# UPSEE 2019

## PAPER- BT: CODE AA*

## ANSWER KEY, Examination Date: 21-04-2019

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | C | 26 | C | 51 | C | 76 | A |
| 2 | A | 27 | B | 52 | D | 77 | D |
| 3 | A | 28 | D | 53 | C | 78 | C |
| 4 | C | 29 | A | 54 | B | 79 | D |
| 5 | D | 30 | C | 55 | A | 80 | C |
| 6 | C | 31 | C | 56 | A | 81 | A |
| 7 | B | 32 | C | 57 | A | 82 | B |
| 8 | A | 33 | B | 58 | D | 83 | C |
| 9 | D | 34 | D | 59 | A | 84 | A |
| 10 | B | 35 | D | 60 | D | 85 | C |
| 11 | D | 36 | A | 61 | C | 86 | B |
| 12 | B | 37 | C | 62 | D | 87 | A |
| 13 | B | 38 | C | 63 | B | 88 | A |
| 14 | A | 39 | D | 64 | D | 89 | A |
| 15 | B | 40 | B | 65 | C | 90 | C |
| 16 | B | 41 | C | 66 | C | 91 | C |
| 17 | B | 42 | D | 67 | A | 92 | C |
| 18 | A | 43 | A | 68 | B | 93 | A |
| 19 | A | 44 | B | 69 | D | 94 | C |
| 20 | B | 45 | A | 70 | B | 95 | C |
| 21 | D | 46 | D | 71 | A | 96 | A |
| 22 | C | 47 | A | 72 | D | 97 | D |
| 23 | B | 48 | B | 73 | A | 98 | B |
| 24 | A | 49 | C | 74 | D | 99 | D |
| 25 | D | 50 | D | 75 | C | 100 | A |

**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 तद्नुसार उत्तर मिलान करें।

**BT**

Question Booklet Sr. No.

Q. Booklet Code

**AA**

Roll No.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

OMR Answer Sheet No.

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |

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

Signature of Candidate
as signed in application)

Seal of Superintendent of Examination Centre

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 | **16** | Time **2** Hours | Marks **400** | No. of Questions in Booklet | **100** |
|---|---|---|---|---|---|

**BT**

Question Booklet Sr. No.

Roll No.

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Signature of the Invigilator

Q. Booklet Code

**AA**

Name of Candidate :

## 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) has 30 Questions to be attempted and Section B (Subject domain) has 70 Questions to be attempted.

# BT

**Section - A :**

General Aptitude : Q. 1 to Q. 15

Mathematics : Q. 16 to Q. 30

**Section - B :**

Bio-Technology : Q. 31 to Q. 100

**001.** Antonym of word "Dissent" is:

(A) Renounce (B) Adopt

(C) Agree (D) Give

**002.** Synonym of work "Impudent" is:

(A) Insolent (B) Partial

(C) Bankrupt (D) Restive

**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

**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

**005.** Find out the word with correct spelling:

(A) Brassere (B) Brissiere

(C) Brasiiere (D) Brassiere

**006.** The value of 25-5 [2+3{2-2(5-3)+5}-10]÷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 circumstances 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

## M. Tech.: Part A-(ii) Mathematics

**016.** If $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$, then

(A) $A^2 = A^{-1}$ (B) $A^3 = A^{-1}$

(C) $A^4 = A^{-1}$ (D) $A^5 = A^{-1}$

where $A^{-1}$ is the inverse matrix of $A$.

**017.** The rank of the matrix

$$A = \begin{bmatrix} 1 & 1 & -1 & 1 \\ -1 & 1 & -3 & -3 \\ 1 & 0 & 1 & 2 \\ 1 & -1 & 3 & 3 \end{bmatrix} \text{ is}$$

(A) 1 (B) 2

(C) 3 (D) 4

**018.** If $A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$ then for every integer n ≥3

(A) $A^n = A^{n-2} + A^2 - I$

(B) $A^n = A^{n-2} - A^2 + I$

(C) $A^n = A^{n-3} + A^2 - I$

(D) $A^n = A^{n-3} - A^2 - I$

where $I$ is the identity matrix of order 3.

**019.** $\lim_{x \to 0} x \sin \frac{1}{x} =$

(A) 0 (B) 1

(C) $\infty$ (D) $-\infty$

**020.** If $f(x) = \begin{cases} \dfrac{x\left(e^{\frac{1}{x}} - e^{\frac{1}{x}}\right)}{\left(e^{\frac{1}{x}} + e^{\frac{1}{x}}\right)}, & x \neq 0 \\ 0, & x = 0 \end{cases}$, *then*

(A) $f$ is continuous and derivable at $x=0$

(B) $f$ is continuous but not derivable at $x=0$

(C) $f$ is discontinuous at $x = 0$

(D) $f$ is derivable everywhere.

**021.** The sum of the serie

$1 - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + ....,$ is equal to

(A) $\frac{\pi^2}{4}$ (B) $\frac{\pi^2}{6}$

(C) $\frac{\pi^2}{8}$ (D) $\frac{\pi^2}{12}$

**022.** The general solution of the partial differential equation

$\left(\frac{y-z}{yz}\right)\frac{\partial z}{\partial x} + \left(\frac{z-x}{zx}\right)\frac{\partial z}{\partial y} = \frac{x-y}{xy}$, is

(A) $\phi(xyz, x^2 + y^2 + z^2) = 0$

(B) $\phi(xyz, xy + yz + zx) = 0$

(C) $\phi(xyz, x + y + z) = 0$

(D) $\phi(xyz, x^2 y + y^2 z + z^2 x) = 0$

**023.** A unit vector normal to the surface $x^3 + y^3 + 3xyz = 3$ at the point *(1,2,-1)* is

(A) $\frac{\hat{i} + 3\hat{j} + 2\hat{k}}{\sqrt{14}}$ (B) $\frac{-\hat{i} + 3\hat{j} + 2\hat{k}}{\sqrt{14}}$

(C) $\frac{\hat{i} + 2\hat{j} + 3\hat{k}}{\sqrt{14}}$ (D) $\frac{-\hat{i} + 2\hat{j} + 3\hat{k}}{\sqrt{14}}$

**024.** The vector field defined by

$\vec{F} = (x + 2y + az)\hat{i} + (bx - 3y - z)\hat{j} + (4x + cy + 2z)\hat{k}$

is irrotational, if

(A) $a=4, b=2, c=-1$

(B) $a=4, b=-2, c=1$

(C) $a=1, b=2, c=4$

(D) $a=-1, b=4, c=2.$

**025.** The value of $\oint_c \left(x^2 + xy\right)dx + \left(x^2 + y^2\right)dy$ where $C$ is the square formed by the lines $y = \pm 1, x = \pm 1$, is equal to

(A) $2\pi$ (B) 2

(C) 1 (D) 0

**026.** The only solution of the differential equation $x\frac{dy}{dx} - \frac{1}{2}y = x + 1$ for which $x$ and $y$ can attain the value unity is given by

(A) $y = 2x - \sqrt{x} + 2$

(B) $y = 2x + \sqrt{x} + 2$

(C) $y = 2x - \sqrt{x} - 2$

(D) $y = 2x + \sqrt{x} - 1$

**027.** The Laplace transform of $e^x x^{\frac{1}{2}}$ is

(A) $\frac{x}{\sqrt{s-1}}$ (B) $\frac{\sqrt{\pi}}{\sqrt{s-1}}$

(C) $\frac{\sqrt{\pi}}{\sqrt{s+1}}$ (D) $\frac{\pi}{\sqrt{s+1}}$

**028.** A die is tossed thrice. A success is getting *1* or *6* on a toss. Then the mean of the number of success is

(A) $\frac{1}{2}$

(B) $\frac{1}{3}$

(C) $\frac{2}{3}$

(D) 1

**029.** A manufacturer knows that the condensers he makes contain on an average 1% of defectives. He packs them in boxes of 100. The probability that a box picked at random will contain 4 or more faulty condensers is

(A) $1 - \frac{8}{3e}$

(B) $1 - \frac{3}{8e}$

(C) $1 - \frac{4}{3e}$

(D) $1 - \frac{3}{4e}$

**030.** The order of convergence of Newton Raphson method is

(A) 0 (B) 1

(C) 2 (D) 3

**031.** Which of the following amino acid does not contribute to fluorescence of a protein?

(A) Tyrosine (B) Phenylalanine

(C) Cysteine (D) Tryptophan

**032.** The helix component of a protein can be determined using which of the following equipment?

(A) Infrared spectrometer

(B) Fluorescence spectrometer

(C) Circular dichroism spectrometer

(D) UV-visible spectrophotomer

**033.** An alternative to glycolytic pathway is

(A) glyoxylate pathway

(B) pentose phosphate pathway

(C) citric acid cycle

(D) gluconeogenesis

**034.** Photochemical reactions in the chloroplasts are directly involved in

(A) fixation of carbondioxide

(B) synthesis of glucose and starch

(C) formation of phosphoglyceric acid

(D) photolysis of water and phosphorylation of ADP to ATP

**035.** How many molecules of oxygen can bind to a molecule of hemoglobin?

(A) One

(B) Two

(C) Three

(D) Four

**036.** Which of the following protects membrane lipids against damage by reactive oxygen species produced in the chloroplast?

(A) Carotenoids

(B) Chlorophyll a

(C) Chlorophyll b

(D) Kaempferol

**037.** The cellular environment is maintained by generating a gradient and transporting the $Na^+$ outside the cells through

(A) diffusion process

(B) passive transport via $Na^+$-$K^+$ pump

(C) active transport via $Na^+$-$K^+$ pump

(D) sodium ions not to be transported

**038.** Match the entries in Group I with the methods of sterilization in Group II

| Group I | | Group II | |
|---|---|---|---|
| I. | Serum | i. | Autoclave |
| II. | Luria broth | ii. | Membrane filtration |
| III. | Polypropylene tubes | iii. | UV irradiation |
| IV. | Biological safety cabinets | iv. | Gamma irradiation |
| | | v. | Dry heat |

(A) I-v; II-iii; III-i; IV-iv

(B) I-i; II-iv; III-v; IV-iii

(C) I-ii; II-i; III-iv; IV-iii

(D) I-iv; II-i; III-iii; IV-v

**039.** Antibiotic resistance marker that cannot be used in a cloning vector in Gram-negative bacteria is

(A) streptomycin

(B) kanamycin

(C) ampicillin

(D) vancomycin

**040.** Lung tuberculosis is caused by

(A) Pseudomonas aeruginosa

(B) Mycobacterium tuberculosis

(C) Streptococcus pneumoniae

(D) Escherichia coli

**041.** Which of the following events occurs in prokaryotes but NOT in eukaryotes?

(A) Protein phosphorylation

(B) RNA polymerase and promoter interaction

(C) Control of transcription by attenuation

(D) Formation of Okazaki fragments

**042.** Match the pathogens in group I with the corresponding disease in group II

| Group I | | Group II | |
|---|---|---|---|
| I. | Bacteria | i. | Measles |
| II. | Virus | ii. | Candidiasis |
| III. | Fungi | iii. | Malaria |
| IV. | Protozoa | iv. | Bovine spongiform encephalitis |
| | | v. | Bovine mastitis |

(A) I-i; II-ii; III-iv; IV-v

(B) I-i; II-iv; III-ii; IV-iii

(C) I-v; II-i; III-iv; IV-ii

(D) I-v; II-i; III-ii; IV-iii

**043.** In which of the following bacterium, chemical energy is converted to both mechanical as well as light energy?

(A) Pseudomonas fluorescence

(B) Escherichia coli

(C) Bacillus subtilis

(D) Vibrio fischeri

**044.** Which of the following organisms has a single-stranded positive sense RNA genome?

(A) Ebola virus

(B) Dengue virus

(C) Mumps virus

(D) Rota virus

**045.** Which of the following statements is CORRECT?

i. Hooke was first to observe living cells and introduce the word cell to describe them.

ii. Brown, Schleiden and Schwann, all working independently, were first to propose the cell theory.

iii. Remak was first to propose the tenet that 'all cells arise from other cells'.

iv. Leeuwenhoek was the first to observe unicellular organisms in pond water.

(A) iii & iv (B) i, ii & iv

(C) i, ii, & iii (D) i & iv

**046.** Match the entries in Group I with their appropriate pairs in Group II

| Group I | | Group II | |
|---|---|---|---|
| I. | Woese and co-workers | i. | Separation of prokaryotic organisms into two separate domains |
| II. | Ribozymes | ii. | Catalytic ribonucleic acids molecules |
| III. | Methanogen | iii. | Possible evolutionary ancestor of the nucleus of eukaryotic cells |
| IV. | Resistance to the dehydrating effects of hypertonic solutions and therefore to plasmolysis | iv. | Extreme halophiles |

(A) I-iii, II-ii, III-i, IV-iv

(B) I-iv, II-i, III-ii, IV-iii

(C) I-i, II-ii, III-iv, IV-iii

(D) I-i, II-ii, III-iii, IV-iv

**047.** Which of the following components of biological membrane are amphipathic?

i. Integral membrane proteins

ii. Phospholipids

iii. Glycolipids

iv. Membrane steroids such as cholesterol, sitosterol and ergosterol

(A) i, ii, iii, iv (B) ii, iv

(C) i, ii, iii (D) i, iv

**048.** Which of the following organelles has a single membrane system?

(A) Nucleus

(B) Endoplasmic reticulum

(C) Mitochondria

(D) Chloroplasts

**049.** Cellular response to steroid hormones is generated through the following events when occur in a specific sequence.

(i) Hormone-receptor interaction

(ii) Hormone entry into cells through diffusion

(iii) Binding of hormone-receptor complex to hormone- response elements

(iv) Nuclear translocation of hormone-receptor complex

Identify the correct sequence of events involved in cellular response to hormone.

(A) (i), (ii), (iii), (iv)

(B) (ii), (i), (iii), (iv)

(C) (ii), (i), (iv), (iii)

(D) (iii), (i), (ii), (iv)

**050.** Which of the following has an antagonistic action on cAMP?

(A) Hexokinase

(B) Protein kinase A

(C) The active GTP-α subunit of a G protein

(D) Phosphodiesterase

**051.** Many cells in the body divide only rarely, if at all; neurons, red blood cells, and keratinocytes are extreme examples. In which stage of the cell cycle would such cells considered to be?

(A) M phase (B) G1 phase

(C) G0 phase (D) G2 phase

**052.** Which alternate form of histone is found in centromeric histones of humans?

(A) H2A.z (B) SMC protein

(C) H1 (D) CENP-A

**053.** The matured mRNA of which of the following eukaryotic proteins lacks introns?

(A) Haemoglobin (B) Myoglobin

(C) Histone (D) DNA polymerase

**054.** In which model organism was RNA interference first discovered by Andrew Fire and Craig C. Mello?

(A) Schizosaccharomyces pombe

(B) Caenorhabditis elegans

(C) Saccharomyces cerevisae

(D) Danio rerio

**055.** Which of the following repeated sequences present in human genome includes an open reading frame coding for reverse transcriptase?

(A) LINE (B) SINE

(C) Microsatellite (D) Minisatellite

**056.** Which type of chemical bond is present in the backbone of a DNA duplex?

(A) Phosphodiester bond

(B) Disulfide bond

(C) Phophoanhydride bond

(D) Amide bond

**057.** In a given plant, red colour (R) of fruit is dominant over white fruit (r); and tallness (T) is dominant over dwarfness (t). If a plant with genotype RRTt is crossed with a plant of genotype rrtt, what will be the percentage of tall plants with red fruits in the F1 generation?

(A) 100% (B) 75%

(C) 50% (D) 25%

**058.** In bats the progeny with genotype Aa do not survive. If you cross two wild type bats, which are homozygous for dominant (AA) and recessive (aa) forms of the trait, respectively, what will be the expected genotypic ratio of the F1 generation?

(A) All heterozygote (B) 3:1

(C) 1:2:1 (D) None

**059.** What is the probability of getting AaBbCc from the cross aaBBcc X AAbbCC?

(A) 1 (B) 1/2

(C) 1/4 (D) 1/8

**060.** RNA structures can be experimentally determined using _____

(A) Nuclear Magnetic Resonance (NMR)

(B) Small Angle X-ray Scattering (SAXS)

(C) X-ray crystallography

(D) All of the above

**061.** In mass spectrometer, the ion currents are measured using which of the following?

(A) Scintillation counter

(B) Ion counter

(C) Electrometer tube

(D) Electric fields

**062.** Negative Staining is used for examining _____

(A) Virus particles

(B) Protein molecules

(C) Bacterial flagella

(D) All of the above

**063.** Which of the following microscopy techniques relies on the specimen interfering with the wavelength of light to produce a high contrast image?

(A) Scanning electron microscopy

(B) Phase contrast microscopy

(C) Transmission electron microscopy

(D) Fluorescence microscopy

**064.** Which of the following components bind to the solid column made of silica, under high salt concentrations?

(A) Proteins

(B) Polysaccharides

(C) Both proteins and polysaccharides

(D) Plasmid DNA

**065.** The charge present on the DNA backbone is negative. The force required to accelerate the molecules towards anode during agarose gel electrophoresis is directly proportional to number of

(A) sugar molecules

(B) nitrogenous bases

(C) phosphate groups

(D) both phosphate group and sugar molecules

**066.** Which of the following is INCORRECT with respect to microarray technique?

(A) Conducts genome wide analysis

(B) Involves base pairing hybridization

(C) Oligonucleotide probes used are overlapping in nature

(D) The target RNA pool is labeled with fluorochrome

**067.** What is the function of Sodium Dodecyl Sulphate (SDS) in denaturing polyacrylamide gel electrophoresis?

(A) Denaturing proteins and giving them net negative charge

(B) Imparting uniform mass to proteins

(C) Imparting net positive charge to proteins

(D) Helps in tracking the mobility of proteins within the gel

**068.** Natural killer cells are found in all of the following, except in

(A) blood (B) thymus

(C) spleen (D) lymph nodes

**069.** Which of the following compounds is NOT found in tears?

(A) Lysozyme (B) Lactoferin

(C) IgA (D) IgE

**070.** Which of the following antibody gives a primary immune reaction?

(A) IgD (B) IgM

(C) IgA (D) IgE

**071.** Mark the one, which is NOT a lymphoid progenitor cell.

(A) Monocyte (B) B-cell

(C) T-cell (D) NK cells

**072.** What is the origin of B-cell?

(A) Pancreas (B) Liver

(C) Thymus (D) Bone marrow

**073.** What is the name of Major Histocompatibility Complex (MHC) in humans?

(A) HLA (B) H2

(C) Adjuvants (D) Haplotype

**074.** Which of the following is an autoimmune disease?

(A) Myocardial infarction

(B) Insulin-dependent diabetes mellitus

(C) Myasthenia gravis

(D) All of the above

**075.** In hybridoma technology, which of the following cell is made deficient of hypoxanthine guanylphosphoribosyltransferase (HGPRT) enzyme for selection in HAT medium?

(A) B cells

(B) Hybrid cells

(C) Myeloma cells

(D) None of the above

**076.** Which of the following is used for constructing a phylogenetic tree?

(A) PHYLIP (B) Phrap

(C) Prodom (D) ProSite

**077.** Which of the following softwares CANNOT be used for visualizing 3D structures of proteins?

(A) PyMOL

(B) RasMol

(C) Swiss pdb Viewer

(D) T-Coffee

**078.** Germ line gene therapy could potentially correct a genetic defect in

(A) affected individual only

(B) affected individual and his or her nephew/ niece only

(C) affected individual and all of his or her descendants

(D) parents of an affected child

**079.** In which of the following genetic engineering applications, a probe is used?

(A) Cleaving DNA

(B) Recombining DNA

(C) Site directed mutagenesis

(D) cDNA library screening

**080.** Which of the following enzymes give rise to blunt ends?

(A) BamH I (B) EcoR I

(C) Sma I (D) Hind III

**081.** Which of the following is a ribonucleo-protein?

(A) Telomerase

(B) Primase

(C) DNA polymerase

(D) RNA polymerase

**082.** Which of the following does NOT affect DNA hybridization with probe during Southern blotting?

(A) Ionic strength of the hybridization buffer

(B) Pressure of the hybridization chamber

(C) Incubation Temperature

(D) Concentration of the probe

**083.** What is the function of Dpn I endonuclease in site directed mutagenesis?

(A) Joining of blunt ends

(B) Addition of dNTPs

(C) Cleavage of methylated DNA

(D) Homologous recombination

**084.** Which of the following blotting techniques does not involve electrophoretic separation of biomolecules?

(A) Dot Blotting

(B) Southern Blotting

(C) Northern Blotting

(D) Western Blotting

**085.** How many DNA duplexes are obtained from one DNA duplex after 4 cycles of PCR?

(A) 4 (B) 8

(C) 16 (D) 32

**086.** Name the term given to the ability of single cells to divide and produce all the differentiated cells in the organism?

(A) Unipotency

(B) Pluripotency

(C) Multipotency

(D) None of the above

**087.** Name the enzyme, which has been silenced to delay the ripening process in tomato?

(A) Polygalacturonase

(B) Hexokinase

(C) Adenosine deaminase

(D) Adenylate cyclase

**088.** Which of the following micro-organism causes crown gall disease in plants?

(A) Agrobacterium tumefaciens

(B) Agrobacterium rhizogenes

(C) Fusarium oxysporum

(D) Ustilago tritici

**089.** Which of the following is used as a pH indicator in mammalian cell culture media?

(A) Phenol red (B) Congo red

(C) Cresol red (D) Methyl red

**090.** Dimethyl sulphoxide (DMSO) is used as a cryopreservant for mammalian cell cultures because

(A) it is utilized as a nutrient

(B) it is an organic solvent

(C) it protects cells by preventing crystallization of water

(D) it easily penetrates cells

**091.** Out of the following, which one is NOT the basic component of culture media used for plant tissue culture?

(A) Complex mixture of salts

(B) Amino acids

(C) Serum albumin

(D) Sugar/ sucrose

**092.** The 'Ti' in Ti plasmid stands for which of the following?

(A) Translocation inducing

(B) Transfer inducing

(C) Tumor inducing

(D) Translation inducing

**093.** Who developed the first cloned mammal, Dolly?

(A) Wilmut and Campbell

(B) Allison and Honjo

(C) Bergstrom and Samuelsson

(D) O'Keefe, Moser and Moser

**094.** In Gel Permeation Chromatography (GPC), solute molecules are separated based on

(A) charge (B) shape

(C) size (D) polarity

**095.** In Michaelis-Menten kinetics for enzymatic reaction, the constant $K_M$ is

(A) the rate at which substrate concentration becomes half of the initial concentration

(B) the rate at which substrate concentration becomes zero

(C) the substrate concentration at which the rate becomes half of the maximum rate

(D) the substrate concentration at which the rate becomes equal to the maximum rate

**096.** In which of the following sequence the different phase of microbial growth occurs?

(A) Lag, log, stationary and death phases

(B) Lag, log, growth and death phases

(C) Stationary, log, lag and death phases

(D) Lag, stationary, decline and death phases

**097.** In a Fed-Batch reactor, which of the following events occurs?

(A) Concentration changes

(B) Volume changes

(C) Neither concentration nor volume change

(D) Both concentration and volume change

**098.** Fick's first law of diffusion states that the diffusive flux is

(A) proportional to concentration

(B) proportional to concentration gradient

(C) proportional to velocity

(D) proportional to reaction rate

**099.** Reynolds number is the ratio of

(A) drag force to viscous force

(B) viscous force to inertial force

(C) gravitational force to viscous force

(D) inertial force to viscous force

**100.** The growth of S. cerevisiae on glucose (MW=180) under anaerobic conditions can be described by the following reaction:

$C_6H_{12}O_6 + 0.094\ NH_3 \rightarrow 0.59\ CH_{1.64}N_{0.16}O_{0.52}$ (biomass) $+ 0.43C_3H_8O_3 + 1.54\ CO_2 + 1.3\ C_2H_5OH + 0.036\ H_2O$

Determine the biomass (MW= 23.74) yield based on substrate.

(A) $0.078\ g.\ g^{-1}$

(B) $0.070\ g.\ g^{-1}$

(C) $0.068\ g.\ g^{-1}$

(D) $0.060\ g.\ g^{-1}$

## SPACE FOR ROUGH WORK / कच्चे काम के लिये जगह