



Centurion
UNIVERSITY

CENTURION UNIVERSITY ENTRANCE EXAMINATION

CUEE-2014

QUESTION BOOKLET

23939

INSTRUCTIONS

Roll Number

Please read the following instructions carefully:

1. CUEE is a common entrance for the students aspiring to take admissions in B Tech (Regular), B. Tech (Agril.Engg.)and B.Sc (Ag) courses of the university.
2. The test is of objective type. The candidates interested for B.Tech (Regular) & B. Tech (Agril.Engg.) have to answer PCM section with a total of 180 questions.

Section-I:-Physics,

Section-II:-Chemistry,

Section-III:-Mathematics,

Candidates interested for BSc (Ag) course are required to answer PCB section with a total of 180 questions.

Section-I:-Physics,

Section-II:- Chemistry,

Section-IV:- Biology.

The Total timing allotted is 3.00 hours.

3. Mention carefully your Roll Number, Question Booklet number in the OMR Answer Sheet and sign at the appropriate place. Write your Roll number on the question booklet.
4. Strictly follow the instructions given by the Centre Supervisor/ Room Invigilator and those given on the Question Booklet.
5. Please mark the answer ONLY with a Black ball point pen on the OMR Answer Sheet.
6. Candidates are not allowed to carry any papers, notes, books, log table, calculators or calculating devices, scanning devices, communication devices like cellular phone/pager/duopen, etc. to the Examination hall. Any candidate found using, or in possession of such unauthorized material, indulging in copying or impersonation, adopting unfair means is liable to be

summarily disqualified and may be subjected to penal action.

7. After finishing the examination, hand over the complete question booklet and OMR Answer Sheet to the Room Invigilator. DO NOT carry the question booklet or any part there of outside the examination room. Doing so, is a punishable offence.
8. Each objective type question is followed by four responses. Your task is to choose the correct/best response. and mark your response by darkening the relevant CIRCLE with black Ball Point Pen on the OMR Answer Sheet and do not on the Question Booklet.
9. All questions are COMPULSORY. There will be "No NEGATIVE MARKING".
10. Completely darken the CIRCLE so that the number inside the CIRCLE is not visible. Darken ONLY ONE CIRCLE for each answer as shown in the example below. The CORRECT and the WRONG method of darkening the CIRCLE on the OMR sheet is given below.

CORRECT Method



WRONG Method



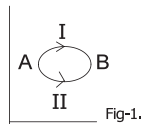
11. DO NOT make any stray marks anywhere on the OMR answer sheet. DO NOT fold or wrinkle the OMR answer sheet. Rough work MUST NOT be done on the answer sheet. Use your test booklet for this purpose.

12. In case you notice any questions missing in the question booklet, kindly bring it to the attention of the Invigilator.

Spece for rough work

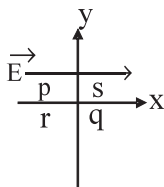
SECTION I - PHYSICS

- The dimensions of magnetic flux is
(a) $[ML^3T^{-2}A^{-1}]$ (b) $[ML^2T^{-2}A^{-1}]$
(c) $[ML^2]$ (d) $[M^2L^2T^2]$
- If $\vec{a} \cdot \vec{b} = [\vec{a} \times \vec{b}]$, then the angle θ between \vec{a} and \vec{b} will be
(a) 60° (b) 45°
(c) 75° (d) 90°
- Rectangular components of vectors \vec{A} and \vec{B} are (A_x, A_y, A_z) and (B_x, B_y, B_z) respectively. If $\vec{A} + \vec{B} = 0$, then
(a) $A_x = -B_x, A_y = -B_y, A_z = -B_z$
(b) $A_x = B_x, A_y = B_y, A_z = B_z$
(c) $A_x > B_x, A_y > B_y, A_z > B_z$
(d) $A_x < B_x, A_y < B_y, A_z < B_z$
- Two balls of masses 2 kg and 4 kg respectively are dropped from rest simultaneously from the top of a 60m tall tower. After a fall of 20m each towards the earth, their respective kinetic energies will be in the ratio of (use $g = 10 \text{ m/s}^2$)
(a) $\sqrt{2}:1$ (b) $1:4$
(c) $1:2$ (d) $1:\sqrt{2}$
- A body of mass 2 kg is rotating with angular speed 2π rad/s in a circular path of radius 1 m. The centripetal force on body will be
(a) 16π (b) 8π
(c) $16\pi^2$ (d) $8\pi^2$
- A car is moving along a straight horizontal road with a speed V_0 . If the coefficient of friction between the tyres and the road is μ , then shortest distance in which the car can be stopped is
(a) $\frac{V_0^2}{2\mu g}$ (b) $\frac{V_0}{\mu g}$
(c) $\left[\frac{V_0}{\mu g}\right]^2$ (d) $\frac{V_0}{\mu}$
- Two particles, each of mass 0.25 kg, move towards each other with speed 3 m/s and 1 m/s respectively, collide and stick together. The speed of the system of two particles after collision will be
(a) 1 m/s (b) 2 m/s
(c) 4 m/s (d) 3 m/s
- A solid sphere is given a kinetic energy E. What fraction of this kinetic energy is associated with rotation?
(a) $3/7$ (b) $5/7$
(c) $1/2$ (d) $2/7$
- A light wire is wound on a hollow cylinder of radius 40 cm. Mass of the cylinder is 3 kg. Force of 30 N is applied on the wire. The angular acceleration of the cylinder is
(a) 25 rad/s^2 (b) 30 rad/s^2
(c) 35 rad/s^2 (d) 2.5 rad/s^2
- If the density of earth is doubled keeping its radius constant, then acceleration due to gravity g on the surface of the earth would become approximately equal to:
(a) 20 m/s^2 (b) 10 m/s^2
(c) 5 m/s^2 (d) 2.5 m/s^2
- A body executes SHM of amplitude A. When the body is at a distance of $A/\sqrt{2}$ from its equilibrium position, the correct relation between KE and PE will be
(a) KE is equal to PE (b) KE is 2 times of PE
(c) KE is 3 times of PE (d) KE is half of PE
- Four rods of a given material have dimensions length ℓ , cross sectional diameter d as specified below. Which of them will undergo maximum elongation when subjected to a given force?
(a) $\ell=1\text{m}, d=2\text{mm}$ (b) $\ell=1\text{m}, d=1\text{mm}$
(c) $\ell=2\text{m}, d=1\text{mm}$ (d) $\ell=2\text{m}, d=2\text{mm}$
- An aero-plane gets its upward lift due to a phenomenon described by the
(a) Archimedes principle (b) Bernoulli's principle
(c) Buoyancy principle (d) Pascal law
- A gas is taken from state A to state B, first through path I and then again through path II. The change in internal energy of the gas as result of these two processes is ΔU_1 and ΔU_2 respectively. Then:
(a) $\Delta U_1 > \Delta U_2$ (b) $\Delta U_1 < \Delta U_2$
(c) $\Delta U_1 = \Delta U_2$ (d) $\Delta U_1 = \Delta U_2 = 0$



- The efficiency of a Carnot engine is 0.6. It rejects 20 J of heat to the sink. The work done by the engine is:
(a) 20 J (b) 30 J
(c) 33.3 J (d) 50 J
- A black body is heated to temperature 1000 K. Stefan's constant is $\sigma = 5.67 \times 10^{-8} \text{ W/(m}^2\text{K}^4)$. Energy radiated per unit area per unit time by the body is
(a) $8.5 \times 10^4 \text{ W/m}^2$ (b) $10.6 \times 10^4 \text{ W/m}^2$

- (c) $5.67 \times 10^4 \text{ W/m}^2$ (d) $4.5 \times 10^4 \text{ W/m}^2$
17. A piece of steel has a length of 60 cm at 25°C . When heated to 60°C its length increases by 0.035 cm. Its coefficient of linear expansion is closest to .
 (a) $1.67 \times 10^{-6}/^\circ \text{C}$ (b) $16.7 \times 10^{-5}/^\circ \text{C}$
 (c) $16.7 \times 10^{-6}/^\circ \text{C}$ (d) $16.7 \times 10^{-8}/^\circ \text{C}$
18. A sound wave given by $y = A_0 \sin(\omega t - kx)$ is reflected from a solid wall with 64% of its amplitude. Then, equation of the reflected wave is
 (a) $\frac{64}{100} A_0 \sin(\omega t + kx)$ (b) $\frac{70}{100} A_0 \sin(\omega t + kx)$
 (c) $64 A_0 \sin(\omega t + kx)$ (d) None of the above
19. Light travelling from a transparent medium to air undergoes total internal reflection at an angle of incidence of 45° . Then refractive index of the medium is closest to
 (a) 1.51 (b) 1.31
 (c) 1.12 (d) 1.41
20. A convex lens of focal length $f = 16 \text{ cm}$ produces a real image of magnification $m = 2$. Distance of the object from the lens is
 (a) 12 cm (b) 16 cm
 (c) 24 cm (d) 48 cm
21. As shown in the figure, there is a uniform electric field along the direction of +ve X-axis. Which of the following pair of points are equipotential?



- (a) ps (b) pq
 (c) rs (d) qs

22. Three bulbs of power $B_1 = 40 \text{ W}$, $B_2 = 60 \text{ W}$ and $B_3 = 100 \text{ W}$ are connected to a 220 V power supply in parallel. What is the decreasing order of their brightness?
 (a) $B_1 > B_2 > B_3$ (b) $B_2 > B_3 > B_1$
 (c) $B_3 > B_1 > B_2$ (d) $B_3 > B_2 > B_1$
23. ECE of two monovalent metals A and B are $7.2 \times 10^{-4} \text{ g}$ and $1.2 \times 10^{-4} \text{ g}$ respectively. A current deposits 14.4 g of metal A during a time interval. Amount of metal B that will be deposited by the same current during the same time is:
 (a) 1.2 g (b) 14.4 g
 (c) 2.4 g (d) 1.8 g

24. A mixed beam of He^+ and O^{2+} ions enters a region of uniform magnetic field at right angles to the field. The kinetic energy of all ions is the same. Mass of $\text{He}^+ = 4 \text{ amu}$ and mass of $\text{O}^{2+} = 16 \text{ amu}$. Then
 (a) He^+ ions will be deflected more than those of O^{2+}
 (b) He^+ ions will be deflected less than those of O^{2+}
 (c) All the ions will be deflected equally.
 (d) No ions will be deflected.
25. If the vertical component of earth's magnetic field at some point is 0.5 oersted and dip angle is 60° , then the magnitude of earth's magnetic field at that point is
 (a) 1 oersted (b) $\frac{\sqrt{3}}{2}$ oersted
 (c) 2 oersted (d) $\frac{1}{\sqrt{3}}$ oersted
26. A step up transformer has turn ratio of 1:25. The current through its secondary coil is 2A. The current through the primary is
 (a) 25 A (b) 100 A
 (c) 50 A (d) 20 A
27. In a hydrogen atom, the electron jumps from 4th orbit to 2nd orbit. If the Rydberg constant $R = 10^7 \text{ m}^{-1}$, then the frequency of the corresponding radiation is
 (a) $5.62 \times 10^{14} \text{ Hz}$ (b) 10^{14} Hz
 (c) $5.62 \times 10^{12} \text{ Hz}$ (d) 10^{12} Hz
28. A radioactive nucleus ${}_{92}\text{X}^{235}$ undergoes two radioactive decay processes and becomes the nucleus ${}_{90}\text{Y}^{231}$. The emitted particles and the correct sequence of their emission is
 (a) 1 β particle and then 1 γ ray photon
 (b) 1 α particle and then 1 γ ray photon
 (c) 1 β particle and then 1 α particle
 (d) 1 α particle and then 1 β particle
29. In a transistor configuration the β parameter is:
 (a) I_b/I_c (b) I_c/I_b
 (c) I_c/I_e (d) I_e/I_c
30. Which is not an electromagnetic wave?
 (a) Radio wave (b) α ray
 (c) X-ray (d) β ray

31. A monochromatic light of wave length 5890 \AA in vacuum enters a glass slab of refractive index 1.5. Its wavelength in the glass will be closest to
 (a) 9372 \AA (b) 7932 \AA
 (c) 7548 \AA (d) 3927 \AA
32. The rest mass of a particle is m_0 . It moves with a uniform speed of $0.6c$ and acquires a relativistic mass m . The ratio m/m_0 is
 (a) $5/4$ (b) $4/5$
 (c) $5/3$ (d) $3/5$
33. What is the condition for the vectors $3\hat{i} + 4\hat{j} - 2\hat{k}$ $2\hat{i} + P\hat{j} + Q\hat{k}$ to be parallel?
 (a) $P = 8/3$ and $Q = 4/3$ (b) $P = -8/3$ and $Q = 4/3$
 (c) $P = -8/3$ and $Q = -4/3$ (d) $P = 8/3$ and $Q = -4/3$
34. A force $3n\hat{i} + 2n\hat{j} + 4n\hat{k}$ acts on a body for 3 seconds and produces a displacement of $3m\hat{i} + 2m\hat{j} + 5m\hat{k}$. The power delivered is .
 (a) 9 watts (b) 10 watts
 (c) 11 watts (d) 12 watts
35. Which of the following is an example of motion for which both the acceleration and velocity are negative? We follow the sign convention of upward is positive.
 (a) A body dropped from a height
 (b) A body thrown upwards
 (c) A body sliding down a slope
 (d) A body at rest
36. The dimensional formula of a physical quantities Q is $M^2 L^2 T^{-3}$. The errors in measuring the quantities M, L and T Respectively are 3%, 4% and 5%. The maximum percentage error that occurs in measuring the quantity Q is
 (a) 10% (b) 12%
 (c) 29% (d) 60%
37. Which of the following physical quantities remains constant in an elastic collision?
 (I) Momentum (II) Kinetic energy
 (a) Only I (b) Only II
 (c) Both I and II (d) Neither I nor II
38. Which physical quantity does the area between force (F) Vs. displacement (s) graph and s – axis represent?
 (a) Impulse (b) work
 (c) Force (d) Power
39. When a body of mass m is to be moved with uniform velocity up a rough inclined plane which makes an angle θ with the horizontal then the force F to be applied is given by
 (a) $m(\sin \theta + \mu_k \cos \theta)$ (b) $mg(\mu_k \sin \theta + \cos \theta)$
 (c) $mg(\sin \theta + \mu_k \cos \theta)$ (d) $m(\mu_k \sin \theta + \cos \theta)$
40. On which of the following factors does the moment of inertia depend?
 I. Mass of the body
 II. The position of the axis of rotation
 III. The distribution of the mass of the body about the axis
 (a) Only I (b) I and II only
 (c) I and III only (d) I, II and III
41. A 20gm particle moves in simple harmonic motion with a frequency of 6 oscillations per second and amplitude of 8 cm. The total distance the particle moves during one oscillation and its r.m.s. speed are closest to
 (a) 32 cm; 212.5cm/s (b) 0,212.5cm/s
 (c) 192 cm; 32cm/s (d) 0.32 cm; 0 cm/s
42. A motor cyclist rides vertically in a hollow sphere of radius 250m. The minimum speed required so that he does not lose contact with sphere at the highest point is closest to
 (a) 35 m/s (b) 49 m/s
 (c) 49.49 m/s (d) 63 m/s
43. A spherical soap droplet is blown into 10^6 smaller droplets of equal radius by an atomizer. The total surface energy increases by a factor of
 (a) 99 (b) 100
 (c) 101 (d) none of these
44. A steel wire of length 40cm is stretched to increase its length by 0.6cm. Find the lateral strain in the wire if the Poisson's ratio for steel is 0.19
 (a) 0.285 (b) 0.0285
 (c) 0.00285 (d) 0.000285
45. Water flows through a horizontal tube of diameter 12cm and length 2 km at the rate of 20 liters/s. The pressure difference between the two end of the tube is close to ($\zeta = 0.01$ poise for water).
 (a) 5kpa (b) 50kpa
 (c) 0.5kpa (d) 0.05kpa
46. When a metal washer is heated, which of the following characteristics' of the washer will increase?
 I. Internal diameter,
 II. Volume, III. Mass
 IV. Density

- (a) Only I (b) I and II only
(c) II and III (d) II and IV
47. A nonviscous incompressible fluid flows in a horizontal tube. The pressure at the inlet is 5 times the pressure at the outlet. In comparison to the inlet, the kinetic energy per unit volume at the outlet.
- (a) decreases by a factor of 4
(b) increases by a factor of 4
(c) decreases by a factor of 6
(d) increases by a factor of 6
48. On what factors does the critical angle of a medium depend ?
- I. speed of light in the medium
II. speed of light in air
III. purity of medium
- (a) I only (b) II only
(c) I and II (d) Neither I nor II
49. If the refractive index of diamond is 2, the speed of light in diamond is ($c = 3 \times 10^8$ m/s)
- (a) 1.25×10^8 m/s (b) 1.5×10^8 m/s
(c) 1.75×10^8 m/s (d) 1.52×10^8 m/s
50. Which of the following is one of the conditions required for a wave propagating in a medium to get reflected?
- I. Medium is continuous
II. Medium ends abruptly at any point
- (a) Only I (b) only II
(c) I and II (d) Neither I nor II
51. What happens to the fundamental frequency of a stretched string fixed at both ends when its linear density becomes $1/9$ of its initial value?
- (a) New frequency is double its initial value
(b) New frequency is half its initial value
(c) New frequency is triple its initial value
(d) New frequency is $1/3$ its initial value
52. What happens to the weight of a body when it is charged positively?
- (a) Decreases (b) Increases
(c) Remains constant
(d) Decreases and increases alternatively
53. Find the balance length in a meter bridge if the resistances in the left and right gaps are in the ratio of 5:3.
- (a) 65.2 cm (b) 62.5 cm
(c) 52.6 cm (d) 56.2 cm
54. What happens to the capacitance of a parallel plate capacitor with circular plates if the radius of its plates is tripled?
- (a) Increases by 9 times
(b) Decreases by 9 times
(c) remains constant
(d) decreases by 3 times
55. The flux through a coil changes by 240 Weber in 20 seconds. What is the induced e.m.f?
- (a) 48 V (b) 480 V
(c) 4800 V (d) 12 V
56. As two circular coils approach each other, what happens to the co-efficient of mutual inductance between them?
- (a) Increases (b) Decreases
(c) Remains same
(d) Decreases and increases alternatively
57. A cylindrical metallic rod of length ℓ and radius r was stretched to a length of 4ℓ , while maintaining its cylindrical shape and volume. Its electrical resistance R will
- (a) decrease by a factor of 4
(b) decrease by a factor of 16
(c) increase by a factor of 4
(d) increase by a factor of 16
58. What is the ratio of velocities of a proton, a deuteron and an α -particle when they are accelerated by same potential difference?
- (a) $1:1:\sqrt{2}$ (b) $1:\sqrt{2}:1$
(c) $1:1:\sqrt{3}$ (d) $\sqrt{2}:1:1$
59. A man standing between two parallel cliffs fires a gun. He hears the first echo after 3 seconds and the next after 6 seconds. What is the distance between the cliffs? Velocity of sound in air is 350 m/s.
- (a) 1050 m (b) 1575 m
(c) 2100 m (d) 3150 m
60. In normal operation of a transistor
- (I) emitter- base junction is forward biased.
(II) emitter-base junction is reverse biased
(III) collector -base junction is reverse biased
(IV) collector- base junction is forward- biased
- (a) only II is true (b) only III is true
(c) only I & IV are true (d) only I & III are true.

SECTION II-CHEMISTRY

61. The number of possible alkynes with molecular formula

C_5H_8 is

- (a) 3 (b) 4
(c) 5 (d) 6

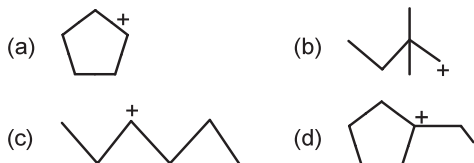
62. The number of optical isomers formed by hydrogenation of the compound, $(CH_3)_2C=CHCH_3$ are

- (a) 0 (b) 1
(c) 2 (d) 3

63. The correct increasing order of the reactivity of halides for SN_1 reaction is

- (a) $CH_3-CH_2-X < (CH_3)_2-CH-X < CH_2=CH-CH_2-X < PhCH_2-X$
(b) $(CH_3)_2-CH-X < CH_3-CH_2-X < CH_2=CH-CH_2-X < PhCH_2-X$
(c) $PhCH_2-X < (CH_3)_2-CH-X < CH_3-CH_2-X < CH_2=CH-CH_2-X$
(d) $CH_2=CH-CH_2-X < PhCH_2-X < (CH_3)_2-CH-X < CH_3-CH_2-X$

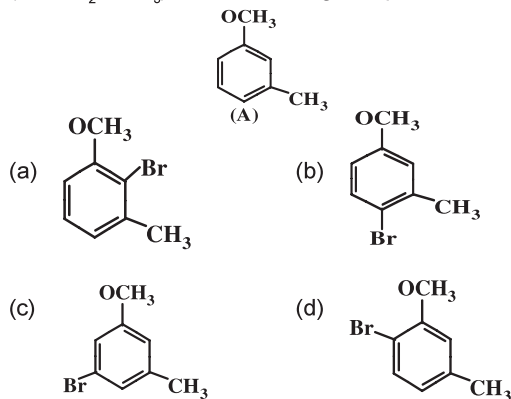
64. Consider the following carbocations and decide which is the most stable one?



65. 3-phenylpropene on reaction with HBr gives (as a major product)

- (a) $C_6H_5CH_2CH(Br)CH_3$
(b) $C_6H_5CH(Br)CH_2CH_3$
(c) $C_6H_5CH_2CH_2CH_2Br$
(d) $C_6H_5CH(Br)CHCH_2$

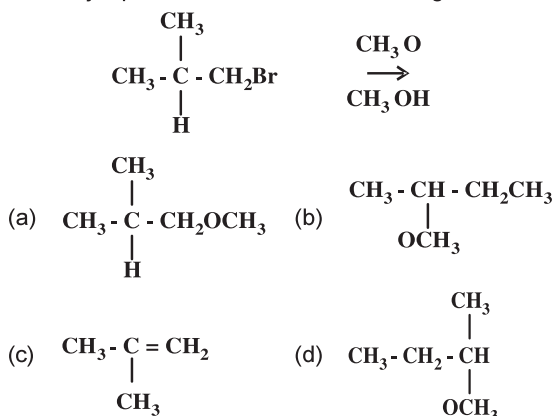
66. The major product obtained on the monobromination (with $Br_2/FeBr_3$) of the following compound A is



67. Which of the following is least reactive in a nucleophilic substitution reaction?

- (a) $(CH_3)_3C-Cl$ (b) $CH_2=CHCl$
(c) CH_3CH_2Cl (d) $CH_2=CHCH_2Cl$

68. The major product formed in the following reaction is



69. The compound which gives the most stable carbonium ion on dehydration is

- (a) $(CH_3)_2CHCH_2OH$
(b) $(CH_3)_3COH$
(c) $CH_3CH_2CH_2CH_2OH$
(d) $CH_3CH(OHCH_2CH_3)$

70. Phenol is less acidic than

- (a) o-nitrophenol (b) p-methylphenol
(c) methanol (d) ethanol

71. The best reagent to convert pent-3-en-2-ol into pent-3-en-2-one is

- (a) acidic permanganate
(b) acidic dichromate
(c) chromic anhydride in glacial acetic acid
(d) pyridinium chloro-chromate

72. Nitrosoamines $R_2N-N=O$ are insoluble in water. On heating them with conc. H_2SO_4 . They give secondary amines. The reaction is called.

- (a) Fries's reaction (b) Etard's reaction
(c) Liberman reaction (d) Perken's reaction

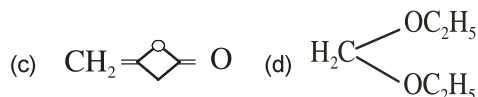
73. Reaction of cyclohexanone with dimethylamine in the presence of catalytic amount of an acid forms a

compound if water during the reaction is continuously removed. The compound formed is generally known as:

- (a) a Schiff's base (b) an enamine
(c) an imine (d) an amine

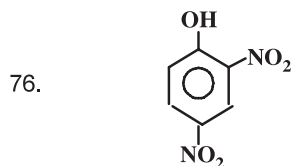
74. $\text{CH}_3\text{CO}_2\text{C}_2\text{H}_5$ on reaction with sodium ethoxide in ethanol gives A, which on heating in the presence of acid gives B. Compound B is

- (a) $\text{CH}_3\text{COCH}_2\text{COOH}$ (b) CH_3OCH_3



75. The reaction,
 $\text{CH}_3 - \text{CH} = \text{CH}_2 \xrightarrow[\text{H}^+]{\text{CO} - \text{H}_2\text{O}} \text{CH}_3 - \underset{\text{COOH}}{\text{CH}} - \text{CH}_2$

- is known as :
 (a) Koch reaction (b) Kolbe's reaction
 (c) Wurtz reaction
 (d) Clemmensen reaction



It is obtained when

- (a) m-dinitrobenzene is treated with alkaline potassium ferri cyanide.
 (b) 2, 4-diaminophenol is oxidized with CHCl_3 and H_2O_2
 (c) m-dinitrobenzene is treated with conc. H_2SO_4
 (d) phenol is carefully nitrated under the influence of a nitrating mixture

77. Iodine test is shown by :

- (a) starch (b) glycogen
(c) polypeptides (d) glucose

78. Cellulose is a polymer of

- (a) glucose (b) fructose
(c) ribose (d) sucrose

79. Absolute alcohol is prepared by

- (a) fractional distillation (b) Kolbe's method
(c) Vacuum distillation (d) Azeotropic distillation

80. Which of the following is the best scientific method to test presence of water in a liquid?

- (a) taste
(b) smell
(c) use of litmus paper
(d) use of anhydrous copper sulphate

81. What percentage of oxygen is present in the compound $\text{CaCO}_3 \cdot 3\text{Ca}_3(\text{PO}_4)_2$?

- (a) 23.3% (b) 45.36%
(c) 41.94% (d) 17.08%

82. An aqueous solution of ethanol has density 1.025 g/mL and it is 2 M. What is the molality of this solution?

- (a) 1.79 (b) 2.143
(c) 1.951 (d) None of these

83. The ratio of velocity of the electron in the third and fifth orbit of Li^{2+} would be :

- (a) 3 : 5 (b) 5 : 3
(c) 25 : 9 (d) 9 : 25

84. The probability of finding electrons in d_{xy} orbital is:

- (a) along X - and Y - axis
(b) along x - and Z - axis
(c) along Y - and Z - axis
(d) at an angle of 45° with X-axis

85. Which of the following statements about kinetic energy (KE) is true?

- (a) All objects moving with the same velocity have the same KE.
 (b) The KE of a body will quadruple if its velocity doubles.
 (c) As the velocity of a body increases, its KE decreases.
 (d) The KE of a body is independent of its mass.

86. Kinetic energy and pressure of a gas of unit are related as:

- (a) $P = \frac{2E}{3}$ (b) $P = \frac{3E}{2}$
(c) $P = \frac{E}{2}$ (d) $P = 2E$

87. Temperature of 1 mole of a gas is increased by 2°C at constant pressure, work done is :

- (a) R (b) 2R
(c) R/2 (d) 3R

88. For a process to be spontaneous at constant T&P
- $(G)_{\text{system}}$ must be negative
 - $(G)_{\text{system}}$ must be positive
 - $(S)_{\text{system}}$ must be positive
 - $(S)_{\text{system}}$ must be negative
89. For the reaction the value of $\text{CO(g)} + \text{Cl}_2(\text{g}) \rightleftharpoons \text{COCl}_2(\text{g})$
- $\frac{K_c}{K_p}$ is equal to : :
- \sqrt{RT}
 - RT
 - $\frac{1}{RT}$
 - 1.
90. One mole of pure ethyl alcohol was treated with one mole of pure acetic acid at 25°C. One-third of the acid changes into ester at equilibrium. The equilibrium constant for the reaction will be :
- $\frac{1}{4}$
 - 2
 - 3
 - 4
91. 99% of a first order reaction was completed in 32 minutes when 99.9% of the reaction will complete:
- 50 min
 - 46 min
 - 48 min
 - 49 min
92. In the radioactive decay
- $${}_Z^A X \longrightarrow {}_{Z+1}^A Y \longrightarrow {}_{Z-1}^{A-4} Z \longrightarrow {}_{Z-1}^{A-4} Z$$
- (High Energy) (Low Energy)
- the sequence of the radiation emitted is :
- α, β, γ
 - γ, α, β
 - β, γ, α
 - β, α, γ
93. Which salt can furnish H^+ ion in its aqueous solution?
- NaH_2PO_2
 - Na_2HPO_3
 - Na_2HPO_4
 - All of these
94. If degree of ionization is 0.01 of decimolar solution of weak acid HA then pKa of acid is
- 2
 - 3
 - 5
 - 7
95. Passage of a current for 548 seconds through a silver coulometer results in the deposition of 0.746 g of silver. What is the current (in A)?

- 1.22
 - 1.16
 - 1.07
 - 1.00
96. If x is specific resistance (in S⁻¹cm) of the electrolyte solution and y is the molarity of the solution, then ρ_m (in S cm²mol⁻¹) is given by :
- $\frac{1000x}{y}$
 - $1000 \frac{y}{x}$
 - $\frac{1000}{xy}$
 - $\frac{xy}{1000}$
97. The degree of dissociation of an electrolyte is α and its van't Hoff factor is i. The number of ions obtained by complete dissociation of 1 molecule of the electrolyte is :
- $\frac{i + \alpha - 1}{\alpha}$
 - $i - \alpha - 1$
 - $\frac{i - 1}{\alpha}$
 - $\frac{i + 1 + \alpha}{1 - \alpha}$
98. The osmotic pressures of equimolar solutions of urea, BaCl_2 and AlCl_3 will be in the order:
- $\text{AlCl}_3 > \text{BaCl}_2 > \text{urea}$
 - $\text{BaCl}_2 > \text{AlCl}_3 > \text{urea}$
 - $\text{urea} > \text{BaCl}_2 > \text{AlCl}_3$
 - $\text{BaCl}_2 > \text{urea} > \text{AlCl}_3$
99. In the face centered cubic unit cell, the radius of atoms in terms of edge length (A) of unit cell is :
- $a/2$
 - $a/\sqrt{2}$
 - $a/2\sqrt{2}$
 - $\sqrt{3}a/4$
100. If the anions (A) form hexagonal closest packing and cations (C) occupy only 2/3 octahedral voids in it, then the general formula of the compound is:
- CA
 - CA_2
 - C_2A_3
 - C_3A_2
101. The volume of gases NH_3 , CO_2 and H_2 adsorbed by one gram of charcoal at 300 K are in :
- $\text{H}_2 > \text{CO}_2 > \text{NH}_3$
 - $\text{NH}_3 > \text{H}_2 > \text{CO}_2$
 - $\text{NH}_3 > \text{CO}_2 > \text{H}_2$
 - $\text{CO}_2 > \text{NH}_3 > \text{H}_2$
102. The gold numbers of protective colloids A, B, C and D are 0.04, 0.004, 10 and 40 respectively. The protective powers of A, B, C and D are in the order :
- $A > B > C > D$
 - $B > A > C > D$
 - $D > C > A > B$
 - $D > C > B > A$

103. Second ionization potential of Li, Be and B is in the order
 (a) $Li > Be > B$ (b) $Li > B > Be$
 (c) $Be > Li > B$ (d) $B > Be > Li$
104. Born-Haber cycle can be used to estimate:
 (a) Lattice energy of ionic crystals
 (b) Electron gain enthalpy
 (c) Electronegativity
 (d) Both (a) and (b)
105. Which of the following does not contain any coordinate bond?
 (a) H_3O^+ (b) BF_4^-
 (c) HF_2^- (d) NH_4^+
106. Which is not correctly matched?
 (a) XeO_3 Trigonal bipyramidal
 (b) ClF_3 bent T shape
 (c) $XeOF_4$ Square pyramidal
 (d) XeF_2 Linear shape
107. A Pt complex of ammonia and chlorine produces four ions per molecule in the solution is :
 (a) $[Pt(NH_3)_5Cl]Cl_3$ (b) $[Pt(NH_3)_6]Cl_4$
 (c) $[Pt(NH_3)_2Cl_4]$ (d) $[Pt(NH_3)_4Cl_2]Cl_2$
108. Which is low spin complex :
 (a) $[Fe(CN)_6]^{3-}$ (b) $[Co(NO_2)_6]^{3-}$
 (c) $[Mn(CN)_6]^{3-}$ (d) All of these
109. Electromagnetic separation is used in the concentration of :
 (a) Copper pyrite (b) Bauxite
 (c) Cassiterite (d) Cinnabar
110. Aluminium is used as a reducing agent in the reduction of :
 (a) Cr_2O_3 (b) SnO_2
 (c) ZnO (d) HgO
111. Reaction of $Zn(OH)_2$ with $NaOH$ produces :
 (a) Na_2ZnO_2 (b) ZnO
 (c) Na_2O (d) None of these
112. Among the carbonates of alkali metals which one has highest thermal stability?
 (a) Cs_2CO_3 (b) Rb_2CO_3
 (c) K_2CO_3 (d) Na_2CO_3
113. At high temperature, nitrogen combines with CaC_2 to give :
 (a) calcium cyanide (b) calcium cyanamide
 (c) calcium carbonate (d) calcium nitride
114. The gaseous product(s) expected at room temperature by reaction of sodium borohydride and boron trifluoride under anhydrous conditions is/are:
 (a) H_2 (b) B_2H_6 and H_2
 (c) B_2H_6 (d) BH_2F and H_2
115. Among NH_3 , PH_3 , AsH_3 and SbH_3 which one is a stronger reducing agent?
 (a) NH_3 (b) PH_3
 (c) AsH_3 (d) SbH_3
116. Heating of ammonium dichromate produces :
 (a) NH_3 , Cr_2O_3 and H_2O
 (b) N_2 , Cr_2O_3 and H_2O
 (c) NO , CrO_3 and H_2O
 (d) N_2O , CrO_3 and H_2O
117. On heating $ZnCl_2 \cdot 2H_2O$, the compound obtained is :
 (a) $ZnCl_2$ (b) $Zn(OH)_2$
 (c) ZnO (d) ZnH_2
118. The correct order of H-M-H bond angle is :
 (a) $NH_3 < PH_3 < SbH_3 < BiH_3$
 (b) $AsH_3 < SbH_3 < PH_3 < NH_3$
 (c) $NH_3 < PH_3 < BiH_3 < PH_3$
 (d) $BiH_3 < SbH_3 < AsH_3 < PH_3$
119. The bond angles of NH_3 , NH_4^+ and NH_2^- are in the order :
 (a) $NH_2^- > NH_3 > NH_4^+$
 (b) $NH_4^+ > NH_3 > NH_2^-$
 (c) $NH_3 > NH_2^- > NH_4^+$
 (d) $NH_3 > NH_4^+ > NH_2^-$
120. Amongst NO_3^- , AsO_3^{3-} , CO_3^{2-} , ClO_3^- , SO_3^{2-} and BO_3^{3-} , the non-planar species are :
 (a) CO_3^{2-} , SO_3^{2-} , BO_3^{3-}
 (b) AsO_3^{3-} , ClO_3^- , SO_3^{2-}
 (c) NO_3^- , CO_3^{2-} , BO_3^{3-}
 (d) SO_3^{2-} , NO_3^- , BO_3^{3-}

SECTION III - MATHEMATICS

121. Let,
 $S = \{x \mid x \text{ is a positive multiple of 3 less than } 100\}$
 $P = \{x \mid x \text{ is a prime number less than } 20\}$.
 Then, $n(s) + n(p)$ is _____.
- (a) 34 (b) 31
 (c) 33 (d) 30
122. Two finite sets have m and n elements. The number of subsets of the first set is 112 more than of the second set. The values of m and n are respectively,
- (a) 4, 7 (b) 7, 4
 (c) 4, 4 (d) 7, 7
122. The domain of the function F defined by
- $$F(x) = \frac{1}{\sqrt{x-|x|}} \text{ is } \underline{\hspace{2cm}}.$$
- (a) \mathbb{R} (b) \mathbb{R}^+
 (c) \mathbb{R}^- (d) None of these
124. If $[x]^2 - 5[x] + 6 = 0$, where $[\cdot]$ denote the greatest integer function, then
- (a) $x \in [3, 4]$ (b) $x \in [2, 3]$
 (c) $x \in [2, 3]$ (d) $x \in [2, 4]$
125. If A and B be two sets such that A and B have 2 and 5 elements respectively. Then the number of one to one functions from A to B is _____
- (a) 10 (b) 20
 (c) 0 (d) 100
126. The value of $\cos^2 48^\circ - \sin^2 12^\circ$ is
- (a) $\frac{\sqrt{5+1}}{8}$ (b) $\frac{\sqrt{5-1}}{8}$
 (c) $\frac{\sqrt{5+1}}{5}$ (d) $\frac{\sqrt{5+1}}{2\sqrt{2}}$
127. Number of solutions of the equation $\tan x + \sec x = 2 \cos x$ lying in the interval $[0, 2\pi]$ is
- (a) 0 (b) 1
 (c) 2 (d) 3
128. If A lies in the second quadrant and $3 \tan A + 4 = 0$, then the value of $2 \cot A - 5 \cos A + \sin A$ is equal to _____
- (a) $-\frac{53}{10}$ (b) $\frac{23}{10}$
 (c) $\frac{37}{10}$ (d) $\frac{7}{10}$
129. The amplitude of $\sin \frac{\pi}{5} + i(1 - \cos \frac{\pi}{5})$ is _____
- (a) $\frac{2\pi}{5}$ (b) $\frac{\pi}{5}$
 (c) $\frac{\pi}{15}$ (d) $\frac{\pi}{10}$
130. The real value of θ for which the expression $\frac{1+i \cos \theta}{1-2i \cos \theta}$ is a real number is _____
- (a) $n\pi + \frac{\pi}{4}$ (b) $n\pi + (-1)^n \frac{\pi}{4}$
 (c) $2n\pi \pm \frac{\pi}{4}$ (d) None of these
131. Number of solutions of the equation $z^2 + |z|^2 = 0$ is _____
- (a) 1 (b) 2
 (c) 3 (d) Infinitely many
132. x and b are real numbers. If $b > 0$ and $|x| > b$, then
- (a) $x \in (-b, \infty)$ (b) $x \in (-\infty, b)$
 (c) $x \in (-b, b)$ (d) $x \in (-\infty, -b) \cup (b, \infty)$
133. The number of parallelograms that can be formed from a set of four parallel lines intersecting another set of three parallel lines is _____
- (a) 6 (b) 18
 (c) 12 (d) 9
134. The number of triangles that are formed by choosing the vertices from a set of 12 points, seven of which on the same line is _____
- (a) 105 (b) 15
 (c) 175 (d) 185
135. The sum of the digits in the unit place of all the numbers formed with the help of 3, 4, 5 and 6 taken all at a time is

- (a) 432 (b) 108
(c) 36 (d) 18
136. The number of terms in the expansion of $(a+b+c)^n$, where $n \in N$ is _____
(a) $\frac{(n+1)(n+2)}{2}$ (b) $n+1$
(c) $n+2$ (d) $(n+1)n$
137. The ratio of the coefficient of x^{15} to the term independent of x in $\left(x^2 + \frac{2}{x}\right)^{15}$ is _____
(a) 12:32 (b) 1:32
(c) 32:12 (d) 32:1
138. If the coefficients of 2nd, 3rd and 4th terms in the expansion of $(1+x)^n$ are in $A \cdot P$, then the value of n is _____
(a) 2 (b) 7
(c) 11 (d) 14
139. The minimum value of $4^x + 4^{1-x}$, $x \in R$ is _____
(a) 2 (b) 4
(c) 1 (d) 0
140. If 9 times the 9th term of an $A \cdot P$ is equal to 13 times the 13th term, then the 22nd term of the $A \cdot P$ is _____
(a) 0 (b) 22
(c) 220 (d) 198
141. If a, b, c are positive integers then the value of the expression $(a+b)(b+c)(c+a)$ is _____
(a) $= 8abc$ (b) $> 8abc$
(c) $< 8abc$ (d) $= 4abc$
142. The ratio in which the line $3x+4y+2=0$ divides the distance between the lines $3x+4y+5=0$ and $3x+4y-5=0$ is _____
(a) 1:2 (b) 3:7
(c) 2:3 (d) 2:5
143. For specifying a straight line, how many geometrical parameters should be known?
(a) 1 (b) 2
(c) 4 (d) 3
144. A point equidistant from the lines $4x+3y+10=0$, $5x-12y+26=0$ and $7x+24y-50=0$ is _____
(a) (1, -1) (b) (1, 1)
(c) (0, 0) (d) (0, 1)
145. The eccentricity of the hyperbola whose latus rectum is 8 and conjugate axis is equal to half of the distance between the foci is _____
(a) $\frac{4}{3}$ (b) $\frac{4}{\sqrt{3}}$
(c) $\frac{2}{\sqrt{3}}$ (d) None of these
146. The equation of the ellipse whose focus is (1, -1), the directrix line $x-y-3=0$ and eccentricity $\frac{1}{2}$ is _____
(a) $7x^2 + 2xy + 7y^2 - 10x + 10y + 7 = 0$
(b) $7x^2 + 2xy + 7y^2 + 7 = 0$
(c) $7x^2 + 2xy + 7y^2 + 10x - 10y - 7 = 0$
(d) None
147. Equation of the circle which passes through (3, 6) and touches the axes is _____
(a) $x^2 + y^2 + 6x + 6y + 3 = 0$
(b) $x^2 + y^2 - 6x - 6y - 9 = 0$
(c) $x^2 + y^2 - 6x - 6y + 9 = 0$
(d) None of these
148. If $F(x) = \begin{cases} \frac{\sin[x]}{[x]}, & [x] \neq 0 \\ 0, & [x] = 0 \end{cases}$, where $[\cdot]$ denotes the greatest integer function, then $\lim_{x \rightarrow 0} F(x)$ is equal to _____
(a) 1 (b) 0
(c) -1 (d) None of these
149. 6 boys and 6 girls sit in a row at random. The probability that all the girls sit together is _____
(a) $\frac{1}{432}$ (b) $\frac{12}{431}$
(c) $\frac{1}{132}$ (d) None of these
150. If $|\vec{a}| = 5$, $|\vec{a} - \vec{b}| = 8$ and $|\vec{a} + \vec{b}| = 10$ then $|\vec{b}|$ is _____
(a) 1 (b) $\sqrt{57}$
(c) 3 (d) None of these

151. The sum of two unit vectors is a unit vector. The magnitude of their difference is _____

- (a) 2 (b) $\sqrt{3}$
 (c) $\sqrt{2}$ (d) 1

152. The line $\frac{x+3}{3} = \frac{y-2}{-2} = \frac{z+1}{1}$ and the plane $4x+5y+3z-5=0$ intersect at a point

- (a) (3, 1, -2) (b) (3, -2, 1)
 (c) (2, -1, 3) (d) (-1, -2, -3)

153. The shortest distance between two straight lines

given by $\frac{x-4}{1} = \frac{y+1}{2} = \frac{z-0}{-3}$ and

$\frac{x-1}{2} = \frac{y+1}{4} = \frac{z-2}{-5}$ is _____

- (a) $\frac{2}{\sqrt{5}}$ (b) $\frac{3}{\sqrt{5}}$
 (c) $\frac{6}{\sqrt{5}}$ (d) None of these

154. The distance of the point (-1, -5, -10) from the point of intersection of the line

$\frac{x-2}{3} = \frac{y+1}{4} = \frac{z-2}{12}$ and the plane $x - y + z = 5$

is _____

- (a) 10 (b) 8
 (c) 21 (d) 13

155. The number of vectors of unit length perpendicular to vectors $\vec{a} = (1,1,0)$, $\vec{i}, \vec{e} = \hat{i} + \hat{j}$ and

$\vec{b} = (0,1,1)$, $\vec{i}, \vec{e} = \hat{j} + \hat{k}$ is _____

- (a) 1 (b) 2
 (c) 3 (d) None of these

156 Let $\vec{a}, \vec{b}, \vec{c}$ be the position vectors of three vertices A, B, C or a triangle ABC respectively. Then the area of this triangle is given by

- (a) $\vec{a} \times \vec{b} + \vec{b} \times \vec{c} + \vec{c} \times \vec{a}$ (b) $\frac{1}{2}(\vec{a} \times \vec{b}) \cdot \vec{c}$
 (c) $\frac{1}{2}|\vec{a} \times \vec{b} + \vec{b} \times \vec{c} + \vec{c} \times \vec{a}|$ (d) None of these

157. $g(x) = xf(x)$ where $f(x) = \begin{cases} x \sin \frac{1}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$

At $x = 0$

- (a) g is differentiable but f is not continuous
 (b) g is differentiable while f is not continuous
 (c) both f and g are differentiable
 (d) g is differentiable but f is not continuous

158. The maximum value of $f(x) = \frac{x}{4+x+x^2}$ on

[-11] is _____

- (a) $-\frac{1}{4}$ (b) $-\frac{1}{3}$
 (c) $\frac{1}{6}$ (d) $\frac{1}{5}$

159. If $f(x) = \frac{x}{\sin x}$ and $g(x) = \frac{x}{\tan x}$ where

$0 < x \leq 1$, then in this interval

- (a) both $f(x)$ and $g(x)$ are increasing functions
 (b) both $f(x)$ and $g(x)$ are decreasing functions
 (c) $f(x)$ is an increasing function
 (d) $g(x)$ is an increasing function

160. If $x+y=k$ is normal to $y^2 = 12x$, then k is

- (a) 3 (b) 9
 (c) -9 (d) -3

161. The minimum value of $2(x^2-3)^2+27$

- (a) 2^{27} (b) 2
 (c) 1 (d) None of these

162 $\int x^6 \sin(5x^7) dx = \frac{k}{5} \cos(5x^7)$, $x \neq 0$, then

- (a) $k = 7$ (b) -7
 (c) $k = \frac{1}{7}$ (d) $-\frac{1}{7}$

163 $\int e^{\tan^{-1}x} \left(1 + \frac{x}{1+x^2}\right) dx$ is equal to _____

- (a) $xe^{\tan^{-1}x} + c$ (b) $\frac{1}{2}xe^{\tan^{-1}x} + c$
 (c) $e^{\tan^{-1}x} + c$ (d) $\frac{1}{2}e^{\tan^{-1}x} + c$

164. $\int_0^{\pi/2} \frac{2^{\sin x}}{2^{\sin x} + 2^{\cos x}} dx$ is _____

(a) 2 (b) π
(c) $\pi/2$ (d) $\pi/4$

165. $I = \int_0^{\pi/2} \frac{\cos x dx}{(1 + \sin x)(2 + \sin x)}$ is _____

(a) $\log \frac{3}{4}$ (b) $\log \frac{4}{3}$
(c) $\log 4$ (d) $\log 3$

166. The area of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ is _____

(a) $\frac{25\pi}{4}$ (b) 12π
(c) 7π (d) 3π

167. A solution of the differential equation

$\left(\frac{dy}{dx}\right)^2 - x \frac{dy}{dx} + y = 0$ is _____

(a) $y = 2$ (b) $y = 2x$
(c) $y = 2x - 4$ (d) $y = 2x^2 - 4$

168. If $\int_0^{100\pi} \sqrt{1 - \cos 2x} dx = 200K$, then K is equal to _

(a) $2\sqrt{2}$ (b) π
(c) $\sqrt{3}$ (d) $\sqrt{2}$

169. A coin is tossed 10 times. The probability of getting exactly six heads is _____

(a) $\frac{512}{513}$ (b) $\frac{105}{512}$
(c) $\frac{100}{153}$ (d) $10C_4 \cdot 6!$

170. Number of divisors of the form $4n + 2, (n \geq 10)$ of the integer 240 is _____

(a) 4 (b) 8
(c) 10 (d) 3

171. The number of different matrices that can be formed with elements 0,1,2 or 3 each matrix having 4 elements is _____

(a) 3×2^4 (b) 2×4^4
(c) 3×4^4 (d) 4^4

172. The distance between the planes $x + 2y + 3z + 7 = 0$ and $2x + 4y + 6z + 7 = 0$ is _____

(a) $\frac{\sqrt{7}}{2\sqrt{2}}$ (b) $\frac{7}{2}$
(c) $\frac{\sqrt{7}}{2}$ (d) $\frac{7}{2\sqrt{2}}$

173. Let $\vec{a} = \alpha\hat{i} + \beta\hat{j} + \gamma\hat{k}$ and $\hat{k} \times (\hat{k} \times \vec{a}) = \vec{a}$. If (α, β, γ) lies on the plane $x + y + z = 2$ then γ is equal to _____

(a) 1 (b) 2
(c) 3 (d) 0

174. The line passing through the points (5, 1, a) and (3, b, 1) crosses the YZ plane at the point

$\left(0, \frac{17}{2}, \frac{-13}{2}\right)$, then _____

(a) $a = 6, b = 4$ (b) $a = 8, b = 2$
(c) $a = 2, b = 8$ (d) $a = 4, b = 6$

175. If $A = \begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$, then the value of

$(|A|) (|AdjA|)$ is _____

- (a) a^3 (b) a^6
 (c) a^9 (d) a^{27}

176. If the entries in a 3x3 determinant are either 0 or 1, then the greatest value of this determinant is _____

- (a) 1 (b) 2
 (c) 3 (d) 9

177. Let $\omega = -\frac{1}{2} + i\frac{\sqrt{3}}{2}$, then the value of the

determinant $\Delta = \begin{vmatrix} 1 & 1 & 1 \\ 1 & -1 - \omega^2 & \omega^2 \\ 1 & \omega^2 & \omega^4 \end{vmatrix}$ is _____

- (a) 3ω (b) $3\omega(\omega - 1)$
 (c) $3\omega^2$ (d) $3\omega(1 - \omega)$

178. If $A = \begin{bmatrix} 1 & k \\ 0 & 1 \end{bmatrix}$, then $A^n =$ _____

- (a) $\begin{bmatrix} n & k \\ 0 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} n & k^n \\ 0 & n \end{bmatrix}$
 (c) $\begin{bmatrix} 1 & nk \\ 0 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & k^n \\ 0 & 1 \end{bmatrix}$

179. The number of triangles which can be formed from 12 points out of which 7 are collinear is _____

- (a) 105 (b) 210
 (c) 175 (d) 185

180. If ${}^{15}C_{3r} = {}^{15}C_{r+3}$, then $r =$ _____

- (a) 2 (b) 3 (c) $\frac{1}{3}$ (d) $\frac{3}{2}$

—000—

SECTION-IV BIOLOGY

181. Which one of the following is a semiautonomous organelle?
a) Ribosome b) Endoplasmic Reticulum
c) Mitochondria d) Golgi bodies
182. Which of the following has no membrane?
a) Golgi bodies b) Ribosome
c) Chloroplast d) Nucleus
183. In the anaphase of mitosis
a) Chromosomes are in the middle of the cell
b) Chromosomes are at one pole
c) Chromosomes move away towards the poles from the middle
d) There are no chromosomes
184. At which stage of prophase of meiosis the crossing over takes place?
a) Zygotene b) Pachytene
c) Leptotene d) Diplotene
185. Swelling of wooden doors during rainy season is due to
a) Osmosis b) Absorption
c) Imbibition d) endosmosis
186. Stomata open in the daytime due to
a) Increase in water potential
b) Decrease in water potential
c) Decrease in p^H
d) Light
187. Water absorption in roots mainly takes place in which zone of root?
a) zone of elongation b) root hair zone
c) Root epidermis d) Maturation zone
188. The sun loving plants are referred to as
a) Halophytes b) Heliophytes
c) Heterotrophs d) sciophytes
189. Transpiration pull in plants occur when there is
a) Open stomata, humid air, well irrigated soil
b) Open stomata, hot air, well irrigated soil
c) Closed stomata, humid air, poorly irrigated soil
d) Closed stomata, dry soil, poorly irrigated soil
190. In plants food materials are translocated through
a) Xylem b) phloem
c) Pith d) bark
191. The term "wood" refers to
a) primary xylem b) secondary xylem
c) protoxylem d) metaxylem
192. Which one of the following is important in electron transport system?
a) Ubiquinone b) Acetyl CoA
c) Tricarboxylic acid d) Fericyanide
193. Which of the following is not formed during glycolysis?
a) Pyruvate b) NADH
c) ATP d) FADH
194. The respiratory quotient during cellular respiration would depend on
a) The nature of enzyme involved
b) The nature of the substrate
c) The amount of carbon dioxide released
d) The amount of oxygen utilised
195. The chief role of cytokinin is
a) to check abscission b) to check senescence
c) to mobilize solutes
d) to check senescence and to mobilize solutes from part to other
196. Vernalin is supposed to
a) induce vegetative growth
b) induce reproductive growth
c) induce secondary growth
d) induce none of these
197. Enzymes generally have
a) Same p^H and temperature optima
b) Same p^H but different temperature optima
c) different p^H but same temperature optima
d) different p^H and temperature optima
198. Genetic information in human beings is stored in
a) DNA b) RNA
c) both DNA and RNA d) none of above
199. The place for keeping and studying dry plants is called
a) Arboreum b) Vasculum
c) Herbarium d) museum
-

-
200. which one of the following has a doubtful biological status
a) Bacteria b) Viruses
c) Blue-green algae d) None of the above
201. Cyanobacteria is the member of
a) Fungi b) protozoa
c) Monera d) Pteridophytes
202. Diffused nucleus found in
a) Bacteria b) virus
c) fungi d) Algae
203. Greenhouse effect refers to
a) ability of atmosphere to retain water vapor
b) ability of certain atmospheric gases to trap heat and keep the planet relatively warm
c) ability of cloud to scatter electromagnetic radiation
d) none of the above
204. Lignin is a component of the secondary cell walls of
a) epidermis b) collenchyma
c) sclerenchyma d) parenchyma
205. The sequence of energy flow through a food chain is
a) producers higher order consumers primary consumers.
b) higher order consumers primary consumers producers.
c) primary consumers higher order consumers producers.
d) producers primary consumers higher order consumers.
206. Each step of food chain represents
a) food web b) sere
c) trophic level d) consumers
207. Mineral-biogeochemical cycles are
a) hydrological cycle b) gaseous cycles
c) carbon cycle d) sedimentary cycles
208. Incomplete burning of petrol or diesel in vehicles creates..... gas which is very poisonous .
a) Carbon dioxide b) Carbon monoxide
c) Methane d) Ozone
209. A major part of air pollution load lies in:
a) Troposphere b) Stratosphere
c) Thermosphere d) Ionosphere
210. Which one is the major polluted state of our country?
a) Delhi b) Kolkata
c) Mumbai d) Chennai
211. What makes you, "you" ?
a) Cytology b) genetics
c) Physiology d) anatomy
212. The father of modern genetics is
a) Mendel b) Bateson
c) De Vries d) Punnett
213. One of the following branch applicable to both plants and animals is
a) Osteology b) ichthyology
c) Agrology d) taxonomy
214. Living organisms are
a) self replicating b) self evolving
c) self regulating d) all of these
215. Which of the following is not a fish
a) Hippocampus b) Torpedo
c) Petromyzin d) Mystus
216. Which one of the following pair is correctly matching
a) Vitamin A-Night blindness
b) Vitamin K-Beri beri
c) Vitamin C- Pellagra
d) Vitamin E- Scurvy
217. Bowman's capsules are all embedded in
a) hilum of kidney b) cortex of kidney
c) pyramids of kidney d) medulla of kidney
218. Protoplasm is a
a) heterogenous system b) colloidal system
c) polyphasic colloidal system d) homogenous system
219. The cranium of brain is consists of
a) 14 bones b) 8 bones
c) 10 bones d) 32 bones
220. Sigmoid notch is found in
a) radius b) ulna
c) humerus d) femur
-

-
221. Which part of nephron is impermeable to salts ?
- a) DCT
 - b) PCT
 - c) ascending limb of loop of Henle
 - d) descending limb of loop of Henle
222. Blood enters into heart due to
- a) contraction of auricle
 - b) contraction of ventricle
 - c) relaxation of auricle
 - d) relaxation of ventricle
223. Erythropoiesis refers to formation of
- a) lymphocytes in blood
 - b) white blood cell
 - c) red blood cell
 - d) blood platelets
224. Murmur is a disorder of
- a) heart valves
 - b) AV Node
 - c) SA Node
 - d) pulmonary vein
225. Brunner's gland are found in
- a) duodenum
 - b) colon
 - c) ileum
 - d) stomach
226. Bitter taste buds are present in
- a) on posterior part of tongue
 - b) at the tip
 - c) on the ventral side
 - d) on the lateral side
227. Development of a man during foetal life is controlled by
- a) pituitary gland
 - b) pancreas
 - c) thyroid gland
 - d) thymus gland
228. The capacity of human stomach to release gastric juice per day is
- a) 3.5ml to 4ml
 - b) 1.5ml to 2ml
 - c) 1 to 2 litres
 - d) 2 to 3 litres
229. Which one of the following controls blood pressure
- a) adrenal
 - b) thyroid
 - c) thymus
 - d) corpus luteum
230. Which one of the following hormones is primarily responsible for the development of ovarian follicles prior to ovulation?
- a) Human chorionic gonadotropin
 - b) Estradiol
 - c) Follicle-stimulating hormone
 - d) Leutenizing hormone
231. Part of eye which is devoid of blood vessel
- a) Retina
 - b) Choroid
 - c) Cornea
 - d) Sclera
232. Jacobson's organ is responsible for
- a) touch
 - b) smell
 - c) vision
 - d) taste
233. Respiration is controlled by
- a) cerebellum
 - b) medulla oblongata
 - c) Olfactory lobes
 - d) hypothalamus
234. Which one of the following cranial nerve of man is both sensory and motor ?
- a) Optic
 - b) Auditory
 - c) Olfactory
 - d) Trigeminal
235. The partial pressure of oxygen in the alveolar air is about
- a) 50 mm Hg
 - b) 101 mm Hg
 - c) 150 mm Hg
 - d) 200 mm Hg
236. Plasmids relate to
- a) Bacteria
 - b) virus
 - c) Amoeba
 - d) plasmodium
237. ECG refers to which organ?
- a) Brain
 - b) Heart
 - c) Kidney
 - d) Liver
238. Green glands are excretory organs of
- a) Mollusc
 - b) Annelida
 - c) Protozoa
 - d) Sponge
239. Heart consists of
- a) epithelial tissue
 - b) muscular tissue
 - c) nervous tissue
 - d) connective tissue
240. Immune system is guided by
- a) B-cell
 - b) T-cell
 - c) Z-cell
 - d) both a & b
-

Spece for rough work

ANSWER KEYS B-Tech (Regular), B.Tech (Agril) & B.Sc (Ag.)

SECTION I - PHYSICS

Questions & Answers

1. (b)	11. (a)	21. (d)	31. (d)	41. (a)	51. (c)
2. (b)	12. (c)	22. (d)	32. (a)	42. (b)	52. (a)
3. (a)	13. (b)	23. (c)	33. (c)	43. (a)	53. (b)
4. (c)	14. (c)	24. (c)	34. (c)	44. (c)	54. (a)
5. (d)	15. (b)	25. (d)	35. (a)	45. (a)	55. (d)
6. (a)	16. (c)	26. (c)	36. (c)	46. (b)	56. (a)
7. (a)	17. (c)	27. (a)	37. (b)	47. (b)	57. (d)
8. (d)	18. (a)	28. (d)	38. (b)	48. (c)	58. (d)
9. (a)	19. (d)	29. (b)	39. (c)	49. (b)	59. (b)
10. (a)	20. (c)	30. (b)	40. (d)	50. (b)	60. (d)

SECTION II - CHEMISTRY

Questions & Answers

61. (b)	71. (d)	81. (c)	91. (c)	101. (c)	111. (a)
62. (a)	72. (c)	82. (a)	92. (d)	102. (b)	112. (d)
63. (a)	73. (b)	83. (a)	93. (c)	103. (a)	113. (b)
64. (d)	74. (a)	84. (d)	94. (c)	104. (a)	114. (c)
65. (a)	75. (a)	85. (b)	95. (a)	105. (c)	115. (d)
66. (b)	76. (d)	86. (a)	96. (c)	106. (a)	116. (b)
67. (b)	77. (a)	87. (b)	97. (a)	107. (a)	117. (a)
68. (a)	78. (a)	88. (a)	98. (a)	108. (d)	118. (d)
69. (b)	79. (a)	89. (b)	99. (c)	109. (c)	119. (b)
70. (a)	80. (d)	90. (a)	100. (c)	110. (a)	120. (b)

SECTION III - MATHEMATICS

Questions & Answers

121. (b)	131. (d)	141. (b)	151. (b)	161. (c)	171. (a)
122. (b)	132. (d)	142. (b)	152. (b)	162. (d)	172. (a)
123. (d)	133. (b)	143. (b)	153. (c)	163. (a)	173. (b)
124. (d)	134. (d)	144. (c)	154. (d)	164. (d)	174. (a)
125. (b)	135. (b)	145. (c)	155. (b)	165. (b)	175. (c)
126. (a)	136. (a)	146. (a)	156. (c)	166. (b)	176. (b)
127. (c)	137. (b)	147. (c)	157. (d)	167. (c)	177. (b)
128. (b)	138. (b)	148. (d)	158. (c)	168. (d)	178. (c)
129. (d)	139. (b)	149. (c)	159. (c)	169. (b)	179. (d)
130. (c)	140. (a)	150. (b)	160. (b)	170. (a)	180. (b)

SECTION IV - BIOLOGY

Questions & Answers

181. (c)	191. (b)	201. (c)	211. (b)	221. (d)	231. (c)
182. (b)	192. (a)	202. (a)	212. (b)	222. (d)	232. (b)
183. (c)	193. (d)	203. (b)	213. (d)	223. (c)	233. (b)
184. (b)	194. (b)	204. (c)	214. (a)	224. (a)	234. (d)
185. (c)	195. (d)	205. (d)	215. (d)	225. (a)	235. (b)
186. (b)	196. (b)	206. (c)	216. (a)	226. (a)	236. (a)
187. (b)	197. (c)	207. (d)	217. (b)	227. (a)	237. (b)
188. (b)	198. (a)	208. (b)	218. (c)	228. (d)	238. (a)
189. (b)	199. (c)	209. (a)	219. (b)	229. (a)	239. (b)
190. (b)	200. (b)	210. (a)	220. (b)	230. (c)	240. (d)