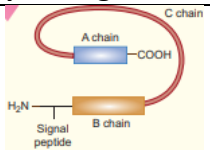
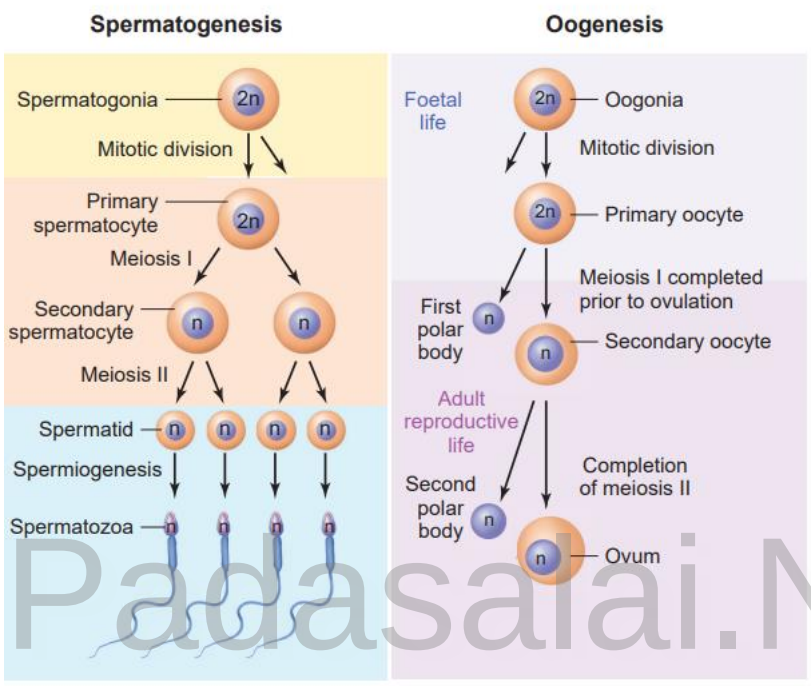
12TH COMMON PUBLIC EXAMINATION MARCH 2025

BIOZOOLOGY TENTATIVE ANSWERKEY MARKS -35

<table>
<tr><th>S.no</th><th>SECTION-A</th><th>Total marks</th></tr>
<tr><td>1.</td><td>b. Denaturation, Primer annealing, Synthesis</td><td>1</td></tr>
<tr><td>2.</td><td>c.Sexual</td><td>1</td></tr>
<tr><td>3.</td><td>a.N-1 rule</td><td>1</td></tr>
<tr><td>4.</td><td>a.Statement 1 is correct but statement 2 is incorrect</td><td>1</td></tr>
<tr><td>5.</td><td>a.Biotic potential</td><td>1</td></tr>
<tr><td>6.</td><td>c. Semiconservative nature of DNA replication</td><td>1</td></tr>
<tr><td>7.</td><td>a.Rhizopus nigricans</td><td>1</td></tr>
<tr><td>8.</td><td>c.Both A and R is false</td><td>1</td></tr>
<tr><td></td><td>SECTION -B</td><td></td></tr>
<tr><td>9.</td><td>The earth has experienced quite a few mass extinctions due to environmental catastrophes. A mass extinction occurred about 225 million years ago during the Permian, where 90% of shallow water marine invertebrates disappeared</td><td>2</td></tr>
<tr><td>10.</td><td><table><tr><th>S.no</th><th>Complete parthenogenesis</th><th>Incomplete parthenogenesis</th></tr><tr><td>1</td><td>Complete parthenogenesis is the only form of reproduction in certain animals and there is no biparental sexual reproduction</td><td>Incomplete parthenogenesis is found in some animals in which both sexual reproduction and parthenogenesis occurs.</td></tr><tr><td>2</td><td>There are no male organisms and so, such individuals are represented by females only.</td><td>Male organism is involved.
e.g. In honey19bees; fertilized eggs (zygotes) develop into queen and workers, whereas unfertilized eggs develop into drones (male).</td></tr></table></td><td>1
1</td></tr>
<tr><td>11.</td><td>a. Zygote Intra-Fallopian Transfer (ZIFT);
b. Intra-Cytoplasmic Sperm Injection (ICSI)</td><td>1
1</td></tr>
<tr><td>12.</td><td>Any two
The human genome contains 3 billion nucleotide bases.
• An average gene consists of 3000 bases, the largest known human gene being dystrophin with 2.4 million bases.
• The chromosomal organization of human genes shows diversity.
• Approximately 30,000 genes are present in human genome and almost 99.9 nucleotide bases are exactly the same in all people.
• Functions for over 50 percent of the discovered genes are unknown. • Less than 2 percent of the genome codes for proteins.
• Repeated sequences make up very large portion of the human genome. Repetitive sequences have no direct coding functions but they shed light on</td><td>1+1</td></tr>
</table>

	chromosome structure, dynamics and evolution (genetic diversity). • Chromosome 1 has 2968 genes whereas chromosome Y has 231 genes. • Scientists have identified about 1.4 million locations where single base DNA differences (SNPs – Single nucleotidepolymorphism – pronounce as 'snips') occur in humans. Identification of 'SNIPS' is helpful in finding chromosomal locations for disease associated sequences and tracing human history.	
13.	Structures which are similar in origin but perform different functions called homologous structures that brings about divergent evolution. Eg:Fore limbs of vertebrates exhibit anatomical similarity with each other and is made of similar bones such as humerus, radius, ulna, carpals, metacarpals and phalanges.	1 1
14.	 Or A chain and B chain joined by C chain. Signal peptide attached to the B chain	2
	SECTION -C	
15.	Sertoli cells secrete inhibin, a hormone which is involved in the negative feedback control of sperm production.	3
16.	Affected individual lacks phenylalanine hydroxylase enzyme, so phenylalanine accumulates and gets converted to phenylpyruvic acid and other derivatives. It is characterized by severe mental retardation, light pigmentation of skin and hair. Phenylpyruvic acid is excreted in the urine.	1 2
17.	Any Three points Darwin failed to explain the mechanism of variation. • Darwinism explains the survival of the fittest but not the arrival of the fittest. • He focused on small fluctuating variations that are mostly non-heritable. • He did not distinguish between somatic and germinal variations. • He could not explain the occurrence of vestigial organs, over specialization of some organs like large tusks in extinct mammoths, oversized antlers in the extinct Irish deer, etc.	3
18.	Any three adaptations 1.Earthworms and land Planarians secrete a mucus coating to maintain a moist situation for burrowing, coiling, respiration, etc., 2. Arthropods have an external covering over the respiratory surfaces and welldeveloped tracheal systems. 3. In vertebrate skin, there are many cellular layers besides the well protected respiratory surfaces that help in preventing loss of water. 4. Some animals obtain their water requirement from food as partial replacement of water lost through excretion. 5. Birds make nests and breed before the rainy season as there is availability of abundant food. But during drought birds rarely reproduce.	

	6. Camels are able to regulate water effectively for evaporative cooling through the skin and respiratory system and excrete highly concentrated urine, and can also withstand dehydration up to 25% of their body weight	
19.	**ELISA** **It is a highly sensitive and specific method used for diagnosis HIV Positive or negative.** **ELISA possesses the added advantages of not requiring radioisotopes or a radiation counting apparatus**	**1** **1** **1**
	SECTION D	
20.(a)	 **Fig. 2.5 Gametogenesis**	**5**
(b)		**5**

Sl.No	Active Immunity	Passive Immunity
1	Active immunity is produced actively by host's immune system.	Passive immunity is received passively and there is no active host participation.
2	It is produced due to contact with pathogen or by its antigen.	It is produced due to antibodies obtained from outside.
3	It is durable and effective in protection.	It is transient and less effective.
4	Immunological memory is present.	No memory.
5	Booster effect on subsequent dose is possible.	Subsequent dose is less effective.
6	Immunity is effective only after a short period.	Immunity develops immediately.

21(a)	**DNA fingerprinting** **1.Extraction of DNA** **The process of DNA fingerprinting starts with obtaining a sample of DNA from blood, semen, vaginal fluids, hair roots, teeth, bones, etc.** **2. Polymerase chain reaction (PCR)** **In many situations, there is only a small amount of DNA available for DNA fingerprinting. If needed many copies of the DNA can be produced by PCR (DNA amplification).** **3. Fragmenting DNA**	**5**

DNA is treated with restriction enzymes which cut the DNA into smaller fragments at specific sites.

4. Separation of DNA by electrophoresis

During electrophoresis in an agarose gel, the DNA fragments are separated into bands of different sizes. The bands of separated DNA are sieved out of the gel using a nylon membrane (treated with chemicals that allow for it to break the hydrogen bonds of DNA so there are single strands).

5. Denaturing DNA

The DNA on gels is denatured by using alkaline chemicals or by heating.

6. Blotting

The DNA band pattern in the gel is transferred to a thin nylon membrane placed over the 'size fractionated DNA strand' by Southern blotting.

7. Using probes to identify specific DNA

A radioactive probe (DNA labeled with a radioactive substance) is added to the DNA bands. The probe attaches by base pairing to those restriction fragments that are complementary to its sequence. The probes can also be prepared by using either 'fluorescent substance' or 'radioactive isotopes'.

8. Hybridization with probe

After the probe hybridizes and the excess probe washed off, a photographic film is placed on the membrane containing 'DNA hybrids'.

9. Exposure on film to make a genetic/DNA Fingerprint The radioactive label exposes the film to form an image (image of bands) corresponding to specific DNA bands. The thick and thin dark bands form a pattern of bars which constitutes a genetic fingerprint.

Or

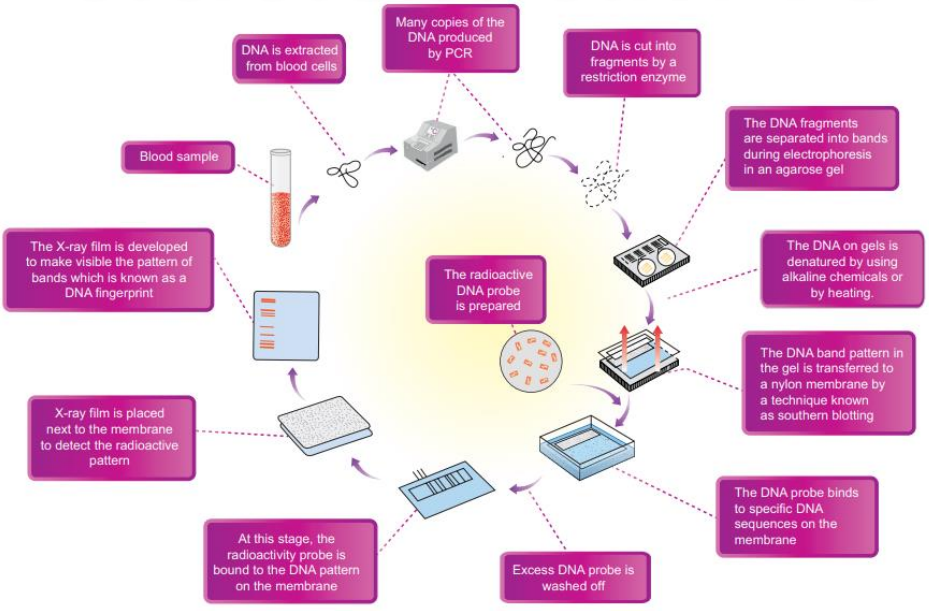


Fig. 5.16 The Steps involved in DNA Fingerprinting technique

(b) **5**

Waste category	Source
Residential	Food wastes, plastics, paper, glass, leather, cardboard, metals, yard wastes, ashes, tires, batteries, old mattresses
Industrial	Packaging wastes, ashes, chemicals, cans, plastics, metal parts
Commercial	Thin and thick plastics, food wastes, metals, paper, glass, wood, cardboard materials
Institutional	Wood, paper, metals, cardboard materials, electronics
Construction and Demolition	Steel materials, concrete, wood, plastics, rubber, copper wires, dirt and glass
Agriculture	Agricultural wastes, spoiled food, pesticide containers
Biomedical	Syringes, bandages, used gloves, catheter, urine bags, drugs, paper, plastics, food wastes, sanitary napkins and diapers, chemicals
E-Waste	Electronic items like used TVs, transistors, tape recorders, computer cabinets, mother boards, CDs, cassettes, mouse, wires, cords, switches., chargers

Its easy to reduce Agriculture waste .
It s difficult to reduce the industrial ,commercial, Biomedical and E wastes.

Prepared by

GOMATHI O