ENTRANCE EXAMINATION FOR ADMISSION, MAY 2011.

Ph.D. (GREEN ENERGY TECHNOLOGY)

COURSE CODE : 159

Register Number :

Signature of the Invigilator
(with date)

COURSE CODE : 159

Time : 2 Hours   Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.

2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.

3. Read each question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.

4. Avoid blind guessing. A wrong answer will fetch you −1 mark and the correct answer will fetch 4 marks.

5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.

6. Do not open the question paper until the start signal is given.

7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.

8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.

9. Use of Calculators, Tables, etc. are prohibited.

IMPORTANT :

Candidates please note :

There are 3 units in the question paper.

Mathematics (Unit I) Q. 1-50

Physics & Chemistry (Unit II) Q. 51 –100

Chemistry & Biology (Unit III) Q. 101 – 150

All Candidates must answer Unit I.

Candidates should select Unit II **or** Unit III **(not both)** depending on their specialization at post-graduate level.

UNIT I — GENERAL

(Compulsory)

1. Energy of a Photon is
   (A) hc/λ (B) $h\omega/\lambda$ (C) h/λ (D) E/λ

2. An electrical transformer works under the principle of
   (A) mutual induction
   (B) self induction
   (C) biased induction
   (D) coil induction

3. Piezoelectric effect is the production of electricity by
   (A) chemical effect
   (B) varying field
   (C) temperature
   (D) pressure

4. Visible light's wavelength range
   (A) $0.39 - 0.77$ mm
   (B) $0.39 - 0.77$ μ m
   (C) $0.39 - 0.77$ nm
   (D) $0.39 - 0.77$ cm

5. $A \times (B+C)$ is
   (A) $(C + A) \times B$
   (B) $(B \times A) + C$
   (C) $(A + B) \times C$
   (D) $(A \times B) + (A \times C)$

6. $\log_{10}4 + 2\log_{10}2$ is equal to
   (A) $4\log_{10}2$
   (B) $2\log_{10}4 + \log_{10}2$
   (C) $4 \log_{10}4$
   (D) $\log_{10}6$

7. If $a = e^b$ then which of the following is true?
   (A) $a = 1$ for $b = -\infty$
   (B) $a = 0$ for $b = -\infty$
   (C) $\log_e b = a$
   (D) $a = 1$ for $b = \infty$

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8. If $x > 1$ and $\dfrac{\sqrt{x}}{x^3} = x^m$ what is the value of m?

(A) $-\dfrac{3}{2}$ (B) $-\dfrac{5}{2}$ (C) 2   (D) -2

9. Find two numbers whose sum is 26 and whose product is 165

(A) 9 and 17   (B) 10 and 16   (C) 12 and 14   (D) 11 and 15

10. The mean of first ten even positive integers is

(A) 5   (B) 10   (C) 11   (D) 55

11. The solution to the equation $\ln(x) + \ln(2) = 3$ is

(A) $e^3 / \ln(2)$ (B) $e^3 / 2$ (C) $3^e / 2$ (D) $3 / \ln(2)$

12. The equation of a straight line that passes through point A(1,-1) and has a slope equal to -1 is

(A) $y = -x$ (B) $y = 1 - x$ (C) $y = 1/x$ (D) $y = x+1$

13. Rank of the matrix $\begin{pmatrix} i & 0 & 0 \\ 0 & i & 0 \\ 0 & 0 & i \end{pmatrix}$ where i is an imaginary number

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

14. In the gate given below what is the output C when the input A = 0,

(A) always 1   (B) always 0
(C) either 0 or 1   (D) cannot be predicted

15. What decimal number equivalent of the binary number $(1011)_2$

(A) 2022   (B) 10   (C) 0   (D) 11

16. What is the probability of getting 1 or 3 when rolling a dice

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

17. Material of gold particle of 1 mm diameter is transformed into 10 nm diameter size particles. Number of fold increase in surface area of the material is

(A) 10   (B) 10^6 (C) 10^{10} (D) 10^{12}

18. The half life of tritium is 12.5 yrs. If we start out with 1 g of tritium, after 25 years there will be

   (A) no tritium left   (B) ¼ g of tritium left

   (C) ½ g tritium left   (D) a total of 2 g of tritium left

19. What is the missing number in the series: 1, 1, 2, 6, 24, 120, ?, 5040

   (A) 360   (B) 720   (C) 1080   (D) 1440

20. A set of elements is said to be Group if it has

   (A) Closure property   (B) Associative

   (C) Identity and inverse   (D) All of the above

21. The force exerted on harmoning spring that makes a linear extension of 0.1 μ m from its equilibrium position. Spring constant is 0.1 piconewton/nanometer

   (A) 0.1 piconewton   (B) 1 piconewton

   (C) 10 piconewton   (D) 100 piconewton

22. The root of the equation $2x^2 + 3x - 14$ is

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

23. Equation of a circle passing through origin, having a radius of 4 units is

   (A) $4x^2 + 4y^2 - 16 = 0$ (B) $x^2 + y^2 - 16 = 0$

   (C) $x^2 + y^2 + 4xy + 16 = 0$ (D) $x^2 + y^2 - 16xy = 0$

24. If $x + e^x = t$ then dx/dt is

   (A) e^x (B) $1 + e^x$ (C) $1/(1 + e^x)$ (D) $x.e^x$

25. The coefficient matrix of the linear equation $5x-2y+c = 0$ is

   (A) [5 -2]   (B) [5 -2 0]   (C) [5 -2 1]   (D) [5 2 1]

26. The inner product of two orthogonal vectors A & B is

   (A) 1   (B) 0   (C) $|A|.|B|$ (D) $(|A|.|B|)/2$

27. The value of $e^{(i\pi/2)}$ is

   (A) 1   (B) -1 (C) i (D) $-\sqrt{3}/2$

28. When A is a matrix and if $A = A^T$ then A is

   (A) Real   (B) Unitary   (C) Symmetric   (D) Orthogonal

29. The function $f(x)=x^2-x$, at $x = 0.5$ has

(A) maxima   (B) minima   (C) saddle point   (D) salient point

30. Complex conjugate of $i / (1 - i)$ is

(A) $\frac{1}{2}(1+i)$ (B) $\frac{1}{2}(1-i)$ (C) $-\frac{1}{2}(1+i)$ (D) $-\frac{1}{2}(1-i)$

31. The force exerted on harmoning spring that makes a linear extension of 0.1 μm from its equilibrium position. Spring constant is 0.1 piconewton/nanometer

(A) 0.1 piconewton   (B) 1 piconewton

(C) 10 piconewton   (D) 100 piconewton

32. The root of the equation $2x^2 + 3x - 14$ is

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

33. Equation of a circle passing through origin, having a radius of 4units is

(A) $4x^2 + 4y^2 - 16 = 0$ (B) $x^2 + y^2 - 16 = 0$

(C) $x^2 + y^2 + 4xy + 16 = 0$ (D) $x^2 + y^2 - 16xy = 0$

34. If $x + e^x = t$ then dx/dt is

(A) e^x (B) $1 + e^x$ (C) $1/(1 + e^x)$ (D) $x.e^x$

35. When two vectors $A(i)$ and $B(j)$ are orthonormal then

(A) $A(i).B(j)=0$ (B) $A(i).B(j)=1$

(C) $A(i).B(j)=\delta_{ij}$ (D) None of the above

36. Circumference of an ellipse is given by

(A) πa^2 (B) πab^2 (C) πab (D) ab^2

37. $f(x) = U/V$, where U and V are independent variables. Then $f'(x)$ is

(A) U'/V' (B) $(U'V + V'U)/UV$

(C) $(U'V + V'U)/U^2$ (D) $(U'V + V'U)/V^2$

38. $\iint C.xdx$ where C is a constant, is equal to

(A) Cx^2 (B) $Cx^2/2 + C_2$ (C) $Cx^2/2 + C_2x$ (D) $Cx^3/6 + C_2x$

39. Det.(A.B.C.....N) is given by

(A) Det. A. Det. Det. C..........Det. N   (B) Det.A + Det.B + Det.C + ...Det.N

(C) (Det.A.Det.B.Det.....Det.N)/N   (D) (Det.A + Det.B + et.C + ...Det.N)N

40. Distance covered by a projectile in 30 seconds, launched at an initial speed of 30m/s with an acceleration of 10m/s² is

(A) 9000 m   (B) 5400 m   (C) 300 m   (D) 4500 m

41. Solution to the expression $y = \sqrt{(2+\sqrt{(2+\sqrt{(2+ .....)))}}}$ is

(A) 2   (B) $2+\sqrt{2}$ (C) $2 + (\sqrt{2})/2$ (D) $2\sqrt{2}$

42. Viscous drag force on an object of radius r, moving at a velocity of v m/s due to a medium of viscosity η is given by

(A) $6\pi\eta rv$ (B) $\eta^2 v\pi r$ (C) $6\pi\eta r$ (D) rv

43. $\int x^{-1}dx$ is,

(A) $x^{-2}/2$ (B) $-x^{-2}/2$ (C) $\log x$ (D) $\log (1/x)$

44. If $y = f(x)$, and if $\log(y)$ vs $\log(f(x))$ represent a straight line, then the slope of the line represent

(A) Power law exponent   (B) dy/dx

(C) Constant term in y=f(x)   (D) Singularity

45. If sum to n term of an arithmetic series is 210, then sum to (n-10) term is

(A) 105   (B) 55   (C) does not exist   (D) -210

46. The volume of the parallelepiped whose edges are represented by $\vec{a}=2\hat{i}-3\hat{j}+4\hat{k}$ $\vec{b}=\hat{i}+2\hat{j}-\hat{k}$ $\vec{c}=3\hat{i}-\hat{j}+2\hat{k}$ is

(A) 6   (B) 15   (C) 28   (D) 7

47. A field F is irrotational if

(A) grad F=0   (B) div F=0   (C) curl F=0   (D) grad F>0

48. S is a surface of constant value for the function f(x,y,z) then the gradient of f is

(A) normal to the level surface   (B) tangential to level surface

(C) arbitrary   (D) curvilinear to the level surface

49. The angle between the vectors $\vec{a} = 3\hat{i} + 6\hat{j} + 9\hat{k}$ and $\vec{b} = -2\hat{i} + 3\hat{j} + \hat{k}$ is

(A) 30°   (B) 45°   (C) 60°   (D) 90°

50. For the function $y = A \sin (\omega t)$, the amplitude and period, respectively are

(A) ωt and A   (B) A and ωt (C) $2\pi/\omega$ and A   (D) A and $2\pi\omega$

ANSWER ANY ONE OF THE UNIT II OR III

UNIT II — (PHYSICAL & CHEMICAL SCIENCES)

51. What is exothermic process?

    (A) A process that absorbs energy as heat

    (B) A process that both absorbs and releases as heat

    (C) A process that releases energy as heat

    (D) A process that exchanges mass

52. A planet in a distant solar system is 10 times more massive than the earth and its radius is 10 times smaller. Given that the escape velocity from the earth is 11 kms⁻1, the escape velocity from the surface of the planet would be

    (A) 1.1 kms^{-1} (B) 11 kms^{-1} (C) 110 kms^{-1} (D) 0.11 kms^{-1}

53. Refractive index of materials is approximately equal to square root of

    (A) electrical permittivity

    (B) magnetic permeability

    (C) electrical permittivity x magnetic permeability

    (D) susceptibility

54. The kinetic energy of molecules of liquid at room temperature and pressure is derived from

    (A) Latent heat of liquid   (B) Specific heat of liquid

    (C) Thermal energy fluctuations   (D) Phase transition

55. In a thermodynamic system, a closed system represents

    (A) System where there is no exchange of heat

    (B) System where there is no exchange of mass

    (C) System where there is no change in volume

    (D) System where the pressure remains constant

56. Which of the following is a solid-state laser?

    (A) He-Ne laser   (B) Nd:YAG laser

    (C) CO_2 laser   (D) Free electron laser

57. A quantum number is not associates with an atomic electron's

    (A) mass   (B) energy

    (C) spin   (D) orbital angular momentum

58. Evanescent field created under total internal reflection mode, has a characteristic penetration depth of the order of

   (A)   200 nm   (B)   200 μm   (C)   200 mm   (D)   200 m

59. Pauli's exclusion principle states that quantum mechanically

   (A)   Identical charges stay together

   (B)   Identical charges cannot stay together

   (C)   Identical charges recombine

   (D)   Identical charges generate photons

60. The following is the example of optical waveguide

   (A)   Optical fiber   (B)   Glass   (C)   Quartz   (D)   Silicon

61. Electric motor works under the

   (A)   Faraday's rule   (B)   Einstein's rule

   (C)   Fleming's left hand rule   (D)   Richard Feynman's rule

62. Inverter is a device that converts

   (A)   DC power to DC power   (B)   AC power to DC power

   (C)   DC power to AC power   (D)   Optical to electrical power

63. Conductivity of metal arises due to the presence of

   (A)   Free atoms   (B)   Free electrons

   (C)   Free holes   (D)   Impurities

64. The cyclotron frequency (ω_c) of an electron rotating under Lorenz force is equal to

   (A) B/m (B) ω/m (C) eB/m (D) e/m

65. Ferrite rods are used to sense the

   (A)   Optical signal   (B)   Microwave signal

   (C)   Electrical signal   (D)   Electromagnetic signal

66. The electron "gas" in a metal is not directly responsible for its

   (A)   electrical conductivity   (B)   thermal conductivity

   (C)   surface luster   (D)   strength

67. A superconducting material when placed in a magnetic field will

 (A) attract the magnetic field toward its centre

 (B) repel all the magnetic lines of forces passing through it

 (C) attract the magnetic field but transfer it into a concentrated zone

 (D) not influence the magnetic field

68. In a ferromagnetic material, susceptibility is

 (A) very small and positive

 (B) very small and negative

 (C) very large and positive

 (D) very large and negative

69. The depletion region in an open circuited p-n junction contains

 (A) electrons

 (B) holes

 (C) uncovered immobile impurity ions

 (D) neutralized impurity atoms

70. Light Emitting Diode (LED) is a semiconductor device in which the p-n junction is

 (A) reverse biased

 (B) forward biased

 (C) unbiased

 (D) none of these

71. The factor responsible for spontaneous polarization is

 (A) free electrons

 (B) atoms

 (C) permanent dipoles

 (D) none of these

72. A laser beam of wavelength 740 nm has coherence time 4×10^{-5}s. What is its coherence length?

 (A) 12 km (B) 2 km (C) 12 m (D) 2 m

73. A thermocouple is made from two metals, Antimony and Bismuth. If one junction is kept hot and other junction is kept cold then, an electric current will Answer

 (A) flow from Antimony to Bismuth at the cold junction

 (B) flow from Antimony to Bismuth at the hot junction

 (C) flow from Bismuth to Antimony at the cold junction

 (D) flow from Bismuth to Antimony at the hot junction

74. A block of mass 0.50 kg is moving with a speed of 2.00 m/s on a smooth surface. It strikes another mass of 1.00 kg and then they move together as a single body. The energy loss during the collision is

 (A) 0.16 J (B) 1.00 J (C) 0.67 J (D) 0.34 J

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75. Fluorescence occurs within

   (A) 10^{-5} s.   (B) 10^{-5} ms.   (C) 10^{-5} μs.   (D) 10^{-5} ns

76. Sky looks blue because the sun light is subjected

   (A) Rayleigh scattering   (B) Compton scattering

   (C) Diffraction of light   (D) Absorption of light

77. Optical fiber operates on the principle of

   (A) Total internal reflectance   (B) Tyndall effect

   (C) Photo-electric effect   (D) Laser technology

78. Light is produced in electric discharge lamps by

   (A) heating effect of current   (B) magnetic effect of current

   (C) ionization in a gas or vapor   (D) carbon electrodes

79. Lumen/watt is the unit of

   (A) Light flux   (B) Luminous intensity

   (C) Brightness   (D) Luminous efficiency

80. The ability of a microscope to reveal closely adjacent points as separate & distinct

   (A) Magnification   (B) Resolution

   (C) Power   (D) f-number

81. Which of the following arrangements will produce H_2 at cathode during electrolysis?

   (A) aqueous solution of NaCl using Pt electrodes

   (B) dil H_2SO_4 with copper electrodes

   (C) aqueous $AgNO_3$ with Ag electrodes

   (D) dil H_2SO_4 with Pt electrodes

82. Radioactive isotopes that have an excessive neutron-proton ratio generally exhibit which one of the following?

   (A) Alpha emission   (B) Beta emission

   (C) Positive capture   (D) K-capture

83. Water gas is an equimolar mixture of

   (A) CO and N_2 (B) CO and H_2O

   (C) CO_2 and N_2 (D) CO and H_2

84. Which of the following is destroying the ozone layer present in stratosphere?

    (A)   Oxides of nitrogen   (B) CH_4

    (C)   CFC   (D)   All of the above

85. IUPAC name of $K_3 Al(C_2O_4)_3$ is

    (A)   Potassium aluminium trioxalate

    (B)   Potassium aluminium (III) trioxalate

    (C)   Potassium aluminium trioxalate aluminate (III)

    (D)   Potassium aluminium tris(oxalate)aluminate (III)

86. Which one of the following bonds has the higher average bond energy (kcal/mole)?

    (A) $S = O$ (B) $C = C$ (C) $C \equiv N$ (D) $N \equiv N$

87. The reaction of erythro 1-bromo 1,2-diphenyl propane with alcoholic KOH gives

    (A)   (Z) –1,2 – diphenyl –1 – propene

    (B)   (E) –1,2 – diphenyl – 1 – propene

    (C)   Both (Z) and (E) – 1,2 – diphenyl –1 – propene

    (D)   1,2 – diphenyl – 1 – propanol

88. Which of the following does not have sp^2 hybridised carbon?

    (A)   Acetone   (B)   Acetic acid   (C)   Acetonitrile   (D)   Acetamide

89. The unit of second order reaction rate constant is

    (A) lit^{-1} mol sec^{-1} (B) lit^2 mol^2 sec^{-1} (C) lit $mol^{-1}sec^{-1}$ (D)   mol sec^{-1}

90. The units of rate and rate constant for a certain reaction are the same. The order of reaction is

    (A)   first   (B)   zero   (C)   second   (D)   third

91. When sucrose is oxidized with con. nitric acid, it gives

    (A)   Tartaric acid   (B)   Succinic acid   (C)   Oxalic acid   (D)   Laerulic acid

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92. For which one of the following processes is Inter System Crossing (ISC) essential?

    (A) Fluorescence   (B) Phosphorescence

    (C) Chemiluminescence   (D) Radioactive decay

93. For an ideal gas PV^r = Constant is

    (A) Adiabatic process   (B) Polytrophic process

    (C) Constant temperature process   (D) Isentrophic process

94. The correct configuration of $_{29}Cu$ is

    (A) $[Ar] 4s^1$ (B) $[Ar] 4s^2$ (C) $[Ar] 3d^{10} 4s^1$ (D) $[Ar] 3d^9 4s^2$

95.. Which molecule has the largest dipole moment?

    (A) HCl   (B) HI   (C) HBr   (D) HF

96. In an octahedral structure, the pair of d-orbitals involved in d^2sp^3 hybridization is?

    (A) $d_{x^2-y^2}, d_{z^2}$ (B) $d_{x^2-y^2}, d_{x^2}$ (C) d_{z^2}, d_{zx} (D) d_{xy}, d_{y^2}

97. Which of the following species is the strongest Bronsted –Lowry base in water?

    (A) NH_3 (B) NH_2^- (C) F^- (D) CO_3^{2-}

98. Camphor is often used in molecular weight determination because

    (A) It is high cryoscopic constant

    (B) It is readily available

    (C) It is volatile

    (D) It is a solvent for many organic substances

99. Pure silicon doped with phosphorus atom is an

    (A) metallic conductor   (B) n-type semi conductor

    (C) p-type semi conductor   (D) insulator

100. The relation between the solubility of a gas and its pressure is known as

    (A) Ostwald's law   (B) Raoult's law

    (C) Henry's law   (D) Distribution law

UNIT III — (BIOLOGICAL & CHEMICAL SCIENCES)

101. End-to-end length of a bacteriophage DNA having 48kbp is

   (A)   15.4μm   (B)   1.54μm

   (C)   1.50μm   (D)   150μm

102. Which of the following can be classified as second messenger molecule

   (A)   G protein   (B)   cyclic adenosine monophophate

   (C)   adenylecyclase   (D)   phospholipase

103. Which of the following is not an Antigen Presenting Cell?

   (A)   Monocytes   (B)   T cell

   (C)   Macrophage   (D)   Thymus epithelial cells

104. Secondary structure of a single strand DNA is

   (A)   Bubbles and knots   (B)   Hairpin & loops

   (C) α helix & β sheets   (D)   Minor grooves and double helix

105. Which one of the following is a neurotransmitter

   (A)   IP3   (B)   Acetyle choline

   (C)   Adenosine triphosphate   (D)   F-Actin

106. Number of solute molecules in one microlitre of one femtomolar solution will be approximately

   (A) 10^{21} (B) 10^9 (C) 6×10^8 (D)   600

107. Distal DNA sequences that help in the expression of a gene is referred as

   (A)   expresser   (B)   initiator

   (C)   attenuator   (D)   enhancer

108. Typical duration for cell division of a laboratory E. Coli strain is

   (A)   2 hours   (B)   200 minutes

   (C)   20 minutes   (D)   2 minutes

109. The macromolecules that require a template for synthesis are

   (A)   nucleic acids and carbohydrates   (B)   proteins and carbohydrates

   (C)   lipids and carbohydrates   (D)   proteins and nucleic acids

110. The polarity of the DNA chain is represented by

(A) 1'-3' (B) 3'-5'

(C) 1'-5' (D) 3'-1'

111. Sequence on a DNA molecules that are same on both strands when read in same direction are known as

(A) sticky sites (B) recognition sites

(C) consensus sequence (D) palindromes

112. T cells mature in the

(A) Thyroid gland (B) Bone marrow

(C) Thymus gland (D) Limph nodes

113. DNA sequences needed for division of eukaryotic chromatids during mitosis is

(A) telomere (B) centromere

(C) centrosome (D) kinetochore

114. The antibiotic chloramphenicol blocks the

(A) cell wall formation (B) transcription

(C) translation termination (D) polypeptide chain elongation

115. The class of green algae is classified as

(A) Phaeophyceae (B) Chlorophyceae

(C) Rhodophyseae (D) Solanaceae

116. Upper chambers of mammalian heart is called

(A) Ventricles (B) Atria

(C) Pericardium (D) Myocardium

117. In the blood pressure measurement, 120/80 represents

(A) systolic pressure/ diastolic pressure (B) diastolic/systolic pressure

(C) perstaltic/normal pressure (D) normal/peristaltic pressure

118. The harmone responsible for increase in altertness, pupilary dialation, and sweating is

(A) melatonin (B) thyroxine

(C) thymosin (D) adrenaline

119. Lactose upon digestion with lactase gives

    (A) Glucose + Sucrose   (B) Galactose + Fructose

    (C) Glucose + Galactose   (D) Glucose + Fructose

120. Double stranded DNA has absorption peak at

    (A) 220 nm   (B) 260 nm

    (C) 488 nm   (D) 620 nm

121. Time of flight mass spectrometer works on the principle of measurement of

    (A) Time of arrival of the molecule at the detector

    (B) Time of arrival of the electron at the detector

    (C) Time of arrival of ion at the detector

    (D) Time of arrival of proton at the detector

122. Psychrophiles are bacteria that grow in the temperature range of

    (A) $-10°$ C to $20°$ C   (B) $15°$ C to $45°$ C

    (C) $30°$ C to $75°$ C   (D) Above $100°$ C

123. In a monolayer assay, there are 100 plaques were counted on an average for aviral diluents sample of 0.1ml at 10^6 dilution. The plaque forming units (pfus) of the sample is

    (A) 10^9 pfus   (B) 10^7 pfus

    (C) 10^5 pfus   (D) 10^3 pfus

124. RNA Polymerase is an enzyme that

    (A) Translate RNA   (B) Replicate DNA

    (C) Transcribe DNA   (D) Replicate RNA

125. The residue which has least conformational hindrance and thus can covers most of the area of Ramachandran plot is

    (A) Gly   (B) Lys

    (C) Ala   (D) Pro

126. Autotrophic microbes

    (A) Releases CO_2 (B) Fixes CO_2

    (C) Releases O_2 (D) Fixes O_2

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127. Maximum number of electrons theoretically possible for a seventh principle shell is

(A) 7

(B) 49

(C) 80

(D) 98

128. Mass of 224 ml of N_2 at S.T.P on liquefaction will be

(A) 0.28 g

(B) 0.14 g

(C) 0.5 g

(D) 2.24 g

129. The unit of second order reaction rate constant is

(A) $lit^{-1} \, mol \, sec^{-1}$

(B) $lit^2 \, mol^2 \, sec^{-1}$

(C) $lit \, mol^{-1} sec^{-1}$

(D) $mol \, sec^{-1}$

130. Which of the following has zero dipole moment?

(A) ClF

(B) PCl_3

(C) $CFCl_3$

(D) SiF_4

131. What is the state of hybridization of carbon in carbanion?

(A) sp

(B) sp^3

(C) sp^2

(D) sp^2d

132. Which one of the following combination is best suitable to form semi-conductor?

(A) Cu + As

(B) Zn + Ge

(C) Ge + As

(D) Sb + As

133. Freon is

(A) CF_4

(B) CCl_3H

(C) CCl_2F_2

(D) CF_3H

134. The number of alpha and beta particles emitted when $_{84}^{218}Ra$ decays to a stable isotope $_{82}^{206}Pb$ respectively be

(A) 2 and 4

(B) 3 and 3

(C) 4 and 2

(D) 3 and 4

135. ESR spectroscopic studies involve the use of

(A) infrared radiations

(B) visible radiations

(C) ultraviolet radiations

(D) microwave radiations

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136. The temperature at which a compound melts into a liquid of the same composition as the solid is called the

(A) Congruent melting point

(B) In congruent melting point

(C) Peristaltic point

(D) Eutectic point

137. Besides CO2, other green house gas is

(A) N_2

(B) CH_4

(C) Ar

(D) He

138. Which pair of compound gives Tollen's test?

(A) Glucose and Fructose

(B) Sucrose and Glucose

(C) Hexanal and Acetophenone

(D) Fructose and sucrose

139. When sucrose is oxidized with con. nitric acid, it gives

(A) Tartaric acid

(B) Succinic acid

(C) Oxalic acid

(D) Laerulic acid

140. Which of the following electron transition is forbidden?

(A) $n \rightarrow \pi^*$

(B) $\pi - \pi^*$

(C) $n \rightarrow \sigma^*$

(D) none of the above

141. For which one of the following processes is intersystem crossing (ISC) essential?

(A) Fluorescence

(B) Phosphorescence

(C) Chemiluminescence

(D) Radioactive decay

142. The hydrated sodium sulphate is an example of

(A) one compound system

(B) two compound system

(C) three compound system

(D) four compound system

143. Hyperglycemia refers to

(A) Increased RBC count

(B) Increased cholesterol level

(C) Increased blood sugar level

(D) Increased urea level in blood

144. Okazaki fragment relates to

(A) DNA Primers for leading strand synthesis

(B) DNA fragment that help synthesis of lagging strand

(C) SiRNA fragments

(D) Partially synthesized mRNA

145. Epigenetic relates to

    (A)   Base pair mismatch due to mutation

    (B)   Cytosine deletion causing genetic disease

    (C)   Transformation of cytosine to Uracil

    (D)   Methylation of cytosine regulating gene expression

146. Type of function protein porin perform is

    (A)   Gene activations   (B)   Specific binding

    (C)   Transport   (D)   Degradation of proteins

147. Which of the following is the perfect ligand for avidin?

    (A)   Streptavidin   (B)   Biotin

    (C)   Nicotine   (D)   IP3

148. Gluconeogenesis is

    (A)   synthesis of glucose from non-carbohydrade precursors;

    (B)   synthesis of glucose from carbohydrade precursors;

    (C)   decomposition of glucose for energy;

    (D)   polymerization of glucose to form α – amylose

149. High resolution structure of a protein can be determined using

    (A)   High resolution phase contrast microscope

    (B)   UV-Visible spectrometer

    (C)   X-ray diffractometer

    (D)   Atomic Force Microscope

150. Genetic engineering process where a section of DNA is inserted into a plasmid or phage chromosome and then allowed to replicate to produce more copies of the DNA is called

    (A)   Expression   (B)   Translation

    (C)   Replication   (D)   Cloning

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