Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)

Notice **Date: 21/02/2026**

All students of B.Sc. I are hereby informed that the internal examination for Semester II will be conducted department-wise from 11th to 13th March 2026 as per the given schedule. Students are requested to be present in their respective classrooms on time.

Sr. No.	Date	Time	Subject	Roll Number	Block Strength	Room Number	Total Strength
1	Wednesday 11-03-2026	12.00 to 1.30 pm	Mathematics	7201-7221,7223-7238, 7240,7241,7243	40	202	168
				7244-7247,7249-7261, 7263-7267,7269-7286	40	203	
				7287-7310,7328-7351	48	204	
				7352-7367,7341,7565-7566,7569,7571-7576, 7579-7581, 7583-7584, 7588,7591-7593, 7595, 7603-7604,7606,7608	40	208	
			Zoology	7242,7248,7368-7407	42	302	214
				7408-7440,7442-7453	44	303	
				,7455-7461,7463-7496,7498-7500	44	310	
				7501-7532,7534-7541	40	311	
				7442-7555,7557-7561, 7563-7564,7567-7568, 7570,7577-7578, 7582, 7585-7587,7589-7590, 7594,7596-7602, 7605, 7607	44	407	
2	Thursday 12-03-2026	12.00 to 1.30 pm	Physics	7201-7221,7223-7238,7240,7241,7243	40	202	108
				7244-7247,7249-7261,7263-7267,7269-7282,7295,7358-7360	40	203	
				7361-7367,7565-7566,7571-7576,7579-7581,7583-7584, 7591-7593,7595,7603-7604,7606,7608	28	204	
			Botany	7242,7248,7368-7407	42	302	214
				7408-7440,7442-7453	44	303	
				,7455-7461,7463-7496,7498-7500	44	310	
				7501-7532,7534-7541	40	311	
				7442-7555,7557-7561, 7563-7564,7567-7568, 7570,7577-7578, 7582, 7585-7587,7589-7590, 7594,7596-7602, 7605, 7607	44	407	
		3.00 pm to 4.30 pm	Comp. Sci.	7268,7283-7294,7296-7311,7313-7331	48	310	89
				7332-7367, 7474,7497 ,7562, 7569,7588	41	311	
3	Friday 13-03-2026	12.00 to 1.30 pm	Statistics	7265-7282, 7306, 7311, 7313-7317,7441, 7497, 7562, 7565,7575, 7580,7584, 7591, 7592,7603,7604,7608	38	302	78
				7318-7357	40	303	
			Chemistry	7201-7221,7223-7232,7242-7243,7248,7295,7368-7372	40	202	146
				7373-7412	40	203	
				7413-7430,7432-7440,7442-7453,	39	204	
				7455-7458,7527,7541,7563-7564,7567-7568,7570,7572,7574,7577-7578,7581-7582,7585-7586,7589-7590,7597-7601,7605	27	208	
			Microbiology	7499-7526,7528-7530	32	209	63
				7531-7532,7534-7540, 7542-7555,7557-7561, 7596,7602,7607	31	210	
			Biotechnology	7459-7496,7498,7587,7594	41	310	41
		3.00 pm to 4.30 pm	Electronics	7233-7238,7240-7241,7244-7247,7249-7261,7263-7264,7268,7283-7294,7296-7297	42	310	82
				7298-7305,7307-7311,7313-7327, 7497, 7562, 7566, 7569,7571,7573,7579,7583, 7588,7593, 7595,7606	40	311	
				Total	289		

(Mr. A. B. Bhosale)
Convener
Time- table Committee

Chief Controller of Examination
Vivekanand College, Kolhapur.
(Empowered Autonomous)

(Dr. S. P. Thorat)
I/c Principal
Vivekanand College, Kolhapur
(An Empowered Autonomous Inst.)
20-2-2026

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)

Attendance B.Sc. I Biotechnology Optional

Roll call	Name	Of	Student	13/03/26 Microbiology	13/03/2026 Cell Biology
7459	ATTAR	GULJAR	AMJADKHAN		
7460	AWATE	SHREYA	KAKASAHEB		
7461	BHOSALE	PARINITA	ABHIJEET	P.A.Bhosale	P.A.Bhosale
7463	CHAVAN	PRIYANKA	AMRUT		
7464	CHAVAN	SAMIKSHA	RAMESH		
7465	CHHATRE	HARSHVARDHAN	NAVANATH		
7466	DAVARE	DIGVIJAY	BALU		
7468	DONGARE	ATHARAV	LAXMAN		
7469	GHODAKE	SANIKA	RAJKUMAR		
7470	GHORPADE	SAURABH	PRAVIN		
7471	HAKIM	MASEERA	MAJIDKHAN		
7472	JADHAV	BHARGAVI	SANGRAM		
7473	JAIN	POONAM	BHUPENDRA		
7475	KADAM	SAYALI	SUNIL		
7476	KALE	ADITI	AJAY		
7477	KAMBLE	ADITI	SHAHAJI		
7478	KAMBLE	PRANALI	SARJERAO		
7479	KARALE	SIDDHI	RAJARAM		
7480	KATAGERI	AMAN	M.		
7481	KATKAR	SWAROOP	SANJAY		
7482	KESARKAR	ASAWARI	RAJAN		
7483	KILLEDAR	SRUSHTI	SANTOSH		
7484	MIRAN	KEZIYASALMA	SABIRAHMED		
7485	NARAKE	TANISHA	KRUSHNAT		
7486	NERLEKAR	BHIMA	SAMBHAJI		
7487	PANDEY	RAGINI	SANJAY		
7488	PANHALKAR	MAYURI	MADHAV		
7489	PATIL	SHRADDHA	PRAKASH		
7490	PATIL	PRASHANT	ANKUSH		
7491	PATIL	SAGAR	ADHIKRAO		
7492	PATIL	SANIKA	RAVSAHEB	S.R.Patil	S.R.Patil
7493	PATIL	TANISHKA	KIRAN		
7494	POWAR	RUTUJA	RAGHUNATH		
7495	SANKPAL	SHREYA	RAJARAM		
7496	SAVTEKAR	HARSHAWARDHAN	ADITYA		
7498	ULPE	SIDDHI	SACHIN	S.S.Ulape	S.S.Ulape
7587	YADAV	SHIVANI	VIJAY		
7594	SHAIKH	MUBINA	ARIF		

VIVEKANAND COLLEGE, KOLHAPUR

(AN EMPOWERED AUTONOMOUS INSTITUTE)

B.Sc. Part- I Biotechnology (Optional) (Sem-II) Internal Examination: March 2026

Course Code: 2DSC03BIT22Basics of Cell biology and genetics

Day- Friday Time- 12-1.30

Date- 13/03/2026 Marks-10M

Name of student-

Roll Number-

Q.1 Choose the correct alternative and complete the sentences. 10M

1. Germplasm theory was proposed by ----------
   a) Weissmann b) Doutrochet
   c) Shelliden d) O.Heartwig
2. Two identical daughter cells are produced after ---------- division.
   a) Meiosis b) Anmitosis
   c) Mitosis d) Amitosis
3. Body metabolism study and all life activities are studied in ----------
   a) Taxonomy b) Ecology
   c) Genetics d) Physiolog
4. Lysosomes are called ----- ---------- of cell.
   a) Protein factory b) Power house
   c) Suicidal bag d) Unit of photosynthesis
5. Eukaryotic cell contain ---------- type of ribosome.
   a)60 s b) 70 s
   c) 80 s d) 90 s
6. ----------is study of nucleus
   a) Histology b) cytology
   c) Karyology d) Osteology
7. Modern concept of gene was proposed by ----------
   a) Watson b)Benzer
   c) T,H. Morgan d) Mendel
8. ---------- is an example of multiple alleles.
   a) Blood group b) Eye colour
   c) Height d) Skin colour
9. ---------- extrachromosomal inheritance is also called maternal inheritance.
   a) Mitochondrial b) Plastid
   c) Plasmid d) Centriole
10. Linkage group were proposed by ----------
   a) Watson b)Benzer
   c) T,H. Morgan d) Mendel

10/10 Good

VIVEKANAND COLLEGE, KOLHAPUR

(AN EMPOWERED AUTONOMOUS INSTITUTE)

B.Sc. Part- I Biotechnology (Optional) (Sem-II) Internal Examination: March 2026

Course Code: 2DSC03BIT22Basics of Cell biology and genetics

Day- Friday | Time- 12-1.30

Date- 13/03/2026 | Marks-10M

Name of student- Sayali Sunil kadam

Roll Number- 7475

Q.1 Choose the correct alternative and complete the sentences. 10M

1. Germplasm theory was proposed by Weissmann
   a) Weissmann b) Doutrochet
   c) Shelliden d) O.Heartwig
2. Two identical daughter cells are produced after Mitosis division.
   a) Meiosis b) Anmitosis
   c) Mitosis d) Amitosis
3. Body metabolism study and all life activities are studied in Physiology
   a) Taxonomy b) Ecology
   c) Genetics d) Physiolog
4. Lysosomes are called Power house of cell.
   a) Protein factory b) Power house
   c) Suicidal bag d) Unit of photosynthesis
5. Eukaryotic cell contain -----80S---- type of ribosome.
   a)60 s b) 70 s
   c) 80 s d) 90 s
6. karyology is study of nucleus
   a) Histology b) cytology
   c) Karyology d) Osteology
7. Modern concept of gene was proposed by Benzer
   a) Watson b)Benzer
   c) T,H. Morgan d) Mendel
8. Blood group is an example of multiple alleles.
   a) Blood group b) Eye colour
   c) Height d) Skin colour
9. Mitochondrial extrachromosomal inheritance is also called maternal inheritance.
   a) Mitochondrial b) Plastid
   c) Plasmid d) Centriole
10. Linkage group were proposed by T.H. Morgan
    a) Watson b)Benzer
    c) T,H. Morgan d) Mendel

VIVEKANAND COLLEGE, KOLHAPUR (AN EMPOWERED AUTONOMOUS INSTITUTE)

B.SC. Part- I Biotechnology (Optional) (Sem -II) Examination: March April 2025-26

Subject Name : Microbiology

Subject Code : 2DSC03BIT21

Internal Exam

10/10

Day & Date: Friday 13/03/2026

Roll No: 7485

10 Marks

Name of student- Tanisha krushnat Narake

Q.1 . Choose the correct alternative and rewrite the sentences:

1. Louis Pasteur is famous for developing Pasteurization
   A) Vaccination B) Pasteurization C) Germ theory D) Antibiotics
2. Viruses can reproduce only inside Living cells
   A) Soil B) Water C) Living cells D) Air
3. Harmful microorganisms cause Diseases.
   A) Food production B) Oxygen formation C) Diseases D) Photosynthesis
4. Pair arrangement of bacteria is called Diplo.
   A) Diplo B) Strepto C) Staphylo D) Tetrad
5. Bacterial cell wall mainly provides: protection
   A) Protection B) Energy C) Movement D) Digestion
6. Yeast extract provides Vitamins.
   A) Vitamins B) Salt C) Oxygen D) Water
7. Synthetic media are: chemically defined
   A) Chemically defined B) Natural C) Living D) Organic
8. Pour plate technique involves mixing bacteria with molten agar.
   A) Mixing bacteria with molten agar B) Streaking agar
   C) Spreading agar D) Heating bacteria
9. Staining helps to observe microorganisms clarly
   A) Observe microorganisms clearly B) Kill microorganisms
   C) Grow microorganisms D) Remove microorganisms
10. Acid-fast staining is mainly used for Mycobacterium
    A) *Mycobacterium* B) *Bacillus* C) *E. coli* D) *Vibrio*

VIVEKANAND COLLEGE, KOLHAPUR (AN EMPOWERED AUTONOMOUS INSTITUTE)

B.SC. Part- I Biotechnology (Optional) (Sem -II) Examination: March April 2025-26

Subject Name : Microbiology

Subject Code : 2DSC03BIT21

69/10

Internal Exam

Day & Date: Friday 13/03/2026

Roll No: 7496

10 Marks

Name of student- Harshwardhan Aditya Savtekar.

Q.1 . Choose the correct alternative and rewrite the sentences:

1. Louis Pasteur is famous for developing Pasteurization
   A) Vaccination B) Pasteurization C) Germ theory D) Antibiotics

2.. Viruses can reproduce only inside Living cells
   A) Soil B) Water C) Living cells D) Air

3. Harmful microorganisms cause Diseases.
   A) Food production B) Oxygen formation C) Diseases D) Photosynthesis

4. Pair arrangement of bacteria is called Diplo.
   A) Diplo B) Strepto C) Staphylo D) Tetrad

5. Bacterial cell wall mainly provides: Protection
   A) Protection B) Energy C) Movement D) Digestion

6. Yeast extract provides Salt.
   A) Vitamins B) Salt C) Oxygen D) Water

7. Synthetic media are: chemically defined
   A) Chemically defined B) Natural C) Living D) Organic

8. Pour plate technique involves Mixing bacteria with molten agar
   A) Mixing bacteria with molten agar B) Streaking agar
   C) Spreading agar D) Heating bacteria

9. Staining helps to: observe microorganism clearly
   A) Observe microorganisms clearly B) Kill microorganisms
   C) Grow microorganisms D) Remove microorganisms

10. Acid-fast staining is mainly used for Mycobacterium
    A) *Mycobacterium* B) *Bacillus* C) *E. coli* D) *Vibrio*

Shri Swami Vivekanand Shikshan Sanstha's
Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)
Notice

Date: 21/02/2026

All students of B.Sc. II are hereby informed that the internal examination for Semester IV will be conducted on department-wise 13th and 14th March 2026 from 2:30 PM to 4:00 PM. Students are requested to be present in their respective classrooms on time, as per the given schedule.

Sr. No.	Date	Subject	Roll Number	Student Strength	Room Number
1	Friday 13-03-2026 (Major)	Physics	7701-7719	19	311
2		Chemistry	7815-7862,7979-7980, 7982-7983, 7989	53	407
3		Mathematics	7720-7736 ,7978	18	311
4		Statistics	7737-7758	22	302
5		Electronics	7759-7762,7977,7986-7988	8	302
6		Comp. Sci.	7763-7814	37	310 A
			7800-7814	15	303
7		Botany	7887-7895,7985	10	215
8		Zoology	7863-7886,7984	25	215
9		Biotechnology	7948-7975	28	208
10		Microbiology	7896-7911,7945-7947 ,7976, 7981, 7912-7944	54	204
			Total	289	

Sr. No.	Date	Subject	Roll Number	Student Strength	Room Number
1	Saturday 14-03-2026 (Minor)	Physics	7720-7732,7737-7738, 7759, 7815-7820,7986-7988	25	311
2		Chemistry	7718-7719,7881-7886,7945-7947,7985	12	303
3		Mathematics	7701-7711,7739-7758,7760-7762, 7783-7808,7977	61	204
4		Statistics	7717,7733-7736,7809-7814, 7978	12	303
5		Electronics	7712-7716,7763-7782	25	302
6		Botany	7824,7826-7865	41	208
			7866-7480,7912-7936	40	210
			7937-7944,7965-7984,7989	27	212
7		Zoology	7821-7823,7825,7887-7911,7848-7964	46	310
			Total	289	

(Mr. A. B. Bhosale)
Convener
Time- table Committee

Chief Controller of Examination
Vivekanand College, Kolhapur.
(Empowered Autonomous)

(Dr. S. P. Thorat)
I/c Principal
Vivekanand College, Kolhapur
(An Empowered Autonomous I...

"Dissemination of Education for Knowledge, Science and culture"

Shikshanmaharshi Dr.Bapuji Salunkhe

Vivekanand College Kolhapur

(An Empowered Autonomous Institute)

Department of Biotechnology Optional

Attendance B.Sc. II

Roll call	Name of student	13/3/26	13/3/26
7948	DHOBALE SHRUTI AMIT	SADhobale	SADhobale
7949	ICHALKARANJIKAR MARIYA JAVED		
7950	JADHAV PALLAVI SITARAM		
7951	KAMBLE MOKSHADA BHAGAVAT		
7952	KUMBHAR GAURI SURESH		
7953	KUMBHAR MADALASA RUKMANGAT		
7954	KURANE ANSHU SHIVAJI		
7955	MULLA SADAF SAMEER		
7956	PARAWALKAR SH.INIDHI ABHINANDA		
7957	PATIL ADITI PRAKASH		
7958	PATIL CHAITRALI YUVRAJ		
7959	PATIL MADHURIMA VIJAY		
7960	PATIL SRISHTI SACHIN		
7961	PATOLE VAIDEHI ARUN		
7962	SALOKHE ADITI SANDIP		
7963	WANDRE RUTUJA SURESH		
7964	YADAV CHHAVI RAMBAHADUR		
7965	CHOUGULE SIDHIKA SACHIN		
7966	DANGAT PAVAN SANTOSH		
7967	JADHAV NIPUN MOHAN		
7968	KOLPE NEHA BHAUSAHEB	KOlPe N.B	KOlPe N.B
7969	KUMBHAR USHA MALLAPPA		
7970	METHE SANIKA TANAJI		
7971	NANNAVARE VINIT RAJENDRA		
7972	PATIL SAMRUDDHI NETAJI		
7973	PATIL SANIKA RANJEET	S.R.Patil	S.R.Patil
7974	RASAL PRADNYA LALASO		
7975	SURYAWANSHI RAJLAXMI RAVINDRA		

प्र. क्र. Q. No.

Q. Explain in detail active immunity & properties. Natural killer cells (NK cells).

1) Active immunity and properties.
- The immunity is that is activated after antigenic stimulation. is known as active immunity.
- After antigenic stimulation active immunity starts to resist the infection or pathogen.
- Active immunity does not require any ab immune donar for. immunity.
- Active immunity require antigenic stimulation for developing antibody or sensitized cells.

• Properties of Active immunity.
1) - Active immunity required participation of antigenic stimulation.
2) - Active immunity activated after come in contact with antigen or infection.
3) - There is lag period present in active immunity.
4) - In active immunity there is immunoglobulin memory cell formation occurs.
5) - Because of memory cell formation the secondary phase of same disease is cure in less time.

प्र. क्र. Q. No.

6) - There is negative phase for developing of antibodies or sensitized cells against phathogen & infection.

7) - Active immunity long last is long lasting immunity.

8) - Active immunity requires time for developing antibodies against pathogen.

- There are two types of Active immunity
1) Natural active immunity
2) Artificial active immunity.

5

प्र. क्र. Q. No.

2) Natural killer cells (NK) :-

- Natural killer cells are small non-phagocytic granuals.
- It contain ~~data~~ immunoglubumins on their surface. it is characteristic feature of B lymphocytes.
- Whereas, it does not contain selectable marker on surface. it is characteristic features of T lymphocytes.
- So, it is called as null cells.
- There are two types of null cells
- Natural killer cells & Killer cells
- Natural killer cells are antibody independent cells.
- Killer cells are antibody dependent cells.
- Natural killer cells posses cytotoxicity against various targeted cells & such as malignant cells and various infectant cells.
- Natural killer cells are antibody independent cells.
- Natural killer cells activated by interleukin.

4

Subject : Fundamental of ~~Enzyme~~ Immunology Technology

प्र. क्र. Q. No.

Q.1. ~~Active~~ Explain in detail active immunity? Properties of active immunity.

Q.2. Natural killer cell (NK cells)

Q.1 → Active immunity :

It is resistance developed by an individual in responce to antigenic stimulus known as active immunity. There are two types -

1) Natural active immunity
2) Artificial active immunity

Properties of Active immunity :

(1) It is produced by hosts immune system as a result of antigenic stimulus

प्र. क्र. Q. No.

(2) It is induced by infection or by contact with antigens.

(3) It is long lasting immunity.

(4) It is effective only after a lag period.

(5) This is due to antigen combining with preexisting antibodies & lowering its level.

(6) Immunological memory is present therefore subsequent challenge is more effective.

(7) It is more effective & confers better protection.

(8) It is not-applicable in immunodeficient individuals.

4

Q.2. → Natural killer cell - (NK cell) :

- It is small population (8-5%) of large non-phagocytic granular lymphocytes.
- Cells do not have detectable immunoglobulins on their surface & lacks surface markers.

प्र. क्र. Q. No.

- Also called as null cells & third population cells.
- Null cells are two types -
  1) Natural killer cell - Antibody independent
  2) Killer cell - Antibody dependent
- NK also called as null cells
- It posses spontaneous cytotoxicity towards various target cell such as malignant & virus infected cells
- Cytotoxicity do not have antibody dependent & MHC restricted.
- NK activity is natural or non immune as does not required by prior antigenic contact. sanitization
- It is part of innate immunity.
- It can be activated by interferon & interleukin-2.
- killer cells are responsible for antibody dependent cell mediated cytotoxicity (ADCC)
- They share charcter T & B cells
- cell posses Fc receptros for binding with IgG antibodies.
- Do not have phagocytic activity.
- Their lineage is different from macrophages & T or B lymphocytes cells.

5

Subject: Fundamentals of Immunology

॥ ज्ञान, विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार ॥
- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

(अधिकारप्रदत्त स्वायत्त)
कोल्हापूर

VIVEKANAND COLLEGE, KOLHAPUR.
(Empowered Autonomous)

SUPPLIMENT

08/10

Jr. Supervisor's Sign. :	
Students Sign. :	
Seat No. : 7958	
Seat No. in words : Seven-Nine-five-eight.	
Suppliment No. : -	
16071	
Centre: V.C.K	

प्र. क्र.
Q. No.

Q.1] Active Immunity and properties of active immunity: Explain in detail.
Q.2] Natural Killer cells (NK. cells)

Ans Q.1] 1] Active immunity is a resistance developed by an individuals immunity as a result of antigenic stimulation.
2] It gain entrance by an natural infection or through artificial immunonization such as vaccination.
3] Active immunity functions activiley by person's immune system when foreign particle or antigen came in contact.

- Properties of active immunity are as follow:
1) Active immunity is a resistance developed by an individuals immune system when came in contact with antigen stimulus.
2) It go through lag phase, i.e some time period is required to produce antibody or immune sensitized cells when antigen stimulation occurs.
3) During the procese of differentiation the level of antibody sometimes is less than required to eliminate antigen. Then it goes through negative phase.

प्र. क्र. Q. No.

4) It is long lasting immunity.
5) It have memory cells.
6) Though the subsequence challenges get readily available.
7) It is not effective in immuno deficient person.
8) They produce antibody when they expose to antigenic stimulation.
9) It is most effective against the antigenic stimulation as compared to passive immunity.

4

प्र. क्र. Q. No.

Q.2) Ans 1] They are in a small population.
2] They are non-phagocytic in nature.
3] They are called as null cells.
4] Sometimes natural killer cells known in common name for null cells.
5] The cells which are 'antibody independent' are known as Natural killer cells.
6] They lack tag phage.
7] They are also reffered as innate immunity cells.
8] Because they are naturally occuring cells.
9] The cells which are 'antibody dependent' are known as killer cells.
10] The killer cells also reffered as 'K cells'.
11] The killer cells required antibody production.
12] This cells are present on the ~~of~~ organs which come in contact with outer environment.
13] Such as skin, mucosal layer of nose, eyes, ears, intestine surface, stomach surface etc.
14] They include tag phage.
15] The Natural killer cells are also termed as 'NK' cells.

4

"Dissemination of Education for Knowledge, Science and culture"
- Shikshanmaharshi Dr.Bapuji Salunkhe

Vivekanand College Kolhapur

(An Empowered Autonomous Institute)

Department of Biotechnology Optional

NOTICE

Date-10/02/2026

This is informed to all students of B.Sc. III Biotechnology (Optional) that there is an arrangement of internal exam for term work for semester 5 for following subjects as follows.

Sr.no	Subject name	Date	Time	Marks
1	Gene technology & Bioinformatics	11/02/026	11.30-12.00	10
2	Fundamentals of Animal Tissue Culture	12/02/026	11.30-12.00	10
3	Cell Metabolism & Virology	13/02/026	12-30-1.00	10
4	Fermentation Technology-2	14/02/026	12-30-1.00	10

Dr. S.B. Mulla

Head of the department

HEAD
DEPARTMENT OF BIOTECHNOLOGY (OPTIONAL)
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

"Dissemination of Education for Knowledge, Science and culture"
- Shikshanmaharshi Dr.Bapuji Salunkhe

Vivekanand College Kolhapur
(An Empowered Autonomous Institute)
Department of Biotechnology Optional
Internal exam Semester VI

Roll call	Name of student	11/2/2026	12/2/2026	13/2/26	14/2/2026
8352	CHAVAN SWARA SHIVAJI				
8353	HIRAVE RIYA SANJAY				
8354	JADHAV SHREEPAD BABAN				
8355	KAMBLE AMRAPALI YASHVANT				
8356	KAMBLE KARAN SURESH				
8357	MAGDUM HARSHVARDHAN A.				
8358	PATIL SANIKA YUVRAJ				
8359	PATIL SNEHAL ANANDA				
8360	SAKATE RITESH KIRAN				
8361	SHAIKH MOIN RIYAJ				
8362	SHINDE BHAKTI BHAGAVAT				
8363	BEG UZMA SALIM				
8364	BIRADAR VAISHNAVI MADHUKAR				
8365	BIRAJDAR ARYAN RAJU				
8366	DESAI SHAHEEN SHABBIR				
8367	DISLE PRERANA SHIVAJI				
8368	GHORPADE TANISHKA MANOJ				
8369	JADHAV PRAJWAL MOHAN				
8370	KOLHAPURE HAFSA RIZWAN				
8371	MORE ABHISHEK ARUN				
8372	NALANG TANVI KIRAN				
8373	PATIL ABHINANDAN BABASO				
8374	PATIL SAKSHI PRAKASH				
8375	PENDHARI ZIYA MOHAMMAD S.				
8376	RAWOOL AMRUTA SUBHASH				
8377	SANGRULE ATHARV RAMESH				
8378	SAWANT ANKIT DIPAK				
8379	SHINDE KUNAL VISHAL				

॥ ज्ञान, विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार ॥
– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

(अधिकारप्रदत्त स्वायत्त)
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SUPPLIMENT (9/10)

Gene Technology & Bioinformatics

प्र. क्र.
Q. No.

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Q1. Scheme for DNA Fingerprinting

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• DNA fingerprinting:

– DNA fingerprinting is a technique which is used to detect the variations in DNA sequences among individuals, creating pattern (or fingerprint) that is unique to each person.

– DNA fingerprinting is also known as 'DNA Profiling' or 'Genetic Fingerprinting'.

– The term DNA fingerprinting was coined by Alec Jeffrey's in 1984.

• Scheme for DNA Fingerprinting:

The process of DNA fingerprinting follows the following scheme –

i) DNA Extraction or DNA Isolation
ii) Fragmentation (using Restriction digestion & PCR amplification)

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iii) Separation (using gel electrophoresis & Southern bl
iv) Hybridization (using probe)
v) Detection (by using autoradiography)

i) DNA Extraction :
- DNA is isolated from the blood, saliva, hair of children, suspected person or from the same parent and suspected criminal (based on the cases).
- Then the DNA is isolated by using different enzymatic methods such as Phenol : Chloroform method or Alkaline - lysis method.

ii) Fragmentation :
a. Restriction Digestion -
- It is an older method.
- In that, the DNA should be cut into smaller fragments by using specific restriction enzymes.
- The resulted fragments may vary in size.

b. PCR amplification -
- It is a modern method.
- In this, using PCR the fragments may be amplified.
- PCR amplification is done by using primers.

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iii) Separation :
a. Gel electrophoresis -
- The separation in that is done on the basis of size.
- During process, the smaller fragments can move faster than the larger fragments.
- This results or creates the series of bands on the gel.

b. Southern Blotting -
- The fragments on the gel are get transferred onto the gel membrane.

iv) Hybridization :
a. Probe -
- The ~~probes~~ hybridization is the connection between the probe and DNA fragments.
- The probes that are complementary to the targets DNA are bind to the fragments and the remaining were washed out.
- ^{32}P probe is used for DNA and RNA.
- ^{35}S probe is used for protein.

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v) Detection :

a. Autoradiography -

- The detection of probes or location of probes is done by using autoradiography.
- Detection is done by using X-ray film or other ~~det~~ computer methods of detection.

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- EMBL is the collaboration with GenBank and the DDBJ.
- EBI (European Bioinformatics Institute) can maintained the EMBL (European Molecular Biology Laboratory).
- EMBL is the part of EBI.

3) DDBJ –
- DDBJ stands for ~~DI Databank of DNA~~ DNA Databank, Japan.
- DDBJ is the collaboration with GenBank and EMBL.
- They share there information not only for Japan but for other some Asia contries.

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08/10

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प्र. क्र. Q. No.

1) Cell Proliferation
2) Serum free media
3) Cell differentiation
4) Natural media & Artificial media

2) Serum free media :-
→ Serum free media contains :-
1) Proteins :-
i) Albumins :- ~~Binding~~ Carrier & buffer, transport Proteins
funct^n → Breaking of fatty acids & lipids.
ii) Globulins :- Binding & transport of lipids.

2) Amino acids :-
Role :- Building blocks of protein & maintaing molecules.
funct^n :- Protein synthesis.

3) Vitamins :-
i) Vitamin-A :- stimulates differentiation of cell
Reduces stress response.
ii) Folic acid :- Cell ~~Prof~~ Proliferation

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4) Hormones :-
i) EGF :- stimulates epithelial cell lines.
ii) FGF :- Regulates differentiation.

5) Growth factors :-

Advantages & Disadvantages of serum-free media.

1) Advantages :-
① Selection of media with defined composition :-
- A large number of advantage in culture growth of cell is desired with define composition.
② Regulation of differentiation :-
- In this use of factors or set of factors is used for differentiation of cells with desired functions of them.

2) Disadvantages :-
① Need of extra media :-
- There is an limitation in this serum-free media that it may not be used in different stages of culture in same cell-lines.
- Hence, it requires separate media for cell lines.
- It may creates difficulties in handling cell lines.
- Required different media for different cell lines.
② cost :-
- It is more expensive than serum contain media, because serum-free media having pure components.
- Serum-free media is more costly.

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9) Natural media & Artifical media :-
1) Natural media :-
- In natural media in old yrs they uses biological resource or component in cell line culture.
- The factor or components they use like body fluid; Pleural fluids, Plasma, Serum, lymph aminotic fluids etc.
- Tiss extract done from chick embryo which is commonly used in culture.
- The extract of spleen, liver, leucocytes are also used in cultured media.
- Still some workers use natural media for organ cultures.

2) Artifical media :-
- The artifical media used in cellline culture since from 1950.
- The primilarily criteria for animal cell culture is,
  - Maintain physiological pH around 7.0 with adequate buffering.
  - Sterilied media has to be used & isotonic for cells.
  - Maintaing proper Osamolarity & temperature.
- Basically the s media require Balance salt solutions for proper growth & proliferations.
- Balgare salt solutions also used in serum free media & culture media.
- The physicochemical properties arise in cell line culture

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10/10

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प्र. क्र.
Q. No.

1) Concept of Catabolism, Anabolism, metabolism and Amphibolism.
2) Characteristics of Viruses.
3) Fatty acid
4) Urea cycle
5) Component of Electron Transport Chain.

1) Concept of Catabolism, Anabolism, metabolism and Amphibolism.

Catabolism :
- It is the set of metabolic processes that break down of complex molecules into simpler form.
- In the Catabolism reaction, they release the energy for next reaction that is Anabolism.
- The energy transfer in the form of ATP.

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Anabolism :

- It is the set of the metabolic process that release the energy from catabolic reaction is used to synthesis the molecules.
- In the Anabolism there are three steps are present.
- Production of Precursors like amino acids, monosaccharides, nucleosides.
- These precursors adsorption into the reactive form.
- then these precurssors are assembles into the complex molecules like lipids, protein, Etc.

Amphibolism :

- The Amphibolism is refuse to get into the metabolic pathways.
- But they shows both characteristics of Anabolism and catabolism in these reaction.
- They allows the Break down of complex molecule into simpler form for release energy.
- Also synthesis of complex molecules.

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Metabolism :

- In the Metabolism there are types that is anabolism reaction and Catabolism reaction.
- The Metabolism is the having capacity to double number of cells.
- Example : The ecoli bacteria double in 40 days ~~only~~ with only provide glucose and amino acid while if they provide all nutrients then they, doubled into 20 days.

2) Characteristics of Viruses.

- The Viruses are Ultramicroscopic, so they only visible ~~when~~ under electron microscope.
- The larger viruses are 450 nm in diameter while smaller viruses are 110 nm in diameter.
- The viruses cultivated only on the living cells.
- Because they live on the host for their food.

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- The viruses are caused diseases in plants, animals and humans.
- The viruses are acellular in nature thats why they have no cytoplasm and cell organelles.
- The viruses are oligate intracellular parasites.
- they are many microorganisms so they crystallized and behaves like the chemicals.
- The viruses have genetic material that is RNA or DNA.
- The DNA are one stranded or Double Stranded present.
- The viruses only have onetype of genetic material either DNA or RNA.
- They are surrounded by protein are called capsid.
- The Viruses are directly attack on the genetic material.