(\frac{r}{\pi}, \frac{r}{\pi}\right)$ (B) $\left(\frac{2r}{3\pi}, \frac{2r}{3\pi}\right)$

(C) $\left(\frac{4r}{3\pi}, \frac{4r}{3\pi}\right)$ (D) $\left(\frac{2r}{3\pi}, \frac{4r}{3\pi}\right)$

(E) Answer not known

185. The axis about which moments of areas are taken is known as

(A) Axis of moments (B) Axis of reference

(C) Centroid (D) Axis of symmetry

(E) Answer not known

186. If two forces P and Q are equal and are acting at an angle α between them, then the resultant is given by (R)

(A) $P\cos\frac{\alpha}{2}$ (B) $2P\cos\frac{\alpha}{2}$

(C) $P\sin\frac{\alpha}{2}$ (D) $2P\sin\frac{\alpha}{2}$

(E) Answer not known

187. Moment of total area about its own centroidal axis is

(A) Zero (B) Two times the area

(C) Three times the area (D) Four times the area

(E) Answer not known

188. A car is moving with a velocity of 15 m/s. The car is brought to rest by applying brakes in 5 seconds. The retardation is

(A) $-3\ m/s^2$ (B) $3\ m/s^2$

(C) $-30\ m/s^2$ (D) $30\ m/s^2$

(E) Answer not known

189. A lift descends with an acceleration of 0.5 m/sec^2 from the top floor of a multi-storied building. The time required to travel a distance of 25 m will be

(A) 5 sec (B) 8 sec

(C) 10 sec (D) 12 sec

(E) Answer not known

190. The stress in a body if suddenly loaded is ———— stress induced when the same load is applied gradually.

(A) One-half (B) Equal

(C) Twice (D) Four time

(E) Answer not known

191. The linear velocity (γ) of a moving particle along the circumference of a circle of radius "r" with a uniform angular velocity w radians /sec^2 will be given by

(A) $V = rw^2$ (B) $V = rw^3$

(C) $V = rw$ (D) $V = \frac{w}{r}$

(E) Answer not known

192. Moment of inertia of a square of side 12 mm about an axis passing through the centre of gravity is

(A) $\frac{12^3}{3}$ (B) $\frac{12^4}{3}$

(C) 12^3 (D) $\frac{12^3}{4}$

(E) Answer not known

193. A hollow square section has an external dimension of 4 cm and internal dimension of 2 cm. The moment of inertia about the horizontal axis passing through its centre is

(A) 16 cm^4 (B) 18 cm^4

(C) 20 cm^4 (D) 24 cm^4

(E) Answer not known

194. For an area whose boundaries are more simply described in rectangular coordinates than in polar coordinates. Its polar moment of inertia is easily calculated with the equation.

(A) $I_{xx} = I_{yy} + I_{zz}$ (B) $I_{zz} = I_{xx} + I_{yy}$

(C) $I_{yy} = I_{xx} + I_{zz}$ (D) $I_{xx} + I_{yy} + I_{zz} = 0$

(E) Answer not known

195. A velocity with which a particle is projected upwards, so that it will not return to the earth is named as

(A) Projectile velocity (B) Uniform velocity

(C) Escape velocity (D) Linear velocity

(E) Answer not known

196. First moment of a quantity about an axis or plane is algebraic sum of first moment of all elements of the quantity about the same axis or plane Hence for area, Qy is

(A) $\int x\, dL$ (B) $\int x\, dA$

(C) $\int \bar{x}\, dA$ (D) $\int y\, dA$

(E) Answer not known

197. If T_1 is tension in the belt on tight side, T_2, tension in the belt on slack side, μ-co-eff of friction , $\theta =$ angle of contact in radians, then

(A) $\frac{T_1}{T_2} = e^{-\mu\theta}$ (B) $\frac{T_1}{T_2} = e^{\mu\theta}$

(C) $\frac{T_2}{T_1} = e^{\mu\theta}$ (D) $\frac{T_1}{T_2} = e^{\mu+\theta}$

(E) Answer not known

198. Identify the type of friction occurs in all solid materials which are subjected to cyclical loading.

(A) Dry friction (B) Fluid friction

(C) Internal friction (D) All these

(E) Answer not known

199. Co-efficient of friction is the ratio of

(A) Force of friction to normal reaction between two bodies

(B) Force of friction to area between two bodies

(C) Force of limiting friction to area between two bodies

(D) Force of limiting friction to normal reaction between two bodies

(E) Answer not known

200. In a belt drive system, the tension acting on the tight side is T_1 and the tension acting on the slack side is T_2 and if 'V' is the velocity of the belt, then the power transmitted on the drive is

(A) $(T_2 - T_1)V$ (B) $(T_1 - T_2)V$

(C) $(T_1 - T_2)/V$ (D) $V/(T_1 - T_2)$

(E) Answer not known
