

**Marking Scheme**  
**Strictly Confidential**  
**(For Internal and Restricted use only)**  
**Senior Secondary School Examination, 2026 (XII<sup>th</sup>)**  
**SUBJECT NAME : Biology (Q.P. CODE 044/57-1-3)**

**General Instructions: -**

<b>1</b>	The CBSE has decided to introduce On Screen Marking (OSM) for the evaluation of Class XII answer Book with the 2026 Examination.
<b>2</b>	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
<b>3</b>	<b>“Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, evaluation done and several other aspects. Its leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in Newspaper/Website, etc. may invite action under various rules of the Board and IPC.”</b>
<b>4</b>	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one’s own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. <b>However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In Class-XII, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.</b>
<b>5</b>	The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
<b>6</b>	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
<b>7</b>	Evaluators will mark ( ✓ ) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. <b>This is most common mistake which evaluators are committing.</b>
<b>8</b>	If a question has parts, please award marks on the right-hand side for each part in the OSM Portal. Marks awarded for different parts of the question will be totaled up by the OSM System.
<b>9</b>	If a question does not have any parts, marks must be awarded in the left-hand margin in the OSM Portal. This may also be followed strictly.

10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 0 to 70 has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
13	<p>Ensure that you do not make the following common types of errors committed by the Examiner in the past :-</p> <ul style="list-style-type: none"> <li>• Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)</li> <li>• Half or a part of answer marked correct and the rest as wrong, but no marks awarded.</li> </ul>
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.
15	The Examiners should acquaint themselves with the guidelines given in the “ <b>Guidelines for Spot Evaluation</b> ” before starting the actual evaluation.
16	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.
17	<b>If a candidate attempts both alternatives/options in a question where only one option/ alternative is required to be attempted, the Evaluator shall award marks in both the options. The system will take the higher of two scores and disregard the other response.</b>
18	<b>In a question having two options/alternatives, if a candidate has attempted only one, then the evaluator shall mark “NA” (Not attempted) against the option that has not been attempted by the candidate.</b>

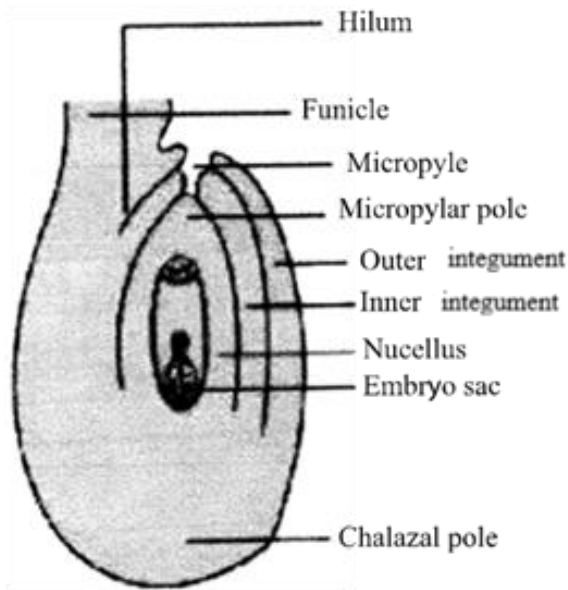
**MARKING SCHEME**  
**Biology (Subject Code-044)**  
**(PAPER CODE : 57/1/3) (26-01-44N)**

Q.No.	EXPECTED OUTCOMES/VALUE POINTS	Marks	Total Marks
	<b>SECTION -A</b>		
1.	(B) / Nucellus	1	1
2.	(D) / Cancer	1	1
3.	(A) / Jaintia hills	1	1
4.	(A) / Stratification	1	1
5.	(B) / Their replication is controlled by chromosomal DNA	1	1
6.	(B) / Ligaments	1	1
7.	(B) / (i) and (iii) are correct	1	1
8.	(C) /Appearance of new traits by mutations.	1	1
9.	(C) / Selectable marker	1	1
10.	(B) / 84	1	1
11.	(B) / Genetically different strains of rice in India – Less than 1000	1	1
12.	(A) / Tomato and Potato	1	1
13.	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
14.	(D) / Assertion (A) is false, Reason (R) is true	1	1
15.	(C) / Assertion (A) is true, Reason(R) is false	1	1
16.	(C) / Assertion (A) is true, Reason(R) is false	1	1
	<b>SECTION -B</b>		
17.	<ul style="list-style-type: none"> <li>• Disease Region A-Typhoid Region B – Filariasis/Elephantiasis</li> <li>• Causative organism Region A– <i>Salmonella typhimurium</i> Region B – <i>Wucheraria bancrofti</i> / <i>Wucheraria malayi</i></li> </ul> <p style="text-align: right;"><b>(Any one)</b></p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2

18.	<p>(a)</p> <p>(i) Dormancy is crucial for storage (dehydration) of seeds to be used to raise the crops in next season / Seeds are used as source of food / for commercial purpose</p> <p>(ii)</p> <table border="1"> <tr> <td>Pea seed</td> <td>Castor seed</td> </tr> <tr> <td>Non endospermic seed</td> <td>Endospermic seed</td> </tr> <tr> <td>Non-albuminous seed</td> <td>Albuminous seed</td> </tr> <tr> <td>No endosperm is left in the seed as it is fully consumed during embryo development.</td> <td>It contains some amount of endosperm as it is not consumed completely during embryo development.</td> </tr> </table> <p style="text-align: center;"><b>(Any one difference)</b></p> <p style="text-align: center;"><b>OR</b></p> <p>(b)</p> <ul style="list-style-type: none"> <li>• Tertiary follicle in the ovary</li> <li>• Secondary oocyte and 1<sup>st</sup> polar body.</li> </ul>	Pea seed	Castor seed	Non endospermic seed	Endospermic seed	Non-albuminous seed	Albuminous seed	No endosperm is left in the seed as it is fully consumed during embryo development.	It contains some amount of endosperm as it is not consumed completely during embryo development.	<p>1</p> <p>1</p> <p>1</p> <p>1/2+1/2</p>	<p></p> <p></p> <p></p> <p>2</p>
Pea seed	Castor seed										
Non endospermic seed	Endospermic seed										
Non-albuminous seed	Albuminous seed										
No endosperm is left in the seed as it is fully consumed during embryo development.	It contains some amount of endosperm as it is not consumed completely during embryo development.										
19.	<p>Advantages of producing plant by micropropagations are :</p> <p>-Large number of plants can be produced in very short duration.</p> <p>-These plants will be genetically identical to the original plant from which they were grown i.e. they are somaclones.</p> <p>- Disease free plant from disease infected plant can be obtained</p> <p>- Any other advantage</p> <p style="text-align: right;"><b>(Any Two )</b></p>	<p><b>1+1</b></p>	<p><b>2</b></p>								
20.	<p>(a)</p> <p>-Communication was not easy at that time.</p> <p>-Concept of genes as stable and discrete units that controlled the expression of traits and of the pair of alleles which did not blend with each other was not accepted by his contemporaries.</p> <p>-Using mathematics to explain biological phenomenon was new and unacceptable.</p> <p>-Mendel could not provide any physical proof for the existence of factors or what they are made of.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b)</p> <p>Adaptive radiation -The process of evolution of different species in a given geographical area starting from a point and literally radiating to other areas of geography.</p>	<p>1/2x4</p> <p>1</p>	<p></p>								

	Example – Darwin’s finches in Galapagos islands. From original seed eating birds other forms arose with altered beaks enabling them to become insectivorous and vegetarian/ A number of marsupials each different from the other evolved from an ancestral stock but all within the Australian island continent /or any other example	1	2
21.	<p>(a) (i)</p> <ul style="list-style-type: none"> <li>Primary Productivity -It is the amount of biomass or organic matter produced per unit area over a time period by plants during photosynthesis.</li> <li>It is measured in terms of- energy / Kcal per m<sup>2</sup> per year / weight / g per m<sup>2</sup> per year.</li> </ul> <p>(ii) Gross primary productivity minus respiratory losses is the net primary productivity /</p> <p style="text-align: center;">NPP - Net Primary Productivity GPP -Gross Primary Productivity R-Respiratory losses.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b)</p> <p>Four types of advanced techniques of ex – situ conservation of biodiversity are-</p> <ul style="list-style-type: none"> <li>-Gametes or pollens of threatened species can be preserved in viable and fertile conditions for long periods using cryopreservation techniques or at -196<sup>0</sup> C</li> <li>-Eggs can be fertilized in vitro.</li> <li>-Plants can be propagated by tissue culture method</li> <li>-Seeds of different genetic strains of commercial importance can be stored in seed banks.</li> </ul>	<p>½</p> <p>½</p> <p>1</p> <p>½x4</p>	2
	<b>SECTION -C</b>		
22.	<p>(a)</p> <ul style="list-style-type: none"> <li>No bands will be seen in agarose gel.</li> <li>DNA fragments being negatively charged will not move towards negative end or cathode / DNA being negatively charged will remain positioned at anode or positive end.</li> </ul> <p>(b)</p> <ul style="list-style-type: none"> <li>Position of positive terminal or anode and negative terminal or cathode has been interchanged.</li> <li>Band at X being the smallest fragment of DNA move farthest towards the anode.</li> </ul>	<p>½</p> <p>½</p> <p>1</p> <p>1</p>	3

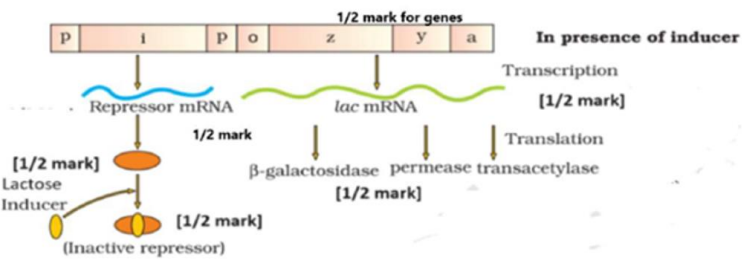
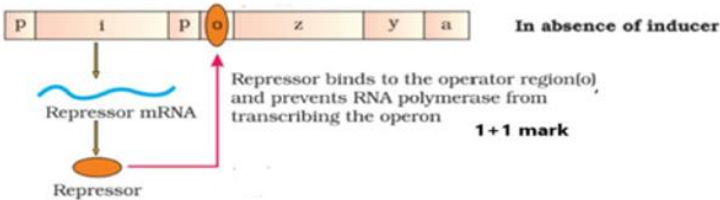
23.	<p>(a)</p> <p>Source plant - <i>Papaver somniferum</i> Part - latex of the plant</p> <p>(b)</p> <ul style="list-style-type: none"> <li>Heroin is formed by acetylation of morphine.</li> <li>Morphine → It is effective sedative/ used as pain killer/ useful in patient who have undergone surgery</li> </ul> <p>Heroin is a depressant / slows down body function</p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>	3
24.	<p>(a)</p> <ul style="list-style-type: none"> <li>No</li> <li>-In cereals or rice or wheat pollen grains lose viability within 30 minutes of their release ,</li> <li>-In some members of Rosaceae or Leguminosae or Solanaceae –they maintain viability for months ,</li> <li>- or any other correct example</li> </ul> <p>(b)</p> <p>They are stored using Cryo-preservation techniques / In liquid nitrogen at <math>-196^{\circ}\text{C}</math></p>	<p><math>\frac{1}{2}</math></p> <p>1</p> <p>1</p> <p><math>\frac{1}{2}</math></p>	3
25.	<p>(a)</p> <ul style="list-style-type: none"> <li>Pedigree analysis –It is analysis of traits or inheritance of traits in several generations of a family.</li> <li>Importance : To trace the inheritance of a trait , abnormality or a disease.</li> </ul> <p>(b)</p> <p>(i) Autosomal- Recessive</p> <p>(ii) Sickle Cell Anaemia / Thalassemia / Phenylketonuria /Any other correct example.</p>	<p>1</p> <p><math>\frac{1}{2}+\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>	3
26.	<p>(a)</p> <p>According to Hardy Weinberg principle –</p> <p>Sum total of all the Allelic frequencies in a population = 1.</p> <p>Let there be two alleles A and a in the population. Let their frequencies be 'p' and 'q' respectively.</p> $p + q = 1$ <p>The frequency of AA will be <math>p^2</math> because - the probability that an allele A with frequency 'p' would appear on both the chromosomes of a diploid individual will be product of probabilities i.e. <math>p^2</math>.</p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>	

	<p>Similarly frequency of 'a' will be <math>q^2</math> ,</p> <p>and Aa is <math>2pq</math></p> <p>Hence <math>p^2 + 2pq + q^2 = 1</math></p> <p>(b)</p> <p>Gene migration or Gene flow, Genetic drift, Mutation, Genetic Recombination, Natural selection</p> <p style="text-align: right;">(Any two)</p>	$\frac{1}{2}$  $\frac{1}{2}$  $\frac{1}{2} + \frac{1}{2}$	3
27.	<p>-Tissue culture</p> <p>-Meristem (apical and axillary) of a virus infected plant, is grown in sterile nutrient medium (in vitro).</p> <p>-Carbon source as sucrose is added to the medium</p> <p>-inorganic salts , vitamins and amino acids are added to the medium</p> <p><b>(Consider any two components of the medium for awarding half marks)</b></p> <p>-Growth regulators like Auxins and Cytokinins are also provided.</p> <p>Thus a healthy sugarcane plant is regenerated which is genetically similar to parent plant</p>	$\frac{1}{2}$  $\frac{1}{2} + \frac{1}{2}$  $\frac{1}{2}$  $\frac{1}{2}$  $\frac{1}{2}$	3
28.	 <p style="text-align: right;">(Label any six parts)</p>	$\frac{1}{2} \times 6$	3

	SECTION-D		
29.	<p>(a)</p> <p>-Competitive release.</p> <p>-A species whose distribution is restricted to small geographical area due to the presence of competitively superior species expands its distributional range when competing superior species is removed.</p> <p style="text-align: center;"><b>OR</b></p> <p>(a)</p> <p>Gause's competitive exclusion principle, states that two closely related species cannot co-exist indefinitely and the competitively inferior one will be eliminated eventually.</p> <p>(b)</p> <p>In shallow south American lakes visiting flamingos and resident fishes compete for common food Zooplankton / any other correct example</p> <p>(c)</p> <ul style="list-style-type: none"> <li>By "Resource partitioning"</li> </ul> <p>They choose different times for feeding or different foraging patterns e.g. Five closely related species of warblers avoid competition and coexist due to behavioural differences in their foraging activities / any other correct example.</p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2} + \frac{1}{2}</math></p> <p>1</p> <p>1</p> <p>1</p>	4
30.	<p>(a)</p> <p>Cross I – Genotypes TT and tt / TT and Tt / TT and TT</p> <p>Cross II – Genotypes Tt and Tt.</p> <p style="text-align: center;"><b>OR</b></p> <p>(a)</p> <p>Monohybrid Cross</p> <p>(b)</p> <ul style="list-style-type: none"> <li>Test Cross.</li> <li>It is done to find the genotype of an organism showing dominant phenotype.</li> </ul> <p>(c)</p> <ul style="list-style-type: none"> <li>It shows that tall trait is dominant over dwarf .</li> </ul> <p>Genetic principle – Law of Dominance.</p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p> <p>1</p> <p>1</p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>	4
	SECTION-E		
31.	<p>(a)(i) <i>Plasmodium falciparum</i></p> <p>(ii)</p> <ul style="list-style-type: none"> <li>Female Anopheles Mosquito</li> </ul>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>	



	<ul style="list-style-type: none"> <li>-Mosquito picks up gametocytes from the infected person.</li> <li>-Fertilization and development takes place in mosquito gut.</li> <li>-Sporozoites from gut migrate to salivary glands of mosquito.</li> </ul> <p>(iii) After entering the blood stream they enter liver, and then into red blood cells and reproduce asexually, RBCs rupture and a toxic substance haemozoin is released causing chills and high fever.</p> <p>(iv) -Avoiding stagnation of water in and around residential areas.          -Regular cleaning of household coolers.          -Use of mosquito nets.          -Introduce fishes like Gambusia in ponds – they feed on mosquito larval.          -Spraying insecticides in ditches of doors and windows to have wire mesh.          -Any other preventive measures.</p> <p style="text-align: right;"><b>(Any two)</b></p> <p style="text-align: center;"><b>OR</b></p> <p>(b)</p> <p>(i) Bio fertilizers – Organisms that enrich the nutrient quality of soil. e.g. bacteria fungi and cyanobacteria.</p> <p>(ii)</p> <p>-Bacteria / <i>Rhizobium</i> / <i>Azotobacter</i> / <i>Azospirillum</i></p> <p><i>Rhizobium</i> forms symbiotic association with roots of leguminous plants and fix atmospheric nitrogen into organic forms to be used by the plant,</p> <p><i>Azotobacter</i> or <i>Azospirillum</i> fix atmospheric nitrogen while free living in the soil.</p> <p><b>(Award one mark for any one organism with its correct contribution)</b></p> <p>-Fungi /genus <i>Glomus</i> .</p> <p>Fungi breakdown organic matter to release nutrient,  <i>Glomus</i> form mycorrhiza with roots of the plants .          This association helps to absorb phosphorous from soil and pass to the plant,          plants show resistance to root-borne pathogens,          plants show tolerance to salinity and drought ,          There is increase in plant growth.</p> <p style="text-align: right;"><b>(Any one )</b></p> <p>-Cyanobacteria / <i>Anabaena</i> / <i>Nostoc</i> / <i>Oscillatoria</i></p> <p>Fix atmospheric Nitrogen , serve as important biofertilizers in paddy fields  <b>(Any one )</b></p> <p>(iii)-Bio fertilizers do not pollute our environment (soil, ground water).          -They conserve the beneficial soil microbes.          -Do not cause contamination and harm human health.</p> <p style="text-align: right;"><b>(Any two advantages)</b></p>	<p><math>\frac{1}{2} \times 3</math></p> <p><math>\frac{1}{2} \times 3</math></p> <p><math>\frac{1}{2} + \frac{1}{2}</math></p> <p>1</p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2} + \frac{1}{2}</math></p>	<p>5</p>
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<p>32.</p>	<p>(a)</p> <p><b>Presence of Inducer `</b></p> <ul style="list-style-type: none"> <li>-Repressor protein is synthesised from the i gene</li> <li>- Lactose act as inducer</li> <li>-Repressor protein is inactivated by interaction with the inducer molecule ie lactose molecule and thus it does not bind to operator.</li> <li>-Operon consist of three structural genes z,y and a</li> <li>-RNA polymerase binds to promoter and initiates transcription ,</li> <li>- Producing enzymes <math>\beta</math> – galactosidase, permease and transacetylase from the genes (z, y, a) thus helping in metabolism of lactose.</li> </ul> <p style="text-align: center;">/</p> <p style="text-align: center;"><b>In presence of inducer</b></p>  <p style="text-align: center;"><b>Absence of Inducer</b></p> <p>The regulatory gene i of lac operon produces a repressor protein and this protein binds to operator region of operon, and prevents RNA polymerase from transcribing the structural genes (z, y, a) not transcribed and thus enzymes are not produced.</p> <p style="text-align: center;">/</p> <p style="text-align: center;"><b>In absence of inducer</b></p> 	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2} \times 6</math></p> <p>1x2</p> <p>1x2</p>	
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	<div>(b)</div> <div>(i)</div> <table><tr><th>Mendelian Disorders</th><th>Chromosomal Disorders</th></tr><tr><td>Due to alteration or mutation in a single gene.</td><td>Absence or excess or abnormal arrangement of chromosomes.</td></tr><tr><td>Inheritance pattern can be studied by pedigree analysis</td><td>Cannot be studied by pedigree analysis</td></tr></table> <div>(ii)</div> <div><div>• Phenylketonuria</div><div>• Cause –Mutation in the gene that codes for the enzymes phenyl alanine hydroxylase (single gene mutations )</div><div>• One symptoms -Mental retardation, Hair loss, Skin pigmentation (Any one)</div><div>• Harmful Compounds Formed Phenylpyruvic acid and other derivatives.</div></div>	Mendelian Disorders	Chromosomal Disorders	Due to alteration or mutation in a single gene.	Absence or excess or abnormal arrangement of chromosomes.	Inheritance pattern can be studied by pedigree analysis	Cannot be studied by pedigree analysis	<div>1½</div> <div>1½</div> <div>½</div> <div>½</div> <div>½</div> <div>½</div>	<div>5</div>
Mendelian Disorders	Chromosomal Disorders								
Due to alteration or mutation in a single gene.	Absence or excess or abnormal arrangement of chromosomes.								
Inheritance pattern can be studied by pedigree analysis	Cannot be studied by pedigree analysis								
33.	<div>(a)</div> <div><div>• After the entry of sperm into female gamete, it undergoes meiotic division II, to produce haploid ovum ie ootid, then the nucleus of sperm and ootid fuse together to form zygote, zygote moves through the isthmus of oviduct towards uterus and it undergoes mitotic division or cleavage to form blastomeres, the embryo with 8 to 16 blastomere is called morula and it further divides and transforms into Blastocyst, blastocyst have outer layer trophoblast and inner cell mass and the trophoblast layer of blastocyst gets attached to endometrium, Uterine wall divide rapidly and covers blastocyst and this it gets embedded in the endometrium of uterus this is called implantation.</div><div>• The site of fertilization is- ampullary region of fallopian tube /isthmus ampullary junction of fallopian tube.</div></div> <div>OR</div> <div>(b) (i)</div> <div>Case I</div> <div>In vitro fertilization followed by zygote intra fallopian transfer or ZIFT / In vitro fertilization followed by Intra uterine transfer or IUT /</div>	<div>½x8</div> <div>1</div> <div>1</div>							

	<p>Intra Uterine insemination or IUI / Artificial insemination or AI .</p> <p>Case II - Invitro fertilization followed by IUT</p> <p>Case III - Intra Cytoplasmic Sperm Injection or ICSI / Artificial insemination or AI / Intra Uterine insemination or IUI.</p> <p>(ii)</p> <ul style="list-style-type: none"> <li>• The copper releasing IUD's are CUT, Cu7, Multiload 375 (Any two)</li> <li>• -Copper releasing IUD's increases phagocytosis of sperms within the uterus, -Cu ions released suppress sperm motility and the fertilising capacity of sperms.</li> </ul>	<p>1</p> <p>1</p> <p><math>\frac{1}{2} + \frac{1}{2}</math></p> <p><math>\frac{1}{2} + \frac{1}{2}</math></p>	<p>5</p>
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