

कुल पृष्ठ संख्या-32 (कवर पेज सहित)



माध्यमिक शिक्षा बोर्ड राजस्थान, अजमेर

उच्च माध्यमिक परीक्षा

(परीक्षार्थी द्वारा स्वयं भरा जाना चाहिये)

Candidate's Roll No. In English
(In Figures)
(In Words) _____

परीक्षार्थी का नामांक हिन्दी में
शब्दों में _____

नोट :- परीक्षार्थी उपरोक्त के अतिरिक्त उत्तर पुस्तिका के अन्य किसी भी भाग में अपना नामांक नहीं लिखें।
भाग में अपना नामांक नहीं लिखें।

माध्यम - हिन्दी अंग्रेजी
विषय Biology
परीक्षा का दिन Tuesday
दिनांक 19/03/19

नोट :- परीक्षार्थी के लिए आवश्यक निर्देश इस पृष्ठ के पिछले भाग पर उल्लेखित हैं। जिन्हें सावधानी पूर्वक पढ़ लें व पालना अवश्य करें।

- परीक्षक हेतु निर्देश :- (1) परीक्षक को उपरोक्त सारणी अनुसार प्राप्तांक भरना अनिवार्य है, अन्यथा नियमानुसार दंडित किया जायेगा।
(2) परीक्षक उत्तर पुस्तिका के अन्दर के पृष्ठों के बायीं ओर निर्धारित कॉलम में लाल इंक से अंक प्रदत्त करें।
(3) कुल योग भिन्न में प्राप्त होने पर उसे पूर्णांक में ही परिवर्तित कर अंकित करें (उदाहरणार्थ : 15 ¼ को 16, 17 ½ को 18, 19 ¾ को 20)

प्रश्नवार प्राप्तांकों की सारणी (परीक्षक के उपयोग हेतु)			
प्रश्नों की क्रम संख्या	प्राप्तांक	प्रश्नों की क्रम संख्या	प्राप्तांक
1		19	
2		20	
3		21	
4		22	
5		23	
6		24	
7		25	
8		26	
9		27	
10		28	
11		29	
12		30	
13		31	
14		योग	
15		प्राप्त अंकों का कुल योग (Round off)	
16		अंकों में	शब्दों में
17			
18			

परीक्षक के हस्ताक्षर संकेतांक

प्रमाणित किया जाता है कि इस उत्तर पुस्तिका के निर्माण में 58 जी.एस.एम. क्रीमवोव कागज ही उपयोग में लिया गया है।165/2019

परीक्षार्थियों के लिए आवश्यक निर्देश

1. समस्त प्रश्नों का हल निर्धारित शब्द सीमा में इसी उत्तर पुस्तिका में करना है। विशेष परिस्थिति में अतिरिक्त उत्तर-पुस्तिका से उत्तर पुस्तिका भरी हुई होने पर पर्यवेक्षक एवं वीक्षक की अनुशंसा पर ही उपलब्ध कराई जायेगी।
2. प्रश्न-पत्र पर निर्धारित स्थान पर अपना नामांक लिखें।
3. प्रश्न-पत्र हल करने के पश्चात् जिस पृष्ठ पर हल समाप्त होता है, उस पर अन्त में "समाप्त" लिखकर अन्त सभी रिक्त पृष्ठों को तिरछी लाइन से काटें।
4. निम्न बातों का विशेष ध्यान रखें अन्यथा अनुचित साधनों की रोकथाम अधिनियम के तहत कार्यवाही की जा सकेगी।
 - (i) उत्तर पुस्तिका के ऊपर/अन्दर तथा प्रश्नोत्तर के किसी भी भाग में चाही गई सूचना के अलावा अपना नाम, पता, फोन नम्बर अथवा पहचान की कोई अन्य प्रकार की सूचना आदि अंकित नहीं करें अन्यथा "अनुचित साधनों के प्रयोग" के अन्तर्गत कार्यवाही की जावेगी।
 - (ii) उत्तर पुस्तिका के पृष्ठों को फाड़ें नहीं। उत्तर-पुस्तिका के मुख पृष्ठ पर अंकित संख्या के अनुसार पृष्ठ होने चाहिये। परीक्षार्थी उत्तरपुस्तिका प्राप्त करते ही पृष्ठ संख्या की जांच कर लें यदि पृष्ठ कम/अधिक होने का क्रम में नहीं हैं तो वीक्षक से तुरन्त बदलवा लें।
 - (iii) परीक्षा केन्द्रों पर पुस्तक, लेख, कागज, केलक्यूलेटर, मोबाईल, पेजर आदि किसी भी प्रकार का इलेक्ट्रॉनिक उपकरण तथा किसी भी प्रकार का हथियार आदि ले जाना निषेध है।
 - (iv) वस्त्र, स्केल, ज्योमेट्री बॉक्स पर कुछ न लिखकर लावें। टेबुल के आस-पास कोई अवैध सामग्री नहीं लावें, इसकी जांच कर लें।
 - (v) अपनी उत्तर पुस्तिका/ग्राफ/मानचित्र आदि परीक्षा भवन से बाहर ले जाना दण्डनीय अपराध है, अतः समाप्ति पर उत्तर पुस्तिका वीक्षक को बिना साँपे परीक्षा कक्ष नहीं छोड़ें।
5. उत्तरों को क्रमानुसार एक ही स्थान पर लिखें। प्रश्न क्रमांक भी सही अंकित करें, अन्यथा दण्ड स्वरूप परीक्षा में 1 अंक कम करने का अधिकार है। बीच में उत्तर पुस्तिका के पृष्ठ रिक्त न छोड़ें। गणित विषय के लिए उत्तर पुस्तिका के अंतिम पृष्ठों पर करें तथा तिरछी रेखा से काटें।
6. जहाँ तक हो सके प्रश्न के सभी भाग के उत्तर, उत्तर पुस्तिका में एक ही स्थान पर अंकित करें।
7. भाषा विषयों को छोड़कर शेष सभी विषयों के प्रश्न-पत्र हिन्दी-अंग्रेजी दोनों भाषा में मुद्रित है। किसी भी प्रवृत्ति/अन्तर/विरोधाभास होने पर हिन्दी भाषा के प्रश्न को ही सही माना जाये।

Section - Aपरीक्षक द्वारा
प्रदत्त अंकप्रश्न
संख्या

परीक्षार्थी उत्तर

1. Agamospermy - (a = without, gomo = gamete and spermy = fertilization)

→ It means the type of reproduction in which there is no gamete formation and fertilization takes place is called agamospermy.

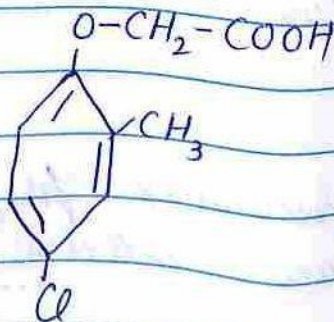
2. Deficiency of Copper (Cu) in the soil causes Dieback disease of lemon (citrus).

3) The class of enzyme which catalyses the oxidation and reduction reaction is Oxido-reductase for e.g., Alcoholic dehydrogenase

phospho Oxido reductase

4) 2-Methyl 4-Chloro Phenoxy Acetic Acid hormone i.e. (MCPA) is used to store potato tubers.

The structure can be shown as -



परीक्षक द्वारा
प्रदत्त अंकप्रश्न
संख्या

परीक्षार्थी उत्तर

5. The technique used to make lacs of copies of DNA from a single copy in very limited time is Polymerisation Chain Reaction (PCR) developed by Mullis in 1955.
6. Biogas - the gas obtained by the anaerobic respiration of bacteria in a biological ~~com~~ substance like dung of cow, buffalo etc is called biogas.
It is used as a fuel and CH_4 (methane) is its main component.
7. Platelets (Thrombocytes) blood corpuscles are necessary for starting the process of blood clotting.
8. The point on retina where both rods and cones are absent is Blind spot from where optic nerve arise. There is ~~an~~ no image formation.
9. Adrenaline hormone prepares the human body to face adverse conditions.



20. In humans, the first cervical vertebra is called Atlas.
21. Implantation - the process by which the blastocyst gets attached with the wall of uterus is called Implantation. It takes place by the end of a week.
22. The measurement of haemoglobin present in blood is called Haemoglobinometry. It can be done using Sahli's Haemoglobinometer.
23. The full form of MRI is Magnetic Resonance Imaging.

Section - B

- 14-i) The relation between diffusion pressure deficit (DPD), osmotic pressure (O.P) and Turgor pressure (T.P) can be shown as follows:

$$\boxed{\text{DPD} = (\text{O.P}) - (\text{T.P})}$$

परीक्षक द्वारा
प्रदत्त अंकप्रश्न
संख्या

परीक्षार्थी उत्तर

ii) In a flaccid cell, OP and DPD are equivalent. This is because the turgor pressure (TP) of such cell is zero as there is no liquid almost left in it. Hence, from the previous relation,

$$DPD = OP - TP$$

for flaccid cell, $TP = 0$
Then,

$$DPD = OP - 0$$

$$\Rightarrow \boxed{DPD = OP}$$

15-i) The critical elements present in soil are Nitrogen (N), Phosphorus (P) and Potassium (K)

ii) Deficiency of Mg and Zn elements appears first in apical buds.

16) A Bacteriophage is more important vector as compared to M13. This is due to the following reasons.

परीक्षक द्वारा
प्रदत्त अंकप्रश्न
संख्या

परीक्षार्थी उत्तर

- i) Bacteriophage are the viruses that can infect E. coli bacteria and hence, experiment becomes easier.
- ii) They develop a plaque area and ~~are~~ constitute double stranded circular DNA.
- 17) Explanation of Agrobacterium Mediated Gene Transfer -

⇒ Agrobacterium has a special type of plasmid called Ti-plasmid (~~Ti~~ Tumour Inducing Plasmid). This plasmid has T-DNA (Transfer DNA) as its functional part.

Whenever, this bacterium infects plants and causes crown gall disease, then it is done by T-DNA.

⇒ For using it as a vector, the harmful part of Ti plasmid is cut by restriction endonuclease enzyme and the desired gene is inserted in its place. The removal of harmful part makes plant safe.

Now, the plant that gets infected by genetically



modified Aerobacterium does not receive T-DNA for tumour but the ~~A~~ desired gene that we want to transfer. Hence, it is called Natural Genetic Engineer of Plants.

(18) - A) Groundnut - iv) Seed ✓

(B) Coconut - iii) Endosperm ✓

(C) Clove - i) dry flower buds ✓

(D) Turmeric - ii) dried Rhizomes ✓

(19) Blue-green algae or Cyanobacteria works as a biofertiliser (microorganisms that increase the fertility of soil) by fixing atmospheric nitrogen in the soil.

⇒ Blue green algae like Nostoc, Anabaena have a special type of cell called Heterocyst. This has nitrogen fixing gene i.e. Nif and Fix gene which are necessary for nitrogen fixation. In this way cyanobacteria convert elementary nitrogen to nitrates which are soluble in water and can be taken by plants.



~~Anaemia~~

(20) Following are the two respiratory disorders:

i) Emphysema - it is caused due to smoking

⇒ In this disease, the alveolar space is decreased and hence, sufficient respiratory surface is not available for exchange of gases.

⇒ The patient feels problem in the process of expiration and hence, air remains filled in the lungs.

⇒ This disease has a common cure by bronchodilators and smoking should be prevented.

ii) Pneumonia - This is a disease of respiratory system caused by the infection of bacterium Diplococcus pneumoniae.

⇒ This disease is generally found in old people and children.



In this disease, there is presence of dead WBCs at the respiratory surface i.e. alveoli are filled with ~~the~~ dead blood cells and the patient feels problem in breathing.

⇒ The protection from infection bacteria should be done and medical treatment is preferred.

② The hormone which induces the development of corpus luteum is Luteinizing hormone (LH hormone). Its secretion is done as a result of stimulation by gonadotropin hormone from adenohypophysis of pituitary gland.

3) If corpus luteum is damaged, then there is no secretion of Progesterone hormone which is also called Sex Determination Hormone. and hence pregnancy does not take place. The further processes of embryonic development are absent.



Q2.) The human sperm has following parts:

i) Head - This part constitutes nucleus and acrosome. It has two functions i.e. (a) genetic function (b) Activation function.

⇒ Nucleus has genetic information from male parent and the acrosome helps in the activation for fertilization.

There is a protein Anti-fertilisin which attaches with fertilisin of ovum and helps in cortical reaction initiation.

⇒ Also, two lysin enzymes are found in acrosome - (a) Hyaluronidase (b) Cathepsin

ii) Middle Piece - This part of human sperm consists of region between neck and tail. There are two centrioles - proximal and distal. Mitochondria is present in the form of a sheath called Man Nebenkern and it is surrounded by layer called Manchette.



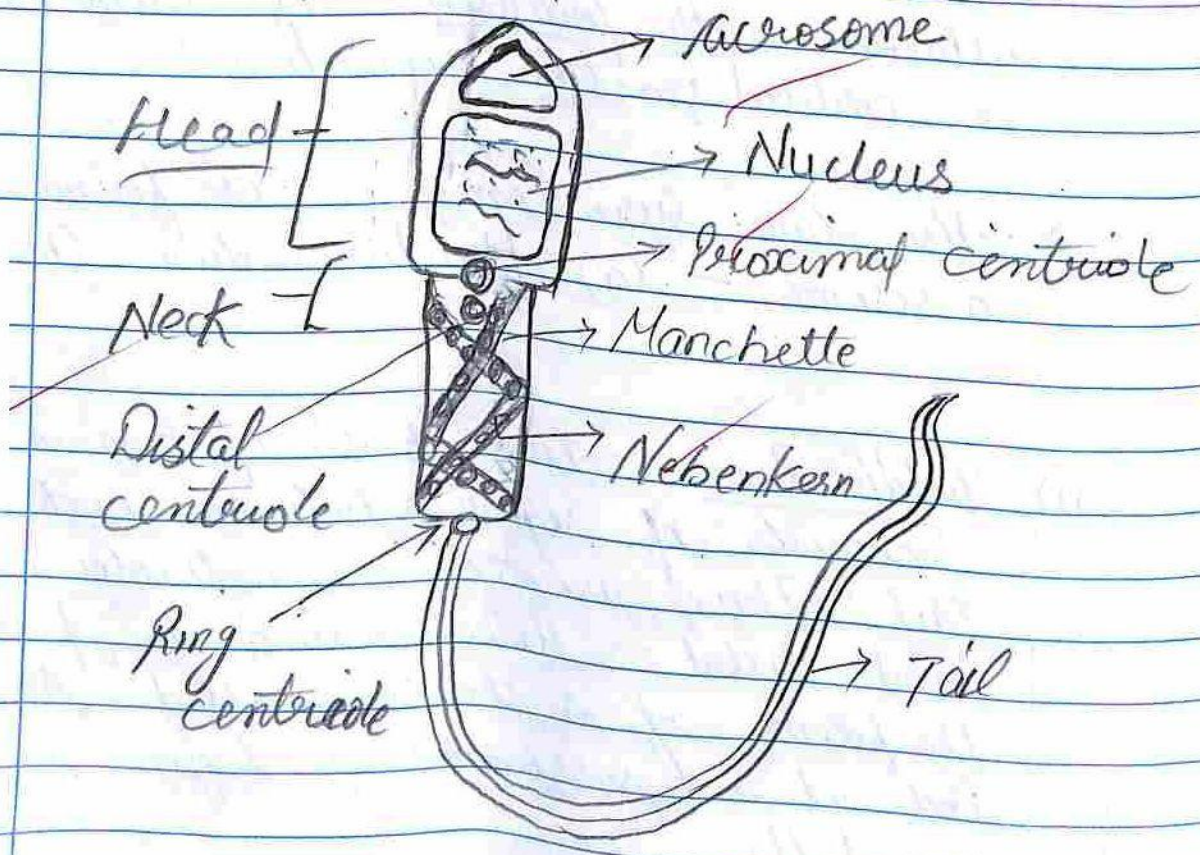
परीक्षक द्वारा प्रदत्त अंक

प्रश्न संख्या

परीक्षार्थी उत्तर

- ⇒ At the junction of middle piece and principal piece, a Ring centriole is found which prevents entry of mitochondria in the principal part.
- ii) Tail - it is the last flagellus part having constitution of (9+2).
⇒ It starts from middle piece and is thin. It has important role in maintaining the mobility of sperm.

BSER-16/5/2019





23



⇒ In the above given gene mutation, T (Thymine) is replaced by C (Cytosine) i.e. a pyrimidine is replaced by another pyrimidine. Hence, this is a Transition type of gene mutation.



⇒ In above gene mutation, Cytosine (C) is replaced by Adenine (A). Cytosine is a pyrimidine and Adenine is a purine. It means a pyrimidine is replaced by a purine, hence, it is Transversion type of gene mutation.

24) Entamoeba histolytica is pathogen of Amoebac dysentery.

⇒ Its two s

⇒ Its symptoms are as follows -

i) The patient suffers from diarrhoea and stomachic.

ii) Sometimes, vomiting and weakness is also seen.

⇒ Prevention -

i) Patient should have clean water and food.

ii) Infectious agents should be kept away.

Section - C

Q5) Structure of Anatroous ovule -

In such type of ovule, it gets completely inverted i.e. micropylar region comes closer to funicle and chalaza is present opposite to the micropyle.

⇒ It has an embryo sac surrounded by outer integument and inner integument.

⇒ There are two parts - funicle and the body (nucellus). Both meet at a place called Hilum.

⇒ Inside the embryo sac covered by two integuments, two four seven cells.



रीक्षक द्वारा प्रश्न संख्या

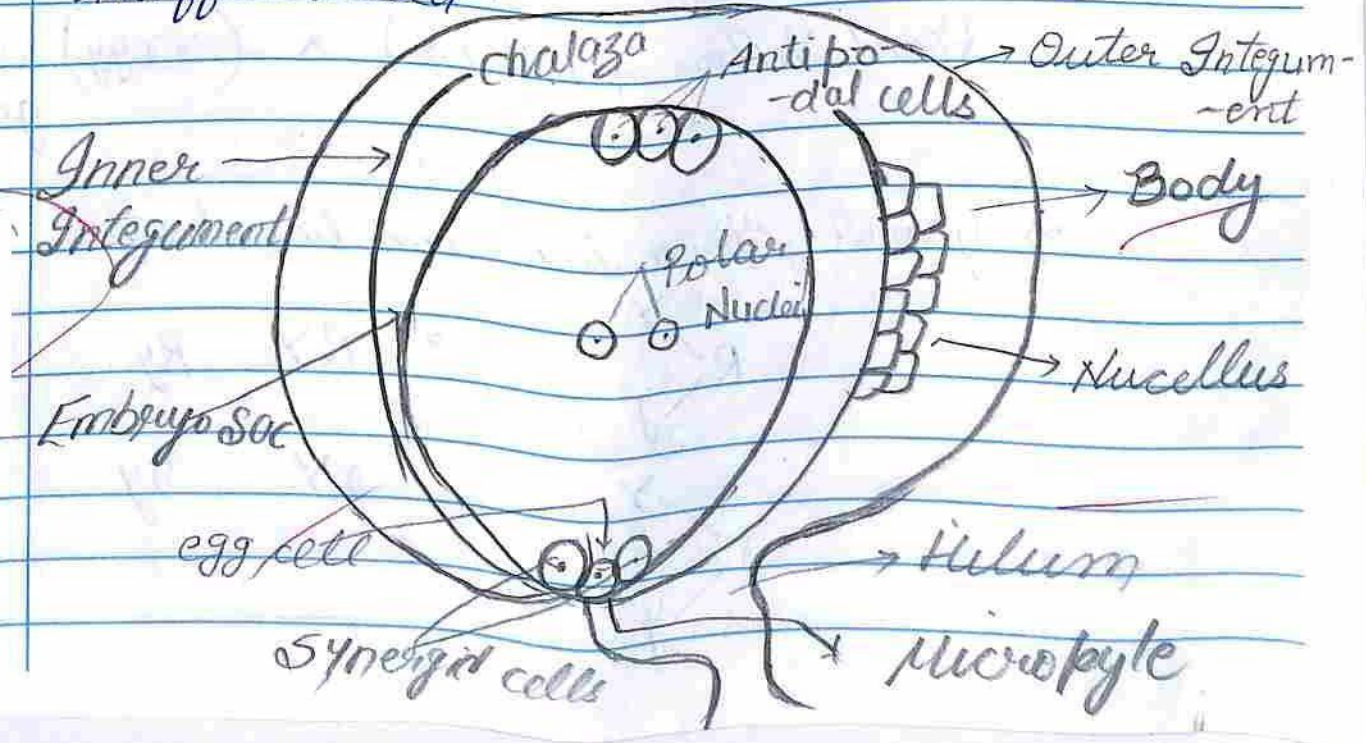
परीक्षार्थी उत्तर

and eight nuclei are present. Towards the micropylar region, egg apparatus is present consisting of two synergid cells that have protoplasmic deposition at base called Filiform apparatus. Egg cell is the third cell of egg apparatus.

⇒ Towards the chalazal region, antipodal cells which are three in number are present.

⇒ Two polar nuclei are present in the middle. They fuse with one of male gamete during fertilization and form triploid Primary Endosperm Nucleus (PEN)

⇒ Also, a parenchymatous group of cells is present outside embryo sac which is undifferentiated.



परीक्षक द्वारा
प्रदत्त अंकप्रश्न
संख्या

परीक्षार्थ उत्तर

(26) Dihybrid Cross - in this type of cross two characters of the organisms are taken into notice and cross is made between the plants.

→ Mendel's Dihybrid Cross - George

Mendel did his experiment on pea plant. He took two pea plants recognising two different characters for dihybrid cross.

One pea plant had round and yellow seed while other had wrinkled green ones.

The first plant is dominant over the second.

Round, Yellow (RRYY) × (rryy) wrinkled green

→ Gamete formation can be shown as -

$\begin{array}{l} Y \\ R \diagdown \\ y \end{array} \rightarrow RY, Ry$

$\begin{array}{l} y \\ r \diagdown \\ y \end{array} \rightarrow rY, ry$

In this way 4 gametes are formed.

σ	RY	Ry	rY	ry
RY	RRYY	RRYy	RrYY	RrYy
Ry	RRYy	RRyy	RrYy	Rryy
rY	RrYY	RrYy	rrYY	rrYy
ry	RrYy	Rryy	rrYy	rryy

(F_2
generation)

Now, from above checker board, we conclude that the plant of pea which is dominant is Round and yellow (9 plants) in F_2 generation.

3 plants were round and green while three were wrinkled yellow.

There was only 1 plant which is wrinkled green.

Hence, the ratio is 9 : 3 : 3 : 1
 (Round yellow) (Round green) (wrinkled yellow) (wrinkled green)

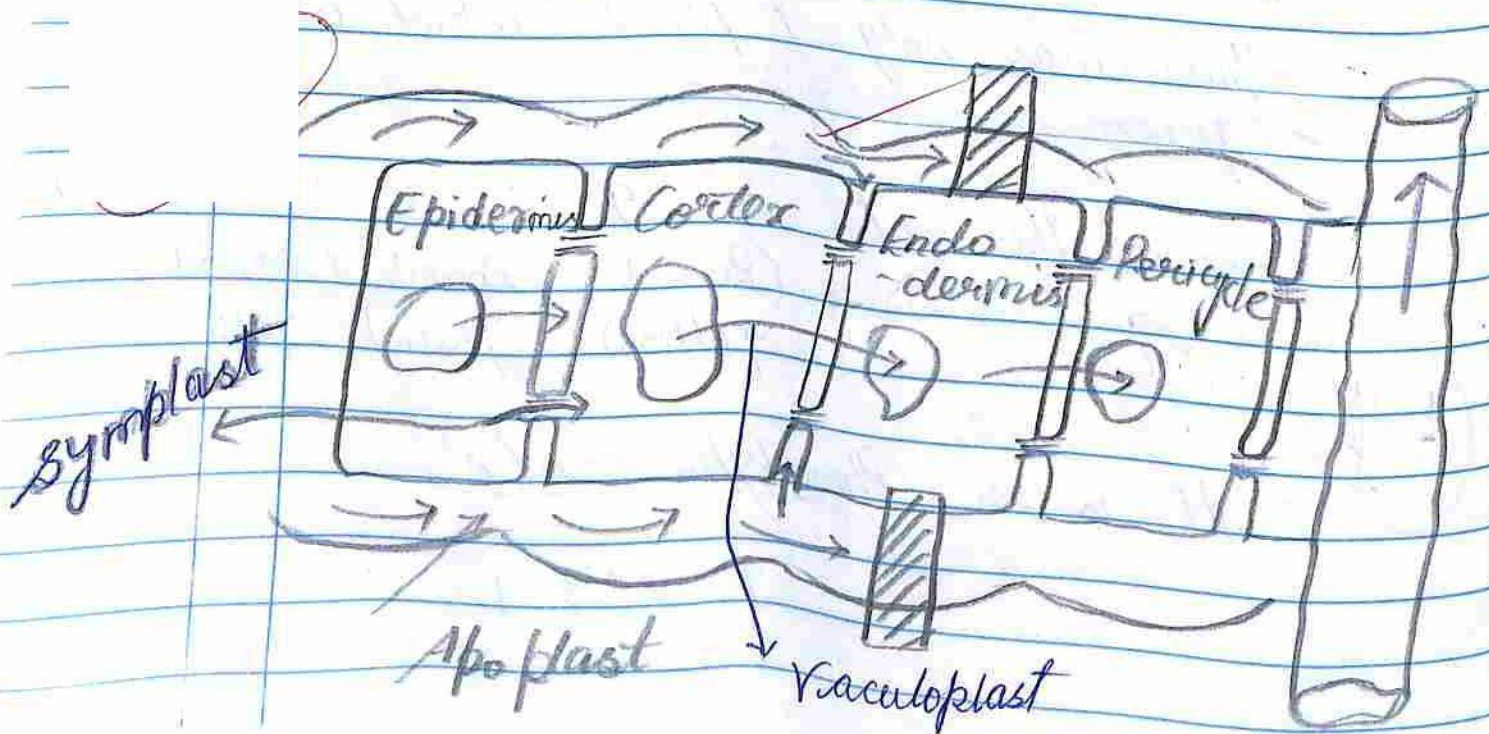
It is the Phenotypic ratio

9 : 3 : 3 : 1



Q7) Apoplast Pathway of Water in Plants -

- ⇒ When flow of water takes place through non-living tissues like cell wall then, it is called Apoplast pathway
- ⇒ It is a passive flow pathway and ~~to~~ requires no energy in the form of ATP.
- ⇒ In the endodermis of root, there comes an obstacle due to presence of Casparian Strips formed by deposition of suberin. Hence, here water flows through plasma membrane not through non-living tissue. In this way, apoplast pathway has a little resistance.

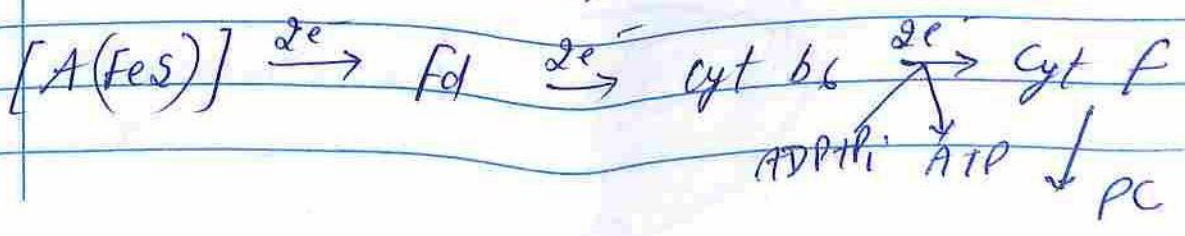


Section - D

(28) - i) Photophosphorylation - the process by which formation of Adenosine Triphosphate (ATP) takes place by transfer of electrons in the presence of light is known as Photophosphorylation.

ii) In cyclic photophosphorylation, only PS-I (Photosystem - I) or Light Harvesting Complex I (LHC - I) participates. The electrons released from the chlorophyll molecule get back to it after transferring through various electron transfer.

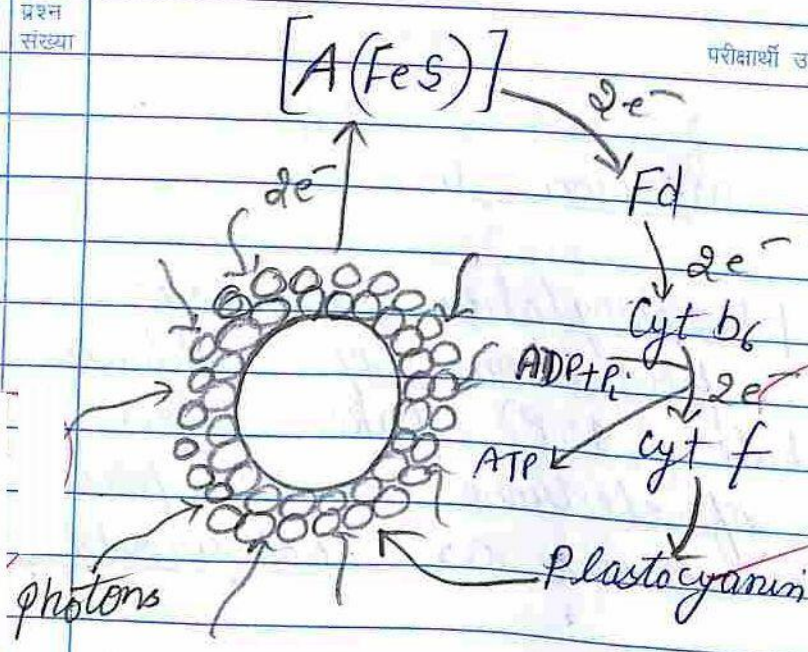
⇒ Firstly, e^- go to Ferrous protein and then to ferredoxin (Fd). Then they are accepted by cytochrome b_6 and go to cytochrome f. During this transfer, ADP is converted to ATP and energy is released. Then, electrons are received by plastocyanin (PC) and released to chlorophyll back.





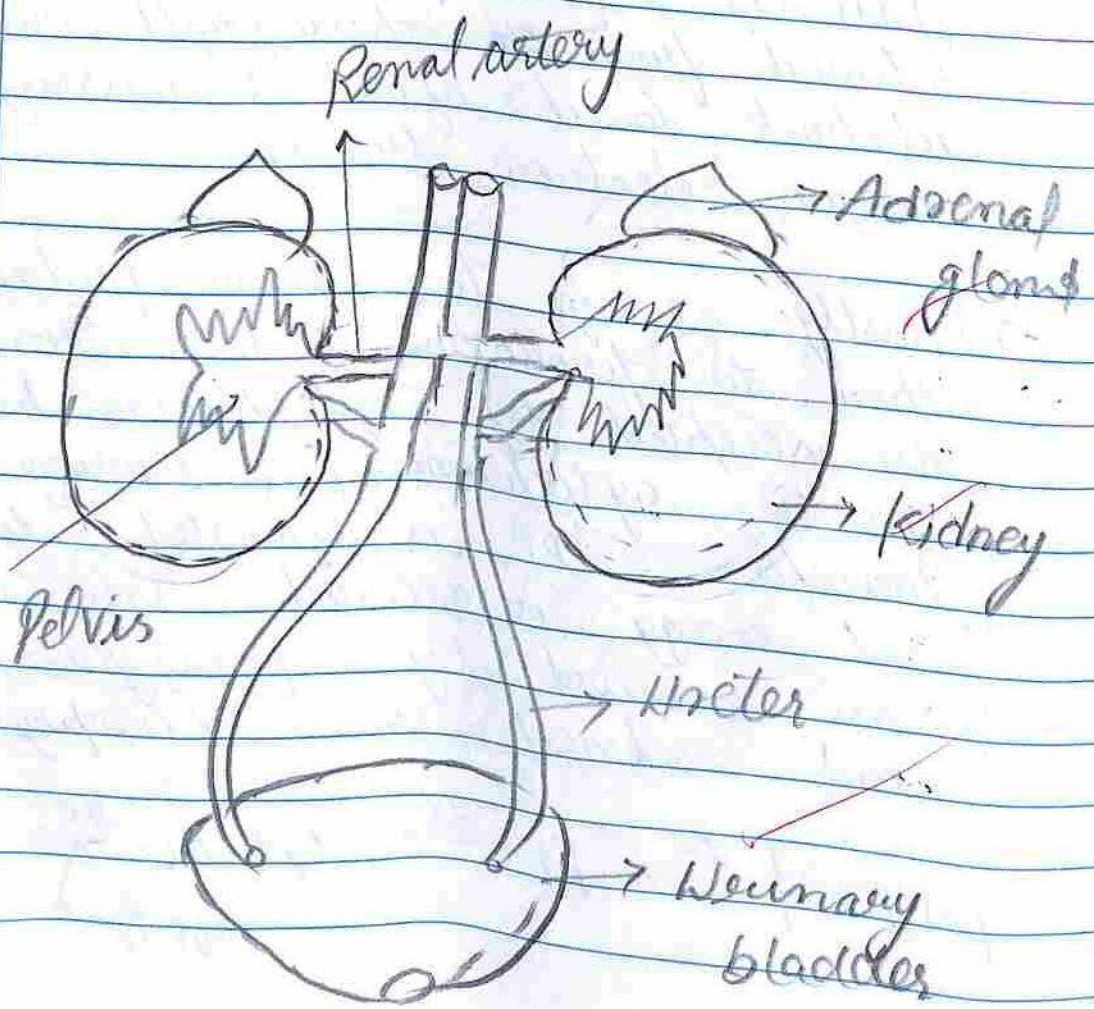
परीक्षक द्वारा प्रश्न संख्या

परीक्षार्थी उत्तर



Cyclic Photo Phosphorylation

(29)





29

ii) Mechanism of Ultrafiltration in Urine Formation can be explained as follows:

⇒ The afferent arteriole brings blood to the glomerulus of nephron. It acts as a microsieve. The pores present in it has diameter of $1 \mu\text{m}$, hence, permeability is increased (100-1000) times.

⇒ We know that the diameter of afferent arteriole is greater than that of efferent arteriole, hence, there is a pressure exerted on the glomerular wall. It is called Glomerular Hydrostatic Pressure (GHP). Its value is approximately 70 mm Hg .

⇒ Also, the colloidal particles like protein, blood corpuscles, etc are not filtered, hence, they exert an opposite pressure to GHP in order to retain the water. This is called Blood Colloidal Osmotic Pressure (BCOP). It has a value of 30 mm Hg .



The filtrate so obtained in the form of glomerular cavity also exerts an opposite pressure on the wall of Bowman's capsule. This is called Capsular Hydrostatic Pressure or (CHP) and has a value of 20 mm Hg.

In this way,

Net Effective Filtration Pressure -

$$NEFP = GHP - BOP - CHP$$

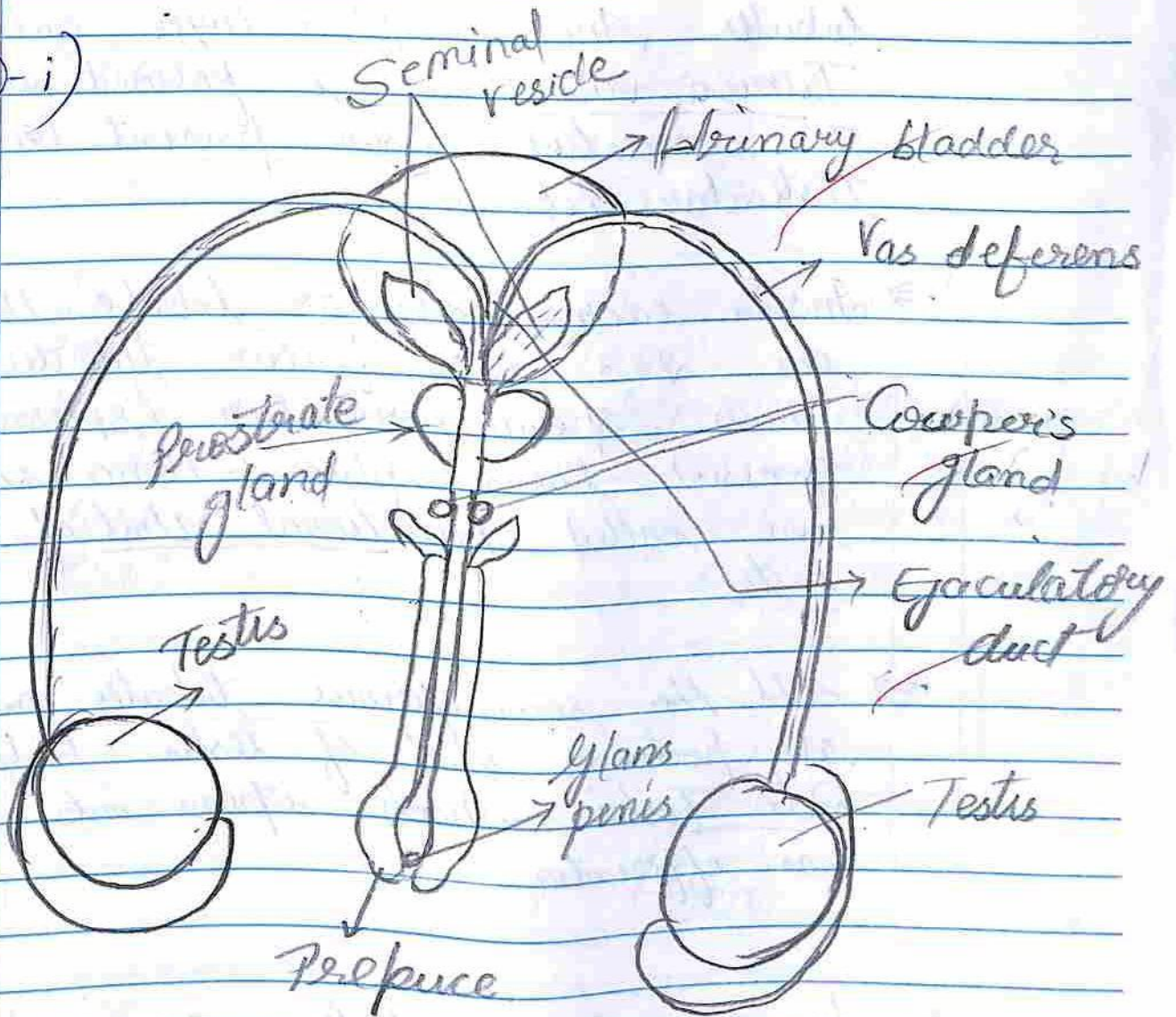
$$= 70 - 30 - 20$$
$$= 70 - 50$$

$$\Rightarrow \boxed{NEFP = 20 \text{ mm Hg}}$$

In this way, the process of ultrafiltration is completed by the action of net effective filtration pressure which has a value of 20 mm Hg.



(30) - i)



(ii) Structure of Testis - testis are present in a pouch outside the abdominal cavity called scrotum.

→ The outermost layer of testis is called Tunica vaginalis. The second layer present in it is Tunica albuginea which gets divided into 250-300 Testicular



Lobules: Another thin layer called Tunica vascularis is formed due to connective tissue present between testicular lobules.

⇒ Inside each testicular lobule, there are 2-3 seminiferous tubules in which sperm formation (spermatogenesis) takes place. Hence, they are called Functional Unit of testis.

⇒ All the seminiferous tubules meet at posterior side of testis to form Rete Testis which sperms into vas efferentia.

⇒ In seminiferous tubules, epithelium has two types of cells i.e. (a) germ cells (b) Sertoli cells.

⇒ Also, between the spaces, Interstitial or Leydig's cells are present which stimulate secretion of Androgens (Testosterone).



111) Following are the functions of Sertoli cells -

(a) They provide nutrition to the sperms.

(b) They secrete Inhibin hormone and Antibularin Protein (ABP).

Inhibin controls spermatogenesis by giving feedback to pituitary gland while ABP prevents formation of female reproductive tract in male during embryonic stage.

आप्त (End)