

UPSEE 2019

PAPER-LS: CODE AA*

ANSWER KEY, Examination Date: 21-04-2019

1	C	26	A	51	B	76	A	101	B	126	C	151	A	176	A	201	C
2	A	27	B	52	D	77	C	102	D	127	B	152	B	177	D	202	A
3	A	28	D	53	D	78	B	103	A	128	A	153	A	178	B	203	A
4	C	29	D	54	A	79	B	104	B	129	B	154	C	179	B	204	C
5	D	30	B	55	C	80	A	105	C	130	B	155	B	180	A	205	A
6	C	31	D	56	D	81	B	106	D	131	C	156	A	181	B		
7	B	32	B	57	A	82	A	107	C	132	D	157	C	182	D		
8	A	33	D	58	C	83	D	108	B	133	A	158	A	183	C		
9	D	34	B	59	C	84	B	109	D	134	D	159	C	184	B		
10	B	35	C	60	D	85	C	110	A	135	B	160	C	185	A		
11	D	36	A	61	C	86	A	111	A	136	B	161	B	186	A		
12	B	37	B	62	B	87	A	112	C	137	A	162	C	187	A		
13	B	38	C	63	B	88	C	113	C	138	C	163	B	188	A		
14	A	39	B	64	B	89	C	114	B	139	B	164	B	189	C		
15	B	40	A	65	C	90	C	115	D	140	A	165	D	190	A		
16	A	41	A	66	B	91	A	116	B	141	D	166	C	191	B		
17	B	42	C	67	B	92	B	117	D	142	B	167	B	192	B		
18	C	43	B	68	C	93	C	118	B	143	D	168	D	193	B		
19	D	44	D	69	C	94	B	119	C	144	D	169	C	194	B		
20	C	45	D	70	B	95	A	120	C	145	A	170	B	195	B		
21	D	46	C	71	A	96	B	121	D	146	A	171	B	196	B		
22	C	47	B	72	B	97	A	122	B	147	D	172	B	197	A		
23	A	48	A	73	D	98	B	123	C	148	C	173	B	198	B		
24	C	49	C	74	D	99	A	124	D	149	D	174	C	199	B		
25	D	50	A	75	B	100	C	125	B	150	D	175	B	200	B		

Note: In case of any grievance, it must be reported at upseegrievance@aktu.ac.in along with Students Roll No. with Paper Code, Question Booklet Code, Question No. and suggested answer with supporting documents on or before 03rd May 2019.

*प्रश्न पुस्तिका क्रमांक **AA** का प्रश्नपत्र एवं कुंजी प्रकाशित की जा रही है। प्रश्न पुस्तिका क्रमांक **BB, CC** तथा **DD** में प्रश्नों एवं उनके विकल्पों का क्रम परिवर्तित है कृपया तदनुसार उत्तर मिलान करें।

**LS**

Question Booklet Sr. No.

Q. Booklet Code

AA

Roll No.

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OMR Answer Sheet No.

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Declaration :

I have read and understood the instructions given on page No. 1

Seal of Superintendent of Examination Centre

Signature of Candidate
as signed in application)

Signature of the Invigilator

Name of Candidate :

To be copied by the candidate in your own handwriting in the space given below for this purpose is compulsory.
"You will know you are in the right profession when : you wake anxious to go to work, you want to do your best daily, and you know your work is important."

* After cutting half upper part of this page, invigilator preserve it along with student's OMR sheet.



No. of Pages in Booklet including title	32	Time	2 Hours	Marks	400	No. of Questions in Booklet	205	Section A :	30
						No. Of Questions to be attempted	100	Section B :	70 (Any TWO Subsections)

LS

Question Booklet Sr. No.

Roll No.

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Signature of the Invigilator

Q. Booklet Code

Name of Candidate :

AA**INSTRUCTIONS TO CANDIDATE**

1. Use BLUE or BLACK BALL POINT PEN only for all entries and for filling the bubbles in the OMR Answer Sheet.
2. Before opening the SECURITY SEAL of the question booklet, write your Name, Roll Number (In figures), and OMR Answer-sheet Number in the space provided at the top of the Question Booklet. Non-compliance of these instructions would mean that the Answer Sheet can not be evaluated leading the disqualification of the candidate.
3. Each question carries FOUR marks. There will be negative marking on wrong answer. FOUR marks will be awarded for each correct answer and ONE mark will be deducted for each wrong answer. No marks will be deducted/awarded for unattempted questions.
4. Each multiple choice question has only one correct answer. More than one answer indicated against a question will be treated as incorrect answer.
5. Use of log table, mobile phones, any electronic gadget and slide rule, etc. is strictly prohibited. Non-programmable calculator is permitted
6. Candidate will be allowed to leave the examination hall at the end of examination time period only.
7. If a candidate is found in possession of books or any other printed or written material from which he/she might derive assistance, he/she is liable to be treated as disqualified. Similarly, if a candidate is found giving or obtaining (or attempting to give or obtain) assistance from any source, he/she is liable to be disqualified.
8. OMR sheet is placed within this paper and can be taken out from this paper but seal of paper must be opened only at the start of paper.
9. This booklet contains TWO Sections, Section A (Aptitude , Mathematics/Chemistry) has 30 Questions to be attempted and Section B has FIVE sub-sections of 35 Questions each, out of which TWO sub-sections to be attempted.
10. Candidates are expected to attempt any TWO subsections ONLY. In case more than two sub-sections are attempted, Section B would be treated as void

LS

Section - A :

- General Aptitude : Q. 1 to Q. 15
Chemistry : Q. 16 to Q. 30

Section B - Life Science :

- Bio Chemistry : Q. 31 to Q. 65
Botany : Q. 66 to Q. 100
Microbiology : Q. 101 to Q. 135
Zoology : Q. 136 to Q. 170
Food Technology : Q. 171 to Q. 205

*(Candidates are expected to attempt any TWO subsections ONLY.
In case more than two sub-sections are attempted, Section B
would be treated as void)*

Section - A : General Aptitude

- | | |
|---|--|
| <p>001. Antonym of word “Dissent” is:
(A) Renounce (B) Adopt
(C) Agree (D) Give</p> <p>002. Synonym of word “Impudent” is:
(A) Insolent (B) Partial
(C) Bankrupt (D) Restive</p> <p>003. Find out which part of the sentence has an error. If there is no mistake, the answer is ‘No error’
(A) I have seen
(B) that film last year
(C) but I do not remember its story
(D) No error</p> | <p>004. Chose the correct meaning of the phrase “To get into hot water”:
(A) To be impatient
(B) To suffer huge financial loss
(C) To get into trouble
(D) To be in confused state of mind</p> <p>005. Find out the word with correct spelling:
(A) Brassere (B) Brissiere
(C) Brasiiere (D) Brassiere</p> |
|---|--|

006. The value of $25-5 [2+3\{2-2(5-3)+5\}-10]\div 4$ is
(A) 5 (B) 23.25
(C) 23.75 (D) 25.75

007. If the sum of a number and its square is 182, what is the number?
(A) 12 (B) 13
(C) 28 (D) 91

008. The sum of the ages of a father and his son is 45 years. Five years ago, the product of their ages was 34. The ages of the son and the father are respectively:
(A) 6 and 39 (B) 7 and 38
(C) 9 and 36 (D) 11 and 34

009. A number, when 35 is subtracted from it, reduces to its 80%. What is four fifth of that number?
(A) 70 (B) 90
(C) 120 (D) 140

010. If the ratio of areas of two circles is 4:9 then the ratio of their circumferences will be:
(A) 3:2 (B) 2:3
(C) 4:9 (D) 9:4

011. Army is related to Soldier as Galaxy is related to:
(A) Planet (B) Satellite
(C) Meteor (D) Star

012. IGH:TRS::?:KIJ
(A) POQ (B) QOP
(C) OPQ (D) QPO

013. '1+2+3' stands for the 'the brave boy' '2+3+4' stands for 'brave boy swims' '1+2+4+5' stands for 'the brave girl swims'. What stand for 'brave'?
(A) 1 (B) 2
(C) 3 (D) 4

014. Manipulate the symbol and find the missing number.
If $3*6=18$
 $4*7=22$
 $9*1=20$
then $5*2=?$
(A) 14 (B) 10
(C) 7 (D) 3

015. In a row of children, Kamal is sixth from the left and Appu is fourth from the right. When Kamal and Appu exchange positions, Appu becomes seventeenth from the right. Which will be Kamal's position from the left?
(A) Twentieth
(B) Nineteenth
(C) Twenty-first
(D) Seventh

Section - A : Chemistry

- 016.** For a gaseous reaction $A + 3B \rightleftharpoons 2C$, $\Delta H = -90.0 \text{ kJ}$, $\Delta S^\circ = -200 \text{ JK}^{-1}$ at 400 K which is the correct value of ΔG° for the reaction $\frac{1}{2}A + \frac{3}{2}B \rightleftharpoons C$ at 400 K .
 (A) -5.0 kJ (B) -10.0 kJ
 (C) -15.0 kJ (D) -20.0 kJ
- 017.** For a given solution of schrodinger wave equation, the value of ψ is expressed as $\psi = f(r) \cdot f(x) \cdot f(y)$. What does this waveform represent.
 (A) f - orbital function only
 (B) d - orbital function only
 (C) p - orbital function only
 (D) p - and d - orbitals functions
- 018.** The reaction $A \rightarrow B$ follows first order Kinetics. The time taken for 0.8 mole of A to produce 0.6 mole of B is 1h. What is the time taken for the conversion of 0.9 mole of A to 0.675 mole of B.
 (A) 0.25 h (B) 2 h
 (C) 1 h (D) 0.5 h
- 019.** Four diatomic species are listed below in different sequence. Which of these presents the correct order of their increasing bond order.
 (A) $O_2^- < ND < C_2^{2-} < He_2^+$
 (B) $NO < C_2^{2-} < O_2^- < He_2^+$
 (C) $C_2^{2-} < He_2^+ < NO < O_2^-$
 (D) $He_2 < O_2^- < NO < C_2^{2-}$
- 020.** Standard free energies of formation (in kJ/ mol) at 298 K are -237.2 , -394.4 and -8.2 for $H_2O(l)$, $CO_2(g)$ and pentane (g), respectively. The value of E°_{cell} for the pentane - oxygen fuel cell is
 (A) 1.968 V (B) 2.0968 V
 (C) 1.0968 V (D) 0.0968 V
- 021.** The ligand field bands of lanthanide complexes are generally sharper than those transition metal complexes because
 (A) transition are allowed for lanthanide complexes
 (B) intensity of the bands are higher for lanthanide complexes
 (C) f - orbitals have higher energy than d - orbitals
 (D) f - orbitals compared to d-orbitals, interact less effectively with ligands.
- 022.** Which one of the following is most basic oxide.
 (A) Ga_2O_3 (B) Im_2O
 (C) Tl_2O (D) Tl_2O_3
- 023.** A crystal will be hard and have high melting point -
 (A) Covalent crystal
 (B) Ionic
 (C) Metallic
 (D) Molecular
- 024.** In an S_{N2} reaction there is
 (A) Partial racemisation
 (B) Complete racemisation
 (C) Complete inversion
 (D) A little inversion and mostly racemisation

025. The conversion shown below

$$R - CO - N_3 \xrightarrow[\text{H}_2\text{O}]{\Delta} R - NH_2$$
 is an example of

- (A) Hofmann rearrangement
 (B) Lossen rearrangement
 (C) Beckmann rearrangement
 (D) Curtius rearrangement

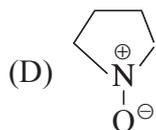
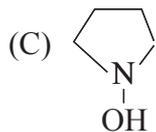
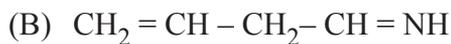
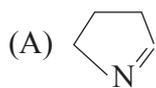
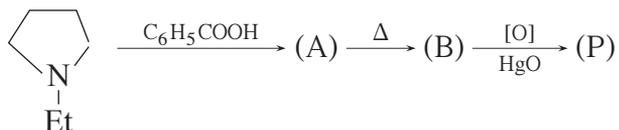
026. Natural rubber is a polymer of

- (A) Isoprene (B) Ethylene
 (C) Styrene (D) Propylene

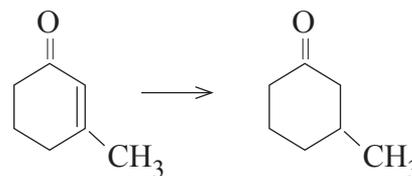
027. The catalyst used in the conversion of ethylene to acetaldehyde using Wacker process is

- (A) $\text{HC}_0(\text{CO})_4$
 (B) $[\text{PdCl}_4]^{2-}$
 (C) V_2O_5
 (D) TiCl_4 in the presence of $\text{Al}(\text{C}_2\text{H}_5)_3$

028. In the given reaction the product (P) is :

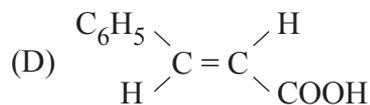
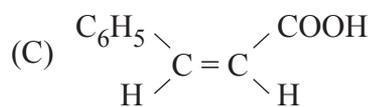
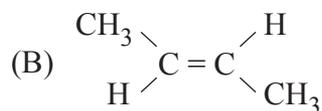
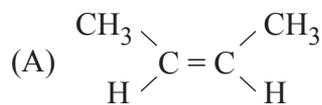


029. The most suitable reagent for the given transformation is



- (A) LiAlH_4
 (B) $\text{NH}_2\text{NH}_2 / \text{KOH}$
 (C) $\text{NaBH}_4 / \text{CeCl}_3$
 (D) $\text{Li} / \text{NH}_3 (l)$

030. Which alkene will give meso compound with Br_2



Section B - Life Science : Bio Chemistry

- 031.** DNA polymerase contains a lysine residue that is important for binding to DNA. Mutations were found that converted this lysine to either glutamate, glycine, valine or arginine. Which mutation would be predicted to with a most and least harmful to the ability of enzyme to bind DNA.
- | Most | Least |
|---------------|----------|
| (A) Glycine | Arginine |
| (B) Arginine | Glycine |
| (C) Glutamate | valine |
| (D) Glutamate | Arginine |
- 032.** Water has a high dielectric constant value of 80. Because of its presence in biological systems compared with low dielectric solvents like hydrocarbons. It should
- (A) strengthen electrostatic interaction but weaken hydrophobic interaction
(B) weaken electrostatic interaction but strengthen hydrophobic interaction
(C) strengthen both electrostatic as well as hydrophobic interaction
(D) weaken both electrostatic as well as hydrophobic interaction
- 033.** A 20 residue peptide composed of the sequence (L-Ala)₂₀ forms a right handed α helix. In methanol if every alternate L-Ala residue is replaced with D-Ala. The peptide will probably
- (A) form a right handed α helix
(B) form a left handed α helix
(C) form 10 residues of right handed α helix followed by 10 residues of left handed α helix
(D) not form helix of any kind
- 034.** How many different pentapeptides are there that contain one residue each of gly, asp, tyr, cys and leu
- (A) 625 (B) 120
(C) 32 (D) None
- 035.** The major groove of DNA is lined by
- (A) N3 of purine and N1 of pyrimidine
(B) N7 of purine and O2 of pyrimidine
(C) N7 of purine and C4 of pyrimidine
(D) None of above
- 036.** Ring structure of glucose is due to formation of hemiacetal and ring formation between
- (A) C1 and C5 (B) C1 and C4
(C) C1 and C3 (D) C2 and C4
- 037.** β oxidation of phytanic acid, a fatty acid derived from chlorophyll ad found in cows milk, cannot take place without prior oxidation at α carbon. Which of the following statement best explains the requirement of α oxidation
- (A) The chain length of phytanic acid is too long for the mitochondrial β oxidation system of handle.
(B) The β carbon in phytanic acid is blocked by a methyl group
(C) Phytanic acid cannot be activated by coenzyme A prior to β oxidation
(D) The mitochondrial acyl carnitine transferase will not transport phytanic acid into the mitochondrial matrix.

- 038.** The Bohr effect in haemoglobin refers to
 (A) The effect of pH on haemoglobin and myoglobin
 (B) Higher pH found in actively metabolizing tissues
 (C) Increased affinity for O₂ at lower pH
 (D) Reduced affinity for O₂ at lower pH
- 039.** An 'A' molecule is competitive inhibitor to the protein 'Y'. To overcome the inhibitory effect of 'A' researcher has to
 (A) Decrease substrate concentration
 (B) Increase substrate concentration
 (C) Decrease reaction pH
 (D) Increase product concentration
- 040.** Warburg effect is characterised by
 (A) Increased glycolysis
 (B) Decreased glycolysis
 (C) Absence of glycolysis
 (D) Malfunctional glycolysis
- 041.** In an enzymatic reaction, if the enzyme concentration is increased from 1mg to 2 mg, which of the following statements is correct?
 (A) K_m will change while V_{max} will remain constant
 (B) K_m will remain constant but V_{max} will be more
 (C) K_m and V_{max} will increase
 (D) K_m and V_{max} will remain constant
- 042.** Phenylmethylsulfonyl fluoride (PMSF) is a/an
 (A) Non competitive inhibitor of serine proteases
 (B) Reversible inhibitor of serine protease
 (C) Competitive inhibitor of serine proteases
 (D) Uncompetitive inhibitor of serine protease
- 043.** Which of the following statements are associated with the process of photorespiration in plants?
 (1) Photorespiration takes place in only C₃ plants.
 (2) Photorespiration takes place in only C₄ plants.
 (3) Photorespiration takes place in both C₃ and C₄ plants.
 (4) Glycolate is oxidized to glyoxylate in the peroxisome.
 (5) Glycolate is oxidized to glyoxylate in the mitochondria.
 (A) 1 and 4 (B) 3 and 4
 (C) 2 and 5 (D) 3 and 5
- 044.** Which of the following enzyme catalyzed reactions has a product containing a newly formed high energy phosphate bond.
 (A) the phosphorylation of glucose
 (B) 2 phosphoglycerate to phosphoenolpyruvate
 (C) 3 phosphoglycerate to 2 phosphoglycerate
 (D) phosphoenolpyruvate to pyruvate

- 045.** Inside an active mitochondrion most electron follow which pathway
 (A) Glycolysis - NADH- oxidative phosphorylation – ATP – oxygen
 (B) Kreb cycle – FADH₂ – electron transport chain – ATP
 (C) Electron transport chain – Kreb cycle – ATP – oxygen
 (D) Kreb cycle – NADH – electron transport chain – oxygen
- 046.** Which carbon atom of glucose was stacked with C¹⁴ so that after 1 cycle of glycolysis and krebs cycle none of the radioactive carbon atom is found in intermediates.
 (A) C-6 (B) C-1
 (C) C-3 (D) C-2
- 047.** Dehydrogenase enzyme of hexosemono-phosphate shunt pathway
 (A) NAD specific
 (B) NADP specific
 (C) FAD specific
 (D) TPP specific
- 048.** If a protein is known to bind Ca²⁺ ions, which of the following side chains is likely to be involved in Ca²⁺ binding?
 (A) Aspartic acid
 (B) Lysine
 (C) Proline
 (D) Glycine
- 049.** DCMU inhibits electron transport in chloroplast by preventing the reduction of
 (A) P 680. (B) QA.
 (C) PQ. (D) QB
- 050.** In a protein 'X' If all glutamic acid are replaced by glutamine then which technique will be used to separate these proteins?
 (A) Isoelectric focusing
 (B) SDS PAGE
 (C) Size exclusion chromatography
 (D) Native PAGE
- 051.** The net charge of a protein may not be sufficient to determine whether a protein will bind to an ion exchanger. This is due to
 (A) The presence of hydrophobic patches on the protein surface
 (B) Heterogeneous spatial distribution of charged amino acids
 (C) The presence of repeating motifs in some proteins
 (D) The strong hydration potential of protein
- 052.** SDS and NaCl are used in the purification of genomic DNA form peripheral blood samples. Their functions in the process are respectively
 (A) salting out of DNA – denaturation of protein
 (B) salting out of protein – denaturation of DNA
 (C) denaturation of protein – salting out of DNA
 (D) denaturation of protein – salting out of proteins

- 053.** A mixture of lys, asp, tyr and ala is passed through an anion exchange column at pH8. What is likely order of elution of amino acids when eluted with buffer of reducing pH gradient.
- (A) tyr,lys,asp,ala
 - (B) lys,ala,asp,tyr
 - (C) asp,tyr,ala,lys
 - (D) lys,tyr,ala,asp
- 054.** A solution of tryptophan has absorbance at 280 nm of 0.54 in a 0.5 cm pathlength cuvettes. Given the absorbance coefficient (ϵ) for trp is 5.4×10^3 L/mol/cm. the concentration of the solution is
- (A) 0.2 mM
 - (B) 20 mM
 - (C) 1×10^{-3} M
 - (D) 0.1mM
- 055.** A mixture of 4 protein of pIs 11,7,5 and 3 are loaded on anion exchange column equilibrated with low ionic buffer strength of pH8. Which of four proteins would be expected to retain on the column.
- (A) Protein with pI 11 but not others
 - (B) Protein with pI 11 and 7 but not others
 - (C) Protein with pI 5,7and 3
 - (D) protein with pI 7 only
- 056.** The void volume of gel filtration column is 30ml. A monomeric protein with a known molecular weight of 25 kDa elutes at volume of 45 ml. the protein that you are trying to purify elutes at volume of 35 ml. which of the following is valid conclusion.
- (A) Your protein is repelled by gel filtration material
 - (B) Your protein MW = 25 kDa
 - (C) Your protein MW > 25kDa
 - (D) Your protein MW < 25kDa
- 057.** Which one of the following arrangement of the metal ions Na^+ , K^+ , Mg^{+2} , and Ca^{+2} . In the order of decreasing concentration is correct with respect to quiescent mammalian cells
- (A) K^+ , Na^+ , Mg^{+2} , Ca^{+2}
 - (B) Na^+ , K^+ , Mg^{+2} , Ca^{+2}
 - (C) Mg^{+2} , K^+ , Na^+ , Ca^{+2}
 - (D) Ca^{+2} , Mg^{+2} , K^+ , Na^+
- 058.** According to Robersons unit membrane model of plasma membrane
- (A) Protein on cytoplasmic and non cytoplasmic sides are same
 - (B) All proteins are transmembrane proteins
 - (C) there is no space between lipid bilayer
 - (D) none

- 059.** Which of the receptor of following hormones is a transcription factor
 (A) Insulin
 (B) Glucagon
 (C) Estradiol
 (D) Adrenaline
- 060.** The common precursor for synthesis of all N linked oligosaccharides residues in glycoprotein contains a branched oligosaccharide linked to
 (A) KDEL sequence
 (B) GPI anchor
 (C) Chaperones
 (D) Dolichol pyrophosphate
- 061.** Marker enzyme of golgi apparatus
 (A) Acetyl CoA synthetase
 (B) Pyruvate kinase
 (C) galactosyl transferase
 (D) Cytochrome oxidase
- 062.** Calmodulin activates protein kinases in response to a transient increase in
 (A) cAMP (B) Ca ions
 (C) DAG (D) NO
- 063.** Deletion of the leader sequence of trp operon of E. coli would result in
 (A) Decreased transcription of trp operon.
 (B) Increased transcription of trp operon.
 (C) No effect on transcription.
 (D) Decreased transcription of trp operon in the presence of tryptophan
- 064.** With reference to lac operon which one of the following merodiploids will show a constitutive expression of β -galactosidase?
 (A) I-O+Z+Y- / F' I+ O+Z-Y+
 (B) I-OCZ+Y- / F' I+O+Z-Y+
 (C) I-O+Z+Y- / F' I+OCZ-Y+
 (D) I-OCZ-Y- / F' I+O+Z+Y+
- 065.** The large (Klenow) fragment of E coli DNA pol I contains which of the following activity
 (A) Reverse transcriptase activity and nick translation activity
 (B) Polymerase activity and nick translation activity
 (C) Polymerase activity with 3-5' exonuclease activity
 (D) 5' -3' exonuclease activity

Section B - Life Science : Botany

- 066.** Placement of gymnosperms between dicots and monocots is one of the drawbacks in the system of classification of:
- (A) Takhtajan
(B) Bentham and Hooker
(C) Engler and Prantl
(D) Linnaeus
- 067.** Plants are classified into the following major categories: division, class, order and family. These four categories generally have specific suffixes. Which of the following describes the correct order of specific suffixes for the categories respectively?
- (A) –ales, -opsida, -phyta, -aceae
(B) –phyta, -opsida, -ales, -aceae
(C) –opsida, -phyta, -aceae, -ales
(D) –phyta, -ales, -opsida, -aceae
- 068.** Duplicate of holotype from the same collection of the same date & locality is known as:
- (A) Syntype (B) Lectotype
(C) Isotype (D) Paratype
- 069.** The incorrect pair is:
- (A) Palmae - Arecaceae
(B) Umbelliferae – Apiaceae
(C) Gramineae- Asteraceae
(D) Labiatae – Lamiaceae
- 070.** The typical example of schizogenous intercellular spaces is:
- (A) secretory cavities of Citrus
(B) resin ducts in Coniferales
(C) secretory ducts in Myrtaceae
(D) large air spaces of water plants
- 071.** The type of vascular bundles found in Dracaena:
- (A) Concentric- amphivasal
(B) Conjoint- collateral
(C) Concentric – amphicribral
(D) Bicollateral
- 072.** Due to the presence of cellulose in the cell wall of plants, leaf shape is determined in the leaf primordia by :
- (A) rates of cell division
(B) planes of cell division
(C) cell migration
(D) cell-cell interactions
- 073.** The tip of the root apical meristem is capped by the histogen:
- (A) Plerome (B) Periblem
(C) Dermatogen (D) Calyptrogen
- 074.** Proteins required for regulation of cell cycle are:
- (A) Actins (B) Myosins
(C) Tubulins (D) Cyclins

- 075.** Geitonogamy is a type of:
- (A) Self pollination in the same flower
 - (B) Self pollination between two different flowers on the same plant
 - (C) Self pollination between two different flowers on different plants
 - (D) Cross pollination
- 076.** The technique of in-vitro fertilization was first time developed in the plant:
- (A) *Papaver somniferum*
 - (B) *Triticum aestivum*
 - (C) *Daucus carota*
 - (D) *Datura innoxia*
- 077.** The CO₂ compensation point for C₃ plants is greater than C₄ plants because in C₃ plants:
- (A) Dark respiration is higher
 - (B) Dark respiration is lower
 - (C) Photorespiration is present
 - (D) Photorespiration is absent
- 078.** Which of the following element plays an important role in biological nitrogen fixation?
- (A) Copper
 - (B) Molybdenum
 - (C) Zinc
 - (D) Manganese
- 079.** When a cell is fully turgid, which of the following will be zero?
- (A) Turgor Pressure
 - (B) Water Potential
 - (C) Wall Pressure
 - (D) Osmotic Pressure
- 080.** Which factor is most important in regulation of transpiration?
- (A) Humidity
 - (B) Temperature
 - (C) Light
 - (D) Wind
- 081.** *Drosophila* has 8 chromosomes in each of its body cell. The number of linkage groups is :
- (A) 10
 - (B) 4
 - (C) 16
 - (D) 2
- 082.** The type of chromosomal aberration where chromosome ring formation occurs at metaphase is :
- (A) Translocation
 - (B) Duplication
 - (C) Inversion
 - (D) Transversion
- 083.** What percentage of the progeny is expected to be homozygous tall bearing yellow flowers when a dihybrid, tall plant bearing yellow flowers (TtYy) is crossed with a dwarf plant bearing white flowers (ttyy)?
- (A) 75
 - (B) 50
 - (C) 25
 - (D) 0
- 084.** When one amino acid is replaced by another amino acid due to mutation, it is called as:
- (A) Point mutation
 - (B) Missense mutation
 - (C) Frame-shift mutation
 - (D) Non-sense mutation

- 085.** The role of PEG in somatic cell hybridization is:
- (A) Isolation of protoplast
 - (B) Regeneration of protoplasts
 - (C) Agglutination of protoplasts
 - (D) Transformation of protoplasts
- 086.** Use of biolistics for gene transfer is a:
- (A) Direct method of gene transfer
 - (B) Indirect method of gene transfer
 - (C) Employs virus for gene transfer
 - (D) Accurate method with 99% result
- 087.** Self - incompatibility:
- (A) Prevents autogamy & promotes allogamy
 - (B) Prevents allogamy & promotes autogamy
 - (C) Prevents allogamy & autogamy
 - (D) Prevents autogamy & promotes homozygosity
- 088.** Golden rice is a transgenic crop with a trait for:
- (A) Pest resistance
 - (B) High vitamin D content
 - (C) High vitamin A content
 - (D) High protein content
- 089.** Plantibodies are the:
- (A) Transgenic plants that express antibodies
 - (B) Antibodies against plant based antigen
 - (C) Antibodies expressed in transgenic plant
 - (D) Transgenic plants that express antigen
- 090.** This plant is commonly regarded as a weed, but it can be used to stimulate the digestion system and work as a diuretic.
- (A) Cranberry
 - (B) Curare
 - (C) Dandelion
 - (D) Willow
- 091.** Name the fiber crop which is source of narcotic resin, hashish commonly known as charas:
- (A) Cannabis sativa
 - (B) Cocos nucifera
 - (C) Bombax cieba
 - (D) Corchorus capsularis
- 092.** Which is a richest source of Protein?
- (A) Chlorella
 - (B) Spirulina
 - (C) Scenedesmus
 - (D) Soyabean
- 093.** Genetically engineered bacteria used for the production of human insulin known as humulin is:
- (A) Acetobacter aceti
 - (B) Bacillus thuringiensis
 - (C) Escherichia coli
 - (D) Agrobacterium tumefaciens

- 094.** 2-4-diphenoxyacetic acid is a:
(A) Herbicide (B) Weedicide
(C) Pesticide (D) Fungicide
- 095.** Kresek is related with:
(A) Blight of rice
(B) Brown rot of potato
(C) Angular leaf spot of cotton
(D) Red stripe of Sugarcane
- 096.** In India (1914), first quarantine regulation was passed by government under the title:
(A) Federal Quarantine Acts
(B) Destructive Insects & Pests Act
(C) Seed certification Act
(D) Indian Quarantine Act
- 097.** Energy transfer from one trophic level to other level in a food chain is:
(A) 10% (B) 20%
(C) 1% (D) 2%
- 098.** Minamata disease is related with the pollutant:
(A) CFC (B) Mercury
(C) Lead (D) Hydrogen Sulphide
- 099.** Fertilization effect on plants shown by the gas:
(A) CO₂ (B) SO₂
(C) O₃ (D) CFC
- 100.** Which of the following is the correct increasing order for Net Primary Productivity in different ecosystem?
(A) Tropical Rain forest, Hot desert, Temperate forest
(B) Hot desert, Tropical Rain forest, Temperate forest
(C) Hot desert, Temperate grassland, Tropical Rain forest
(D) Hot desert, Tropical Rain forest, Temperate grassland

Section B - Life Science : Microbiology

- 101.** What do H and N stand for in influenza strains nomenclature?
(A) H: Hemagglutinin; N: Nucleoprotein
(B) H: Hemagglutinin; N: Neuraminidase
(C) H: Hyaluronidase; N: Nucleoprotein
(D) H: Hyaluronidase; N: Neuraminidase
- 102.** Monocytes and neutrophils are important cells participating in
(A) Antibody production
(B) Perforin production
(C) Passive immunity
(D) Phagocytosis
- 103.** The process of anabolism is one in which microbial cells
(A) Synthesize molecules and structures
(B) Transport electrons among electron carriers
(C) Microbial cells break down larger molecules into smaller ones
(D) Glycolysis and the Krebs cycle are key intermediaries
- 104.** Binomial nomenclature has NOT yet been implemented for
(A) Bacteria (B) Viruses
(C) Protozoa (D) Fungi
- 105.** Cauliflower mosaic virus contains
(A) Linear ss RNA
(B) Circular ds RNA
(C) Circular ds DNA
(D) Linear dsDNA
- 106.** The epidemic that infected Europe, Middle East and North Africa and killed millions of people was known as the 'Black Death'. The disease was caused by
(A) Breathing of foul air
(B) Small pox
(C) Anthrax
(D) Bubonic plague
- 107.** A gene is best defined as
(A) A sequence of nucleotides in RNA that codes for a functional product.
(B) Three nucleotides that code for an amino acid.
(C) A sequence of nucleotides in DNA that codes for a functional product.
(D) A long segment of DNA.

108. Match the following:

Group I	Group II
(P) Francesco Redi	(i) early pioneer of the microscope
(Q) Robert Koch	(ii) swan-necked flasks
(R) Louis Pasteur	(iii) postulates of germ theory
(S) Antonie van Leeuwenhoek	(iv) boiled broth in airtight flasks
	(v) decaying meat in open; gauze-covered; and sealed jars

- (A) P-v, Q-iv, R-iii, S-i
 (B) P-v, Q-iii, R-ii, S-i
 (C) P-iv, Q-ii, R-iii, S-i
 (D) P-iv, Q-iii, R-ii, S-i

109. Which of the following may not be a constituent of a vaccine formulation?

- (A) Aluminum salts
 (B) Cytokines
 (C) Lipid A
 (D) GTP

110. Match antibiotics in Group I with their inhibitory activities in Group II.

Group I	Group II
(P) Vancomycin	(i) Folate metabolism
(Q) Rifampin	(ii) Cell wall synthesis
(R) Levomycetin	(iii) Protein synthesis
(S) Ciprofloxacin	(iv) RNA synthesis
	(v) DNA synthesis

- (A) P-ii, Q-iv, R-iii, S-v
 (B) P-ii, Q-iv, R-i, S-v
 (C) P-i, Q-iv, R-iii, S-v
 (D) P-iv, Q-iii, R-ii, S-v

111. Optical isomers of all amino acids exist except

- (A) Glycine (B) Arginine
 (C) Alanine (D) Proline

112. A 27 year old nursing mother is diagnosed as suffering from genital herpes, which of the following drug is most likely to be prescribed at this time ?

- (A) Chloroquine
 (B) Ketoconazole
 (C) Foscarnet
 (D) Ritonavir

113. Process of mating through which two bacterial cells transfer their DNA, a cell acts as a donor while other as recipient, process is known as

- (A) Transduction
 (B) Transformation
 (C) Conjugation
 (D) Recombination

114. Identify the correct definition of an antiseptic:

- (A) Chemicals that kill or prevent infection and damage living tissues
 (B) Chemicals that kill or prevent infection without damaging living tissues
 (C) Chemicals that can only kill or prevent infection on non-living tissues
 (D) Chemicals that can kill or prevent infection only in humans

115. Microbial killing in the ozone sterilizer is achieved through a process called
(A) Condensation
(B) Alkylation
(C) Cavitation
(D) Oxidation
116. In five kingdom system, the main basis of classification is
(A) Structure of nucleus
(B) Mode of nutrition
(C) Locomotion
(D) Cytoskeleton rearrangement
117. Under stress conditions bacteria accumulate
(A) ppGpp (Guanosine tetraphosphate)
(B) pppGpp (Guanosine pentaphosphate)
(C) either ppGpp or pppGpp
(D) both ppGpp and pppGpp
118. In death phase there is a remarkable decrease in number of
(A) Parent bacteria
(B) Viable bacteria
(C) Progeny
(D) Dividing bacteria
119. In a batch culture of *Penicillium chrysogenum*, the maximum penicillin synthesis occurs during the
(A) lag phase
(B) log phase
(C) stationary phase
(D) death phase
120. Which one of the following is the primary host for pseudo-rabies virus?
(A) Dog
(B) Man
(C) Swine
(D) Horse
121. Analysis of DNA sequences suggest that eukaryotic mitochondrial genomes primarily originated from
(A) Fungi
(B) Protozoa
(C) Algae
(D) Bacteria
122. Lophotrichous bacteria have
(A) a single flagellum at each pole
(B) a cluster of flagella at one or both ends
(C) flagella that are spread evenly over the whole surface
(D) flagella that are spread randomly over the whole surface

- 123.** A base substitution that causes regular codon to change into another codon that codes for different amino acid is said to be
- (A) nonsense mutation
 - (B) synonymous mutation
 - (C) missense mutation
 - (D) All of the above
- 124.** Innate host defense mechanisms are critical to the protection of the body because
- (A) They utilize pre-committed antigen presenting cells that have already been induced by other immune responses.
 - (B) The antibodies derived from the innate response are critical to neutralize bacterial toxins.
 - (C) They are highly specific for the invading pathogens that avoid PAMP receptor recognition.
 - (D) They provide immediate, continuous protection in the absence of a specific immune response.
- 125.** Which one of the following transport mechanism is NOT employed by prokaryotes?
- (A) Active transport
 - (B) Endocytosis
 - (C) Group translocation
 - (D) Passive diffusion
- 126.** Which one of the following microscopic techniques is best suited to visualize the topology and distribution of transmembrane protein of a cell membrane?
- (A) Scanning electron microscopy
 - (B) Transmission electron microscopy
 - (C) Freeze-fracture electron microscopy
 - (D) Thin-section electron microscopy
- 127.** In a population containing fast and slow growing bacteria, the slow growing bacteria can be enriched by supplementing the medium with
- (A) Ciprofloxacin
 - (B) Penicillin
 - (C) Levomycetin
 - (D) Penicillin and Levomycetin
- 128.** A microbe, which grows at temperatures above 95°C is most likely to be
- (A) an archaean
 - (B) a fungus
 - (C) a virus
 - (D) none of these
- 129.** Which one of the following is the causative agent of fowl cholera?
- (A) *V. cholera*
 - (B) *P. multocida*
 - (C) *E. coli*
 - (D) *S. pullorum*

130. Binomials with identical genus and species are referred as
(A) Homonym (B) Tautonym
(C) Basionym (D) Protonym
131. The chemical substance that enters the Krebs cycle for further metabolism is
(A) Ethyl alcohol
(B) Pyruvic acid
(C) Acetyl CoA
(D) Adenosine triphosphate
132. The process of budding takes place
(A) Primarily in viruses
(B) In bacteria that form branches
(C) Only within the protozoa
(D) In the yeasts
133. Cytopathic effects are observed during the
(A) Cultivation of viruses in tissues
(B) Dormant stage of the virus
(C) Assembly stage of new viral particles
(D) Inactivation of viruses by chemicals
134. Many cases of conjunctivitis, also known as pinkeye, are caused by
(A) *Bacillus cereus*
(B) *Chlamydia trachomatis*
(C) *Listeria monocytogenes*
(D) *Haemophilus aegyptius*
135. Barophilic microorganisms are able to grow
(A) At cold temperatures
(B) At high pressures
(C) At high temperatures
(D) At high pH values

Section B - Life Science : Zoology

- 136.** An enzyme catalyzed reaction was measured in the presence and absence of an inhibitor for an uncompetitive inhibitor:
- (A) only K_m increased
 - (B) both K_m and V_{max} increased
 - (C) only V_{max} increased
 - (D) both K_m and V_{max} are unaffected
- 137.** Coelomates has:
- (A) a complete lining called peritoneum, derived from mesoderm covering the body cavity.
 - (B) a complete lining called peritoneum, derived from ectoderm covering the body cavity.
 - (C) Round worm as representative of this group
 - (D) Flat worm as representative of this group.
- 138.** The first vertebrate animal appeared in which of the following geological ages?
- (A) Jurassic Period
 - (B) Silurian Period
 - (C) Ordovician Period
 - (D) Cretaceous Period
- 139.** An organism having heart for circulation, excretes through green glands. It has several ganglia and tactile organs on its body and its larval form is very different from its adult form. This organism is likely to respire by:
- (A) exchanging oxygen and carbon dioxide through an extensive tracheal system.
 - (B) gaseous exchange over thinner areas of cuticle or by gills.
 - (C) an efficient tracheal system that delivers oxygen directly to the tissues.
 - (D) a double transport system, where the circulating fluid contains a dissolved respiratory pigment.
- 140.** Gause's exclusion principal states that two species with identical niches cannot coexist indefinitely. Which of the following statements is the most appropriate regarding the validity of the principal?
- (A) It depends upon how one defines niche.
 - (B) There are in nature many instances of continued coexistence of closely related species.
 - (C) The principal is universally true.
 - (D) It does not predict the outcome where, both the species are equally strong competitors.

141. Small RNAs with internal complementary sequences that form hairpin-like structure, synthesized as precursor RNAs and cleaved by endonucleases to form short duplexes are called
- (A) sn RNA (B) m RNA
(C) t RNA (D) mi RNA
142. A color blind man marries with a normal woman, whose father was color blind. What percentage of children of is expected to be color blind?
- (A) 75% (B) 50%
(C) 25% (D) 100%
143. The speciation in which a population splits into two geographically isolated populations experience dissimilar selective pressure and genetic drift is known as:
- (A) Sympatric speciation
(B) Parapatric speciation
(C) Peripatric speciation
(D) Allopatric speciation
144. Complex eukaryotic cells may have evolved from simple prokaryotic cells because complexity of organization increases the:
- (A) growth rate
(B) efficiency of energy utilization
(C) tolerance to starvation
(D) Ability to attain large size.
145. Phosphorylation of serines as well as methylation and acetylation of lysines in histone affect the stability of chromatin structure above the nucleosome level and have important consequences for gene expression. The resulting changes in charge are expected to affect the ability of the tails to interact with DNA because:
- (A) DNA is negatively charged.
(B) DNA-histone interaction is independent of net charge.
(C) phosphorylation of serine increases DNA-histone interaction.
(D) methylation and acetylation of lysine increases DNA-histone interaction.
146. Name one evolutionary conservative molecule from the following:
- (A) Cytochrome C
(B) Lysine
(C) Vassopressin
(D) Acetyl coenzyme
147. Rigor mortis is due to:
- (A) Excess availability of calcium
(B) Release of Magnesium
(C) Excess of ATP
(D) Delpletion of ATP.

- 148.** The size of red blood cells (RBC) in venous blood is greater than that of arterial blood. This increased size of red blood cell in the venous blood is due to:
- (A) the increased permeability of red blood cell membrane.
 - (B) the decreased osmotic pressure in plasma.
 - (C) the increased osmotic pressure in RBC
 - (D) the dissociation of cytoskeleton protein in RBC.
- 149.** The part of the embryo from which the ectoderm, mesoderm and endoderm are formed in chick is known as:
- (A) Primitive streak
 - (B) hypoblast
 - (C) epiblast
 - (D) cytotrophoblast
- 150.** After gull nestings hatch, the parents remove the egg-shells from the nest. This behaviour is due to:
- (A) clean the area
 - (B) reduce the infection
 - (C) make more space in the nest
 - (D) minimize nest detection by the predators
- 151.** The recent studies on Archaea suggest that life could have originated:
- (A) extra terrestrially and seeded through meteorite impacts.
 - (B) in shallow coastal areas
 - (C) in deep hydrothermal vents
 - (D) in hot terrestrial habitats.
- 152.** The female prefer those males of the same species that have the most exaggerated courtship characters, this behavior pattern is termed as:-
- (A) Promiscuity
 - (B) Sexual selection
 - (C) Polygamy
 - (D) Monogamy
- 153.** Assume a male sparrow (species X) is hatched and reared in isolation and allowed a critical imprinting period to hear the song of male of another sparrow(species Y).Now after the isolation, what kind of behavior will species X show:
- (A) It will sing the song of species Y that it had heard in the critical period.
 - (B) It will sing the song of its own species X.
 - (C) It will not sing at all.
 - (D) It will sing a song not sung by either X or Y.

154. Regarding microtubule assembly and disassembly during cell division, which will be most appropriate answer?
- (A) Once formed, kinetochore microtubules depolymerize at the plus ends throughout mitosis.
 - (B) Once formed, kinetochore microtubules polymerize at the plus ends throughout mitosis.
 - (C) Kinetochore microtubules polymerize at their minus ends up to anaphase, at which point they depolymerize.
 - (D) Kinetochore microtubules polymerize at their minus ends up to cytokinesis, at which point they depolymerize.
155. A marine biologist dug up a small animal from the ocean floor. The animal was uniformly segmented with short, stiff appendages and soft, flexible skin. It had a complete digestive system and an open circulatory system but no exoskeleton. Based on this description, the animal appears to be a:
- (A) Lancelot
 - (B) Roundworm
 - (C) Mollusc
 - (D) Crustacean
156. In pre-industrial period in England, peppered moths had light coloration which effectively camouflaged them against light coloured trees and lichens. During industrial revolution, many lichens died out and trees become blackened by soot from factories and interestingly, dark coloured moths were predominantly seen. This happened due to:
- (A) Natural selection of dark coloured moths which were initially present in fewer numbers.
 - (B) New mutation which arose due to environmental pollution.
 - (C) Macroevolution occurring due to environmental change.
 - (D) Natural selection of the camouflaging mechanism of the moths.
157. The most common vegetation in the Western Ghats of India is tropical moist deciduous forest but that in Deccan plateau depleted thorn forest. The possible reason is:
- (A) richer soil of Western Ghats compared to Deccan Plateau.
 - (B) extensive deforestation in Deccan plateau compared to Western Ghats.
 - (C) Higher rainfall in Western Ghats compared to Deccan Plateau.
 - (D) Higher temperature in Deccan plate compared to Western Ghats.

- 158.** A neuron that fires when an individual is eating by hand, also fires when he sees someone else eating with hand. Such neurons are called:
- (A) Mirror neurons
 - (B) Mimicry neurons
 - (C) Motor neurons
 - (D) Reward neurons
- 159.** Microevolution is the term used for change in allele frequencies that occur over time:
- (A) within a population at species level.
 - (B) within a community at population level.
 - (C) due to appearance of new genes infections.
 - (D) due to mutation, natural selection, flow and genetic drift.
- 160.** A mechanism that can cause a gene to move from one linkage group to another is:
- (A) Crossing Over
 - (B) Inversion
 - (C) Translocation
 - (D) Duplication
- 161.** Routinely used glucose biosensor estimates blood glucose level by sensing the concentration of:
- (A) Glucose
 - (B) Oxygen
 - (C) delta-gluconolactone
 - (D) Hydrogen peroxide
- 162.** Name the ectotherm that can thermoregulate by behavioural means rather than by physiological means:
- (A) Bumble bee in an orchard
 - (B) Tuna fish in the ocean
 - (C) Lizard in a desert
 - (D) Flatworm in a pond
- 163.** Which of the following is not a characteristic of Phylum Chordata?
- (A) Pharyngeal slits
 - (B) Amniotic egg
 - (C) Post anal tail
 - (D) Notochord
- 164.** “Organ of Pecten” is found in the eyes of:
- (A) Frog (B) Bird
 - (C) Snake (D) Fish
- 165.** The word ‘fermentation’ is used in biochemistry and Microbial technology to denote different phenomenon. If the former is called C and latter is called T. Which of the following statement is true?
- (A) All C is T but all T is not C.
 - (B) All T is C but C is not T.
 - (C) T is always product of genetic engineering while C is not.
 - (D) C is always an aerobic process, while T can be aerobic or anaerobic.

166. How many genetically different gametes can be made by an individual of genotype AaBbccDDEe?
(A) 1.3 (B) 2.5
(C) 3.8 (D) 4.32
167. A person takes 1.0 ml of insulin injection daily at 8:00AM. His son gave 1.5ml of insulin at 8:00AM considering the father will go to party and eat more during lunch. The father also avoided breakfast as he planned to eat more during lunch. Which of the following events will occur?
(A) Father will be normo-glycemic
(B) Father will be hypoglycemic condition before lunch
(C) Father will be hyperglycemic condition before lunch
(D) Blood glucose level of the father will be low after taking lunch.
168. During DNA replication, events in the replication fork require different types of enzymes having specialized functions except:
(A) DNA polymerase III
(B) DNA gyrase
(C) DNA ligase
(D) DNA glycosylase
169. The T- waves of ECG indicates:
(A) Atrial depolarization
(B) Ventricular depolarization
(C) Ventricular repolarization
(D) Atrial depolarization
170. A paraphyletic group:
(A) contains unrelated organisms
(B) includes the most recent common ancestors but not all of the descendants.
(C) includes all the representatives of a clade but not the most common recent ancestors
(D) contains all the representative of a clade and the most recent common ancestor.

Section B - Life Science : Food Technology

171. Match the enzymes in Column I with their functions in Column II

	Column I		Column II
P.	Amylase	1.	Conversion of sucrose to glucose and fructose
Q.	Invertase	2.	Softening of dough
R.	Phosphatase	3.	Effectiveness of pasteurization
S.	Protease	4.	Conversion of starch to maltose

- (A) P-1, Q-2, R-3, S-4
- (B) P-4, Q-1, R-3, S-2
- (C) P-1, Q-4, R-2, S-3
- (D) P-2, Q-4, R-3, S-1

172. Which of the following is oil soluble pigment present in fruits and vegetables?

- (A) Flavonoids
- (B) Carotenoids
- (C) Anthocyanins
- (D) Tannins

173. Which of the following is an example of a classical diffusional mass transfer process without heat transfer?

- (A) Drying of food grains
- (B) Carbonation of beverages
- (C) Distillation of alcohol
- (D) Concentration of fruit juice

174. Production of low calorie light bears specifically uses which of the following enzymes?

- (A) Glucoamylase
- (B) Fungal α -amylase
- (C) Either or both (a) and (b)
- (D) Neutral proteases

175. Aflatoxins is produced by

- (A) Streptococcus sp.
- (B) Fusarium sp.
- (C) Aspergillus sp.
- (D) Salmonella sp

176. Campylobacters cause

- (A) Acute enterocolitis
- (B) Neural disorder
- (C) Tuberculosis
- (D) Cholera

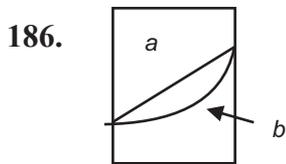
177. Why it is better to use jacketed vessel in a dairy industry than a stainless steel container?

- (A) To prevent milk from charring
- (B) For better temperature control
- (C) The temperature of food and wall is equal which is very high
- (D) All of the above

- 178.** Which of the following is insoluble precursor of pectin?
- (A) Pectin
 - (B) Protopectin
 - (C) Methyl alcohol
 - (D) Pectic acid
- 179.** What is full form of PFA and ISI?
- (A) Predictive Food Analysis and Indian Science Institute
 - (B) Prevention of Food Adulteration and Indian Science Institute
 - (C) Prevention of Food Adulteration and International Science Institute
 - (D) Predictive Food Analysis and International Science Institute
- 180.** What does HACCP stand for?
- (A) Hazard Analysis and Critical Control Point
 - (B) Hazard and Critical Control Point
 - (C) Health Analysis and Critical Control Point
 - (D) Hazard and Critical Cooking Point
- 181.** At its core what does HACCP stipulate?
- (A) That companies should use the right ingredients in the preparation of food.
 - (B) That all organizations involved in the food business should implement and maintain hygiene procedures based on HACCP principles.
 - (C) That people should wash their hands before handling food.
 - (D) That food processing organizations should keep their administrative records in good order
- 182.** Which of the following is NOT a step in the process involved in dry milling of maize?
- (A) Degermination
 - (B) Sifting
 - (C) Removal of moisture
 - (D) Diluting
- 183.** Which of the following microbe is used in the production of blue cheese?
- (A) Streptococcus thermophilus
 - (B) Lactobacillus bulgaricus
 - (C) Penicillium roqueforti
 - (D) Rhizopus stolonifer

184. The reciprocal of heat transfer co-efficient is
- (A) Volume
 - (B) Thermal insulation
 - (C) Density
 - (D) Temperature difference

185. Ratio of equilibrium concentrations of solute A in liquid phase and gas phase i.e. CA_L^* and CA_g^* respectively is α . α is called
- (A) Diffusion coefficient
 - (B) Distribution coefficient
 - (C) Mass transfer coefficient
 - (D) None of the above



In the above diagram, 'a' and 'b' refers to

- (A) Steady state heat transfer, Unsteady state heat transfer
- (B) Unsteady state heat transfer, Steady state heat transfer
- (C) Unsteady state heat transfer, Unsteady state heat transfer
- (D) All of the above

187. Which among the following is the statement of the 'Fick's Law'?

- (A) The molar flux of species relative to an observer moving with the molar average velocity is proportional to the concentration gradient of the species.
- (B) The mass flux of species relative to an observer moving with the molar average velocity is proportional to the concentration gradient of the species.
- (C) The molar flux of species relative to an observer moving with the mass average velocity is proportional to the concentration gradient of the species.
- (D) The molar flux of species relative to a stationary observer is proportional to the concentration gradient of the species.

188. What does the term absolute humidity?

- (A) Moisture content of a gas by mass
- (B) Moisture content of a gas by moles
- (C) Ratio of humidity to humidity at saturation
- (D) Temperature at which moisture begins to condense when it is cooled

189. Humidification is a

- (A) Mass transfer operation
- (B) Heat transfer operation
- (C) Simultaneous heat and mass transfer
- (D) None of the above

- 190.** In which of the following process, enthalpy is constant?
- (A) Adiabatic
 - (B) Non-adiabatic
 - (C) Isothermal
 - (D) Non-isothermal
- 191.** De-humidification is done in
- (A) Adiabatic temperature
 - (B) Adiabatic saturated temperature
 - (C) Adiabatic unsaturated temperature
 - (D) None of the above
- 192.** Rittingers law can be defined as
- (A) Energy required is proportional to new particle size
 - (B) Energy required is proportional to new surface created
 - (C) Input energy is directly proportional to square root of diameter of the new particle
 - (D) Energy required to reduce size of a particle to its 80 % of the actual size
- 193.** The ratio of initial particle size to final particle size is defined as
- (A) Reduction ratio
 - (B) Kick's ratio
 - (C) Rittingers ratio
 - (D) Bond's ratio
- 194.** The ratio of inertial force to the viscous force is known as
- (A) Grashof number
 - (B) Reynolds number
 - (C) Prandlt number
 - (D) Fourier number
- 195.** What are Sequestrants?
- (A) Food stabilizers
 - (B) Form a complex ion with metals like copper, iron
 - (C) Added for color
 - (D) They keep the food oxidized
- 196.** Which of these can be termed as critical limit?
- (A) Washing vegetables before using them
 - (B) Cooking chicken to reach a temperature of 165°F (74°C) for 15 seconds
 - (C) Checking the use by date on canned ingredients
 - (D) The temperature food is kept at in a fridge
- 197.** Which of the following refers to amount of protein absorbed by the body from a food?
- (A) Biological Value
 - (B) Limiting Value
 - (C) Reference pattern
 - (D) None of the above

- 198.** Which of the following enzymes is tested to ensure adequate pasteurization?
- (A) Peroxidase
 - (B) Alkaline phosphatase
 - (C) Catalase
 - (D) Kinase
- 199.** Choose one of the correct statements about fatty acids:
- (A) Melting point of fatty acid increases with increasing degree of unsaturation
 - (B) Melting point of fatty acid depends on chain length and degree of unsaturation
 - (C) Absence of double bond leads to lower melting point
 - (D) All of the above
- 200.** The class of trans-fat predominantly present in fat of ruminants and dairy product is
- (A) Oleic acid
 - (B) Vaccenic acid
 - (C) Eicosapentaenoic acid
 - (D) Arachidonic acid
- 201.** Which of the following is an amino acid with uncharged polar side chain?
- (A) Tryptophan
 - (B) Phenylalanine
 - (C) Tyrosine
 - (D) Histidine
- 202.** Which of the following is not correct about vitamins?
- (A) Vitamins are inorganic elements whereas minerals are organic elements
 - (B) Fats soluble vitamins have more tendency to cause hypervitaminosis
 - (C) Fat soluble vitamins are absorbed by lipids in the intestinal tract
 - (D) B and C are water soluble vitamins
- 203.** Vitamin D₃ is also known as
- (A) Cholecalciferol
 - (B) Biotin
 - (C) Riboflavin
 - (D) Ascorbic acid
- 204.** What is Glycemic Index of carbohydrates?
- (A) It shows which other nutrient it is being ingested with
 - (B) It shows how quickly a carbohydrate is digested
 - (C) It shows how carbohydrate affects blood sugar level
 - (D) All of the above
- 205.** Milk not properly cooled may encounter this off flavor
- (A) Malty
 - (B) Foreign
 - (C) Feed
 - (D) Rancid

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