



# माध्यमिक शिक्षा बोर्ड राजस्थान, अजमेर

## उच्च माध्यमिक परीक्षा

(परीक्षार्थी द्वारा स्वयं भरा जाना चाहिये)

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(In Words)	..... .....
परीक्षार्थी का नामांक हिन्दी में	
शब्दों में .....	

प्रश्नवार प्राप्तांकों की सारणी (परीक्षक के उपयोग हेतु)			
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प्रश्नों की क्रम संख्या	प्राप्तांक	प्रश्नों की क्रम संख्या	प्राप्तांक
1		19	
2		20	
3		21	
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5		23	
6		24	
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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			

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)

परीक्षक के हस्ताक्षर \_\_\_\_\_ संकेतांक



### 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 पृथक से उत्तर पुस्तिका भरी हुई होने पर पर्यवेक्षक एवं वीक्षक की अनुशर्षा 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 के सभी रिक्त पृष्ठों को तिरछी लाईन 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 नामांक, 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 पूरे होने चाहिये। परीक्षार्थी उत्तरपुस्तिका प्राप्त करते ही पृष्ठ संख्या की जांच कर लें यदि पृष्ठ कम/अधिक या क्रम में नहीं हैं तो वीक्षक से तुरन्त बदलवा लें।
  - (iii) परीक्षा केंद्रों 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, ज्यामेट्री बॉक्स पर कुछ न लिखकर लावें। टेबुल के आस-पास कोई अवैध सामग्री नहीं होनी चाहिये, इसकी जांच कर लें।
  - (v) अपनी उत्तर पुस्तिका/ग्राफ/मानचित्र आदि परीक्षा भवन से बाहर ले जाना दण्डनीय अपराध है, अतः परीक्षा समाप्ति पर उत्तर पुस्तिका वीक्षक को बिना सौंपे परीक्षा कक्ष नहीं छोड़ें।
5. उत्तरों को क्रमानुसार एक ही स्थान पर लिखें। प्रश्न क्रमांक भी सही अंकित करें, अन्यथा दण्ड स्वरूप परीक्षक को 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 प्रकार की त्रुटि/अन्तर/विरोधाभास होने पर हिन्दी भाषा के प्रश्न को ही सही माना जाये।





'SECTION - A'

1. Agamospermy → It is asexual reproduction, i.e., there is ~~no formation of meiosis and no fertilisation~~. The offsprings are formed without the process of gamete formation & their fusion is absent.
2. Copper deficiency
3. Oxido-reductase enzymes
4. Gibberelline hormone
5. Polymerase chain Reaction (PCR)
6. ~~Biogas is the gas which is produced by biological processes, i.e., by fermentation~~
6. Biogas is the gas which is produced by the activity of anaerobic bacteria on ~~to~~ organic materials, for the production of a source of energy. It mainly consists of CH<sub>4</sub> and CO<sub>2</sub>, & produced by biological processes.
7. Platelets / Blood platelets
8. Blind spot
9. Adrenaline hormone



Atlas

11. Implantation is the process when the embryo in its blastocyst stage gets incorporated in the uterus, after 7-8 days after fertilisation, for its further development & safety causes.
12. Measurement of Hb present in blood is called Haemoglobinometry. Its amount is  $12-16 \text{ mg/mm}^3$  in blood.
13. MRI  $\Rightarrow$  Magnetic Resonance ~~Imaging~~ Imaging.

'Section-B'

14. (i)  $DPD = OP - TP$ , i.e., Diffusion Pressure deficit is <sup>equal to</sup> the difference between the values of ~~TP~~ Osmotic pressure ~~of solute~~ and Turgor pressure.

(ii) "OP and DPD are equivalent in a flaccid cell." This is ~~true~~ true because a flaccid cell ~~cell~~ exerts no pressure on its membrane, as there is negligible cell solution in a flaccid cell, exerting no pressure on membrane, thus having zero turgor pressure.





ii) "OP and DPD are equivalent in a flaccid cell."  
This is true because a flaccid cell exerts no pressure on its membrane & wall, & having a net 'zero' Turgor pressure.

Since the value of  $DPD = OP - TP$

$$DPD = OP - 0$$

$$\boxed{DPD = OP}$$

Zero TP of flaccid cell is because of negligible amount of solvent in the cell solution, and so pressure exerted on the membrane & wall is negligible, or we can say, zero.

BSEUP-16/9/2019

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

(ii) Calcium, Sulphur, Iron & Boron\* are the elements whose deficiency symptoms appear first in apical buds.

16. "A bacteriophage is more important vector in comparison to M13." This is because:

1.  $\lambda$ -bacteriophage mainly attacks on *E. coli* bacteria which is most easily studied & available & experimented.
2. They have a flag plaque region, & also a cos site which has its own proteins, ~~there~~ and easy to study also than M13.



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17. Agrobacterium mediated gene transfer is one of the greatest technique produced by biotechnology. Agrobacterium has a 'Tumor-inducing-plasmid' or Ti-plasmid, which has gene for tumor formation and causing harm to the infected person. But, this tendency of Agrobacterium has been used in a positive way, by incorporating the gene of interest (like that of resistance from a particular bacteria, or pest in case of plants) in the plasmid, & modifying the bacteria to disable its negative impacts. This modified bacteria with the resistance gene is then introduced to the plant cells, forming more & more copies of the resistant gene by incorporating it in the plant, & thus making the plant resistant from the pest to the particular pest or bacteria or pathogen.

- 18.
- A. Groundnut → (iv.) Seed
  - B. Coconut → (iii) Endosperm
  - C. Clove → (i) dry flower buds
  - D. Turmeric → (ii) dried rhizomes.





19. ~~But~~ Blue-green algae or Cyanobacteria work as excellent biofertilizers. This can be best exemplified by the work of 'Anabena' in rice fields. It fixes atmospheric ~~Atm~~ Nitrogen, being present in the leaves of a pteridophyte 'Azolla', in the rice & paddy fields, & thus providing absorbable Nitrogen to the rice plants, increasing their yield ~~fo~~ upto 20% or more. Other BGA like Nostoc, Oscillatoria are also involved in nitrogen fixing. A species of Nostoc has been found to decrease the alkalinity of soils, thus greatly increasing the fertility of soil.

20. Two respiratory disorders :-

1. Emphysema: It is mainly caused by excessive smoking. The lungs remain filled by air and the surface area for gaseous diffusion decreases, causing immense difficulty. It can be relieved by bronchodilators, and proper treatment is must.

2. Pneumonia → It is caused by the infection of Streptococcus pneumoniae or Diplococcus pneumoniae. Due to this, the lungs are filled by a fluid or mucus type of stuff, causing chills, cough, fever. Problems occur in





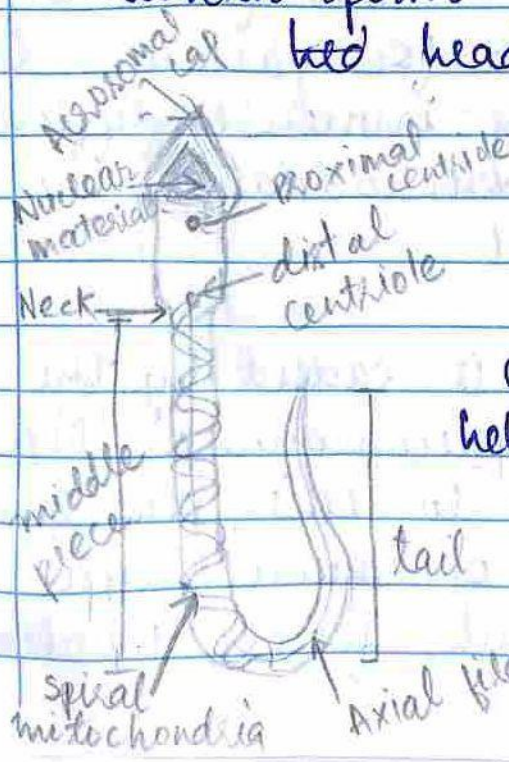
breathing also. When severe, the nails & lips may turn greyish to bluish.

21. The development of Corpus luteum is induced by the LH or the ~~Luteinizing~~ ~~Hormone~~ Luteinizing hormone.

The corpus luteum is damaged if ~~there~~ occurs no fertilisation takes place.

The Corpus luteum, when active, releases amounts of progesterone. But when it is damaged, progesterone concentration decreases, thus maintenance of the uterus prepared for implantation is affected, & the uterus sheds off its layer leading to menstruation.

22. Human sperm consists of 3 parts: head, middle piece & tail.



The head consists of the hereditary material, along with a cover, called acrosome. This acrosome consists of enzymes, which help in digesting the layers of the ovum. There is a proximal centriole which leads the





first cell division after zygote formation. There is an axial sheath filament arising from the distal centriole, which continues till the tail of sperm. Between the head & the middle piece, there's a neck. The middle piece consists of a spiral mitochondrial arrangement, which provides the sperm energy for all its activities. The tail provides motility to the sperm. There's also a special Zonson's ring structure in the human sperm.

BSER-16/07/19



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(i) Type of gene mutation  $\Rightarrow$  Transition  
 In Transition, there is a change in nucleotide such that 1 purine is replaced by another purine (~~A to G~~ or G (Adenine by guanine or guanine by adenine), or 1 pyrimidine by other pyrimidine, like here, T (pyrimidine) by C (pyrimidine)

(ii) Gene mutation  $\rightarrow$  TRANSVERSION

In Transversion, one purine base is replaced by pyrimidine base, or vice versa, like here, C (pyrimidine) is mutated to A (purine)

24

pathogen of amoebic dysentery  $\rightarrow$  Entamoeba histolytica

Its symptoms:



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- 1) Stool with excess blood clots & mucous.
- 2) Pain (abdominal), cramps, fever etc.

Preventive measures :

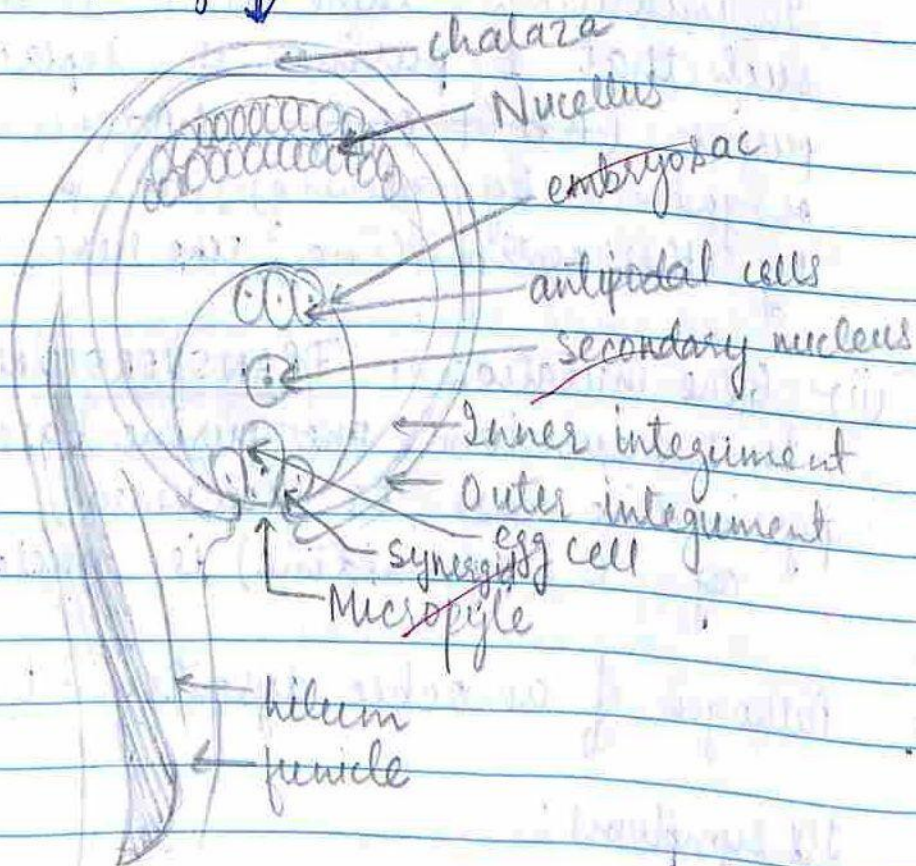
- 1) Intake of only clean food & water, avoiding contaminated stuffs.
- 2) Proper cleanliness should be maintained, food should be covered, there should not be any breeding places for flies.

### 'SECTION - C'

25

### Anatropous Ovule

↳ diagram ↓







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In anatropous ovule, the micropyle, chalazal & funiculus lie in a straight line. At the micropylar end, there's an egg cell, surrounded by two synergids, and at the chalazal side, there're 3 antipodal cells. In the middle portion of the embryo sac, there is secondary nucleus formed by the fusion of two polar nuclei. The embryo sac is surrounded by nucellar tissue, deriving nutrition from it. The anatropous ovule is also called 'Inverted ovule' and it found in 80% of the angiospermic families.

BSDK 16/5/2019

26. Dihybrid cross is a cross involving two characters at a time, like a cross between tall & round seeded plant, and a dwarf & green seeded plant. This cross involved two characters, <sup>which are</sup> height of plant and of colour of seed.

Mendel chose two plants, ~~(i) tall with round seeds~~ true breeding varieties, ~~(ii) dwarf~~

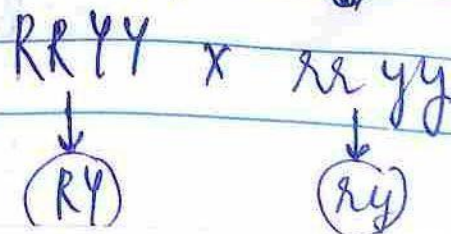
(i) round and yellow seeded. [RRYY]

(ii) with wrinkled and green seeds. [rryy]

→ characters taken by Mendel → colour & shape of seed.

~~He self pollinated~~ He crossed the two plants, as shown

Y → dominant allele (yellow) ~~RRYY × rryy~~  
 R → dominant allele (round)



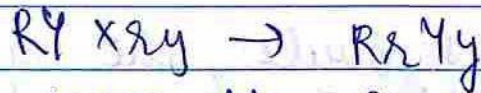




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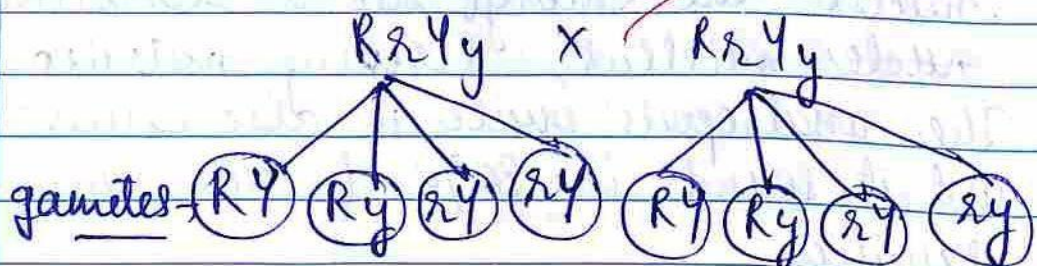
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By this cross, the  $F_1$  generation produced had a genotype  $RrYy$ , but phenotypes round and yellow seed.

Now, Self pollination or here,  
Self cross in  $F_1$  generation



Checker board  $\rightarrow$

$\sigma^7$ $\phi$	$R^Y$	$R^y$	$r^Y$	$r^y$
$R^Y$	$RRYY$	$RrYy$	$RrYY$	$RrYy$
$R^y$	$RrYy$	$RrYY$	$RrYy$	$Rryy$
$r^Y$	$RrYY$	$RrYy$	$rrYY$	$rrYy$
$r^y$	$RrYy$	$Rryy$	$rrYy$	$rryy$

This gave a  $F_2$  phenotypic ratio:-  $9:3:3:1$

Where  $9 \Rightarrow$  round & yellow seeded plants

$3 \Rightarrow$  round & green seeded plants

$3 \Rightarrow$  wrinkled & yellow seeded plants

$1 \Rightarrow$  wrinkled & green seeded plants.



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This dihybrid cross <sup>gave</sup> ~~proved~~ <sup>proof of</sup> the ~~law~~ of Independent Assortment ~~q~~

The dihybrid cross proved to be the base of the law of independent assortment given by Mendel

27.

Mode of enzyme action →

Enzymes are biocatalysts. They increase the rate of reaction by ~~in~~ decreasing the activation energy ~~for~~ required for the reaction. For reactants to convert into products, some amount of energy (activation energy) has to be given to the reactant initially. The enzyme decreases this required energy value. This is by adsorption phenomenon occurring at the surface of enzyme. As enzyme is engaged in an Enzyme-Substrate complex with a particular substrate, other substrate molecules ~~o~~ remain concentrated there, ~~the~~ so as to react as soon as the enzyme gets free from the ES complex. This increases the rate of reaction. The concentration of substrate molecules near the enzyme is due to adsorption, which releases heat, that is used to lower down the activation energy. Thus, this is how the activation energy is decreased in the presence of an enzyme.

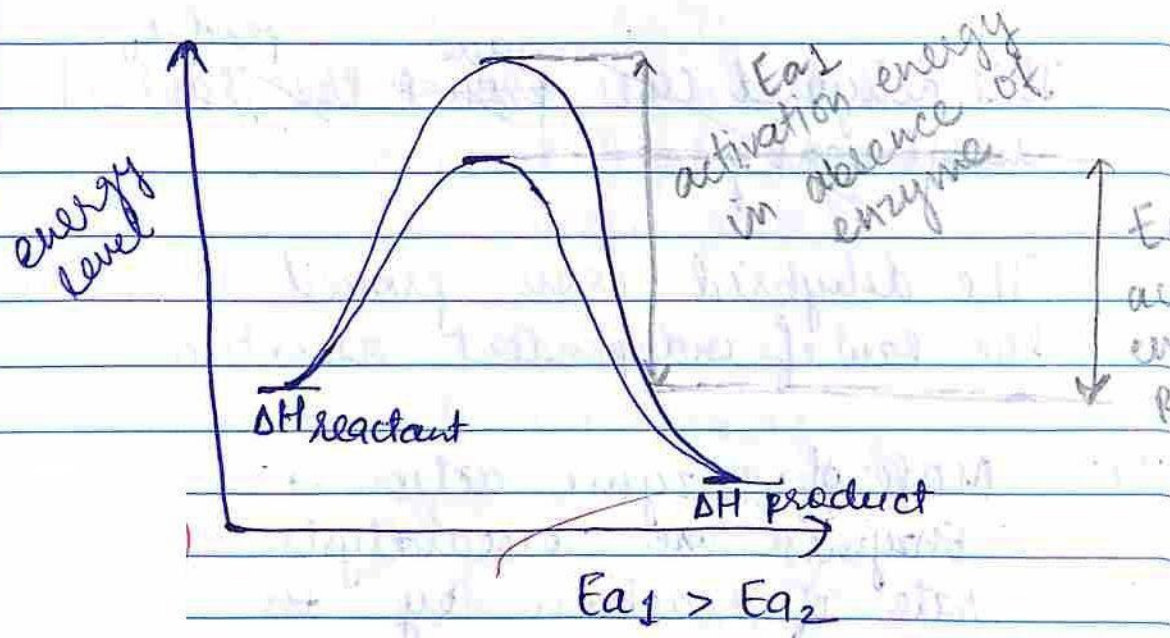




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### Section-D

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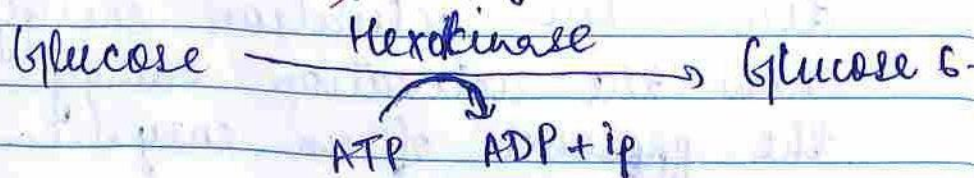
28. (i) Site of glycolysis  $\rightarrow$  cytoplasm.

(ii) The glycolysis process involves the conversion of glucose into pyruvic acid, involving a series of 10 steps.

The main steps in glycolysis are  $\rightarrow$

(a) Phosphorylation of glucose

Glucose converts into glucose-6-phosphate by loss of energy, which takes place in the presence of enzyme Hexokinase.







The glucose-6-phosphate converts into fructose-6-phosphate, which again on phosphorylation gets converted to fructose-1,6 biphosphate. Enzyme  $\Rightarrow$  Hexose isomerase

(b) Formation of PGAL and ~~to~~ DHAP.

Fructose<sup>1,6 biphosphate</sup> gets converted into 3-Phosphoglyceraldehyde and Dihydroxyacetone phosphate in the presence of enzyme Aldolase.

The DHAP again converts into 3-PGAL to get converted into 1,3-diphosphoglyceraldehyde.

1,3-diPGAL gets oxidised to 1,3-diphosphoglyceric acid, which gets converted to 3-phosphoglyceric acid, then 2-phosphoglyceric acid and finally into phosphoenol pyruvic acid.

(c) Conversion of PEP into pyruvate/pyruvic acid in the presence of enzyme pyruvic kinase. This steps also releases ~~ATP~~ ATP.

$\Rightarrow$  steps on next page.

Note  $\rightarrow$  The Oxidation step in which 1,3 diphosphoglyceraldehyde gets oxidised to 1,3 diphosphoglyceric acid releases electrons, which are taken by  $NAD^+$ , for forming  $NADH + H^+$ .



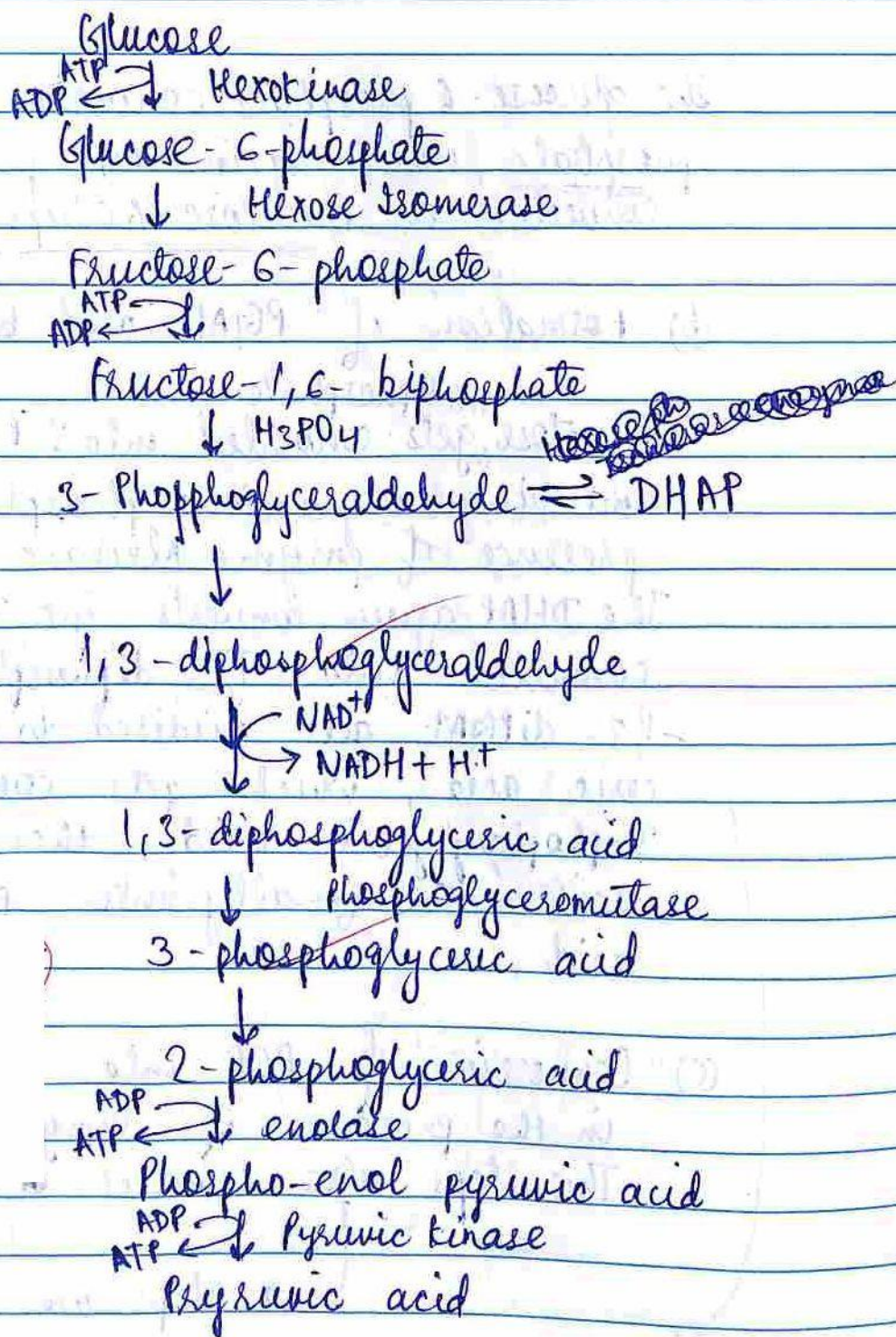


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(iii)



Glycolysis steps

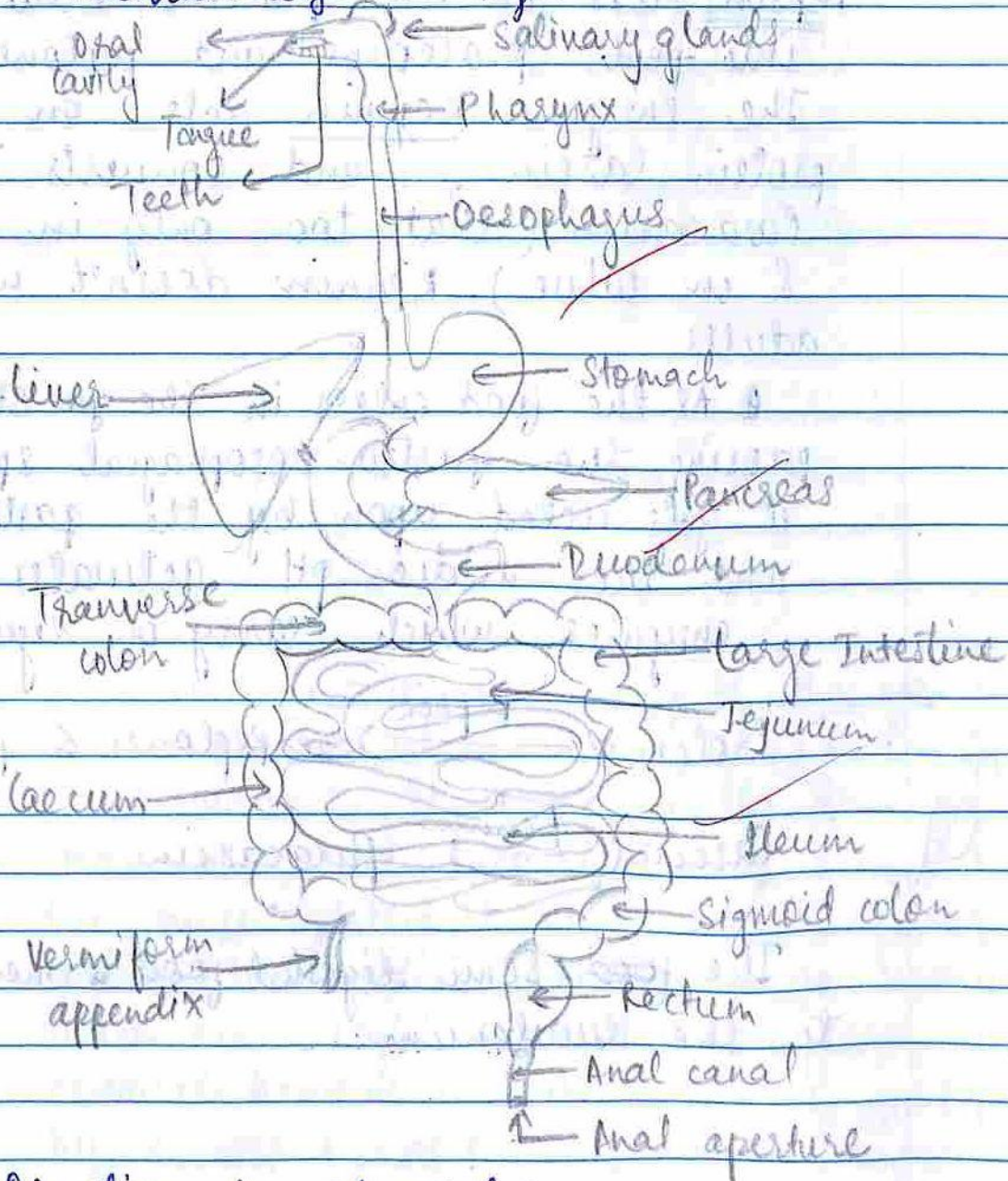
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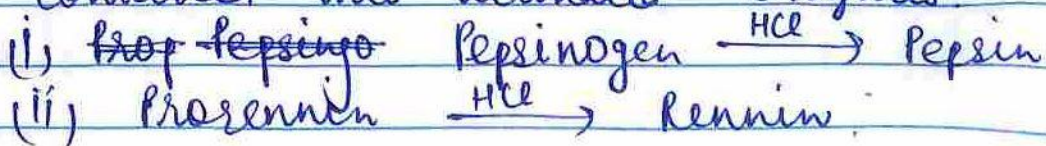
29.

Human digestive system →



Digestion in stomach:

In stomach, due to the acidic nature created by acid HCl, the proenzymes get converted into activated enzymes.







Pepsin acts on the proteins breaking the into pept proteoses and peptones.

The enzyme Rennin acts on the protein casein, and converts it into paracasein (that too only in children & in calves). Rennin doesn't work in adults.

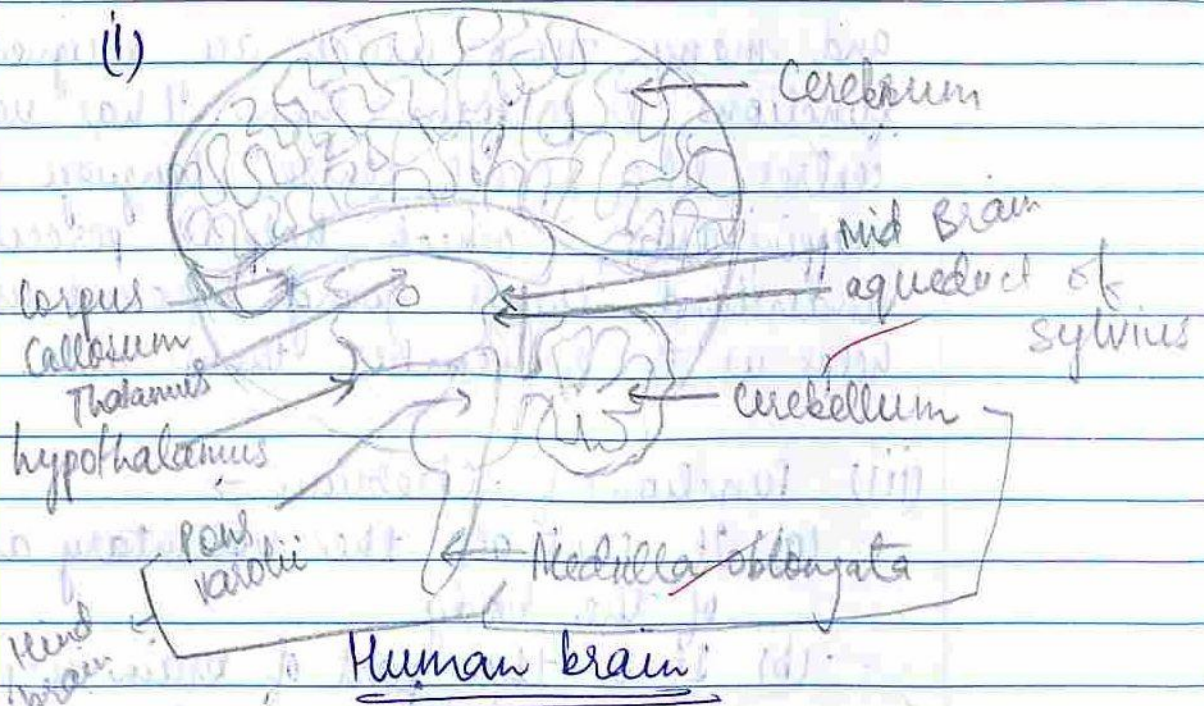
As the food enters in the stomach, passing the gastro-oesophageal sphincter it gets acted upon by the gastric juice and the acidic pH activates the enzymes, which carry on digestion as -

Proteins  $\xrightarrow{\text{pepsin}}$  peptones & proteose

Casein  $\xrightarrow{\text{Rennin}}$  paracasein

The ~~food~~ semi-digested food then proceeds to the duodenum.





- (ii) Cerebrum is the part of the fore brain. It comprises about  $\frac{2}{3}$  <sup>part</sup> of the brain's area and volume. It is maximally developed in mammals, and this fact only makes human the most intelligent on earth. The cerebrum cortex is divided into two ~~to~~ hemispheres, which are, right cerebral hemisphere, and left cerebral hemisphere. These two are connected by a Corpus Callosum, which <sup>consists of a</sup> band of neurons. The cerebrum has a cortex ~~cortex~~. The cerebrum has a large no. of folds in its structure, which increases its area many folds for better activity. The cerebrum is divided into many parts, the ~~pre~~ prefrontal cortex, the parietal part, temporal part,





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प्रदत्त अंक

प्रश्न  
संख्या

परीक्षार्थी उत्तर

and many more which are assigned their functions & perform them. It has various centres, like speech centre, language centre, mapping area, which help us perceive & understand things going around us, & helps us to remember them also.

(iii) Functions of Cerebrum →

(a) It controls the voluntary actions of the body.

(b) It is the part of brain responsible for intelligence, logical thinking, skills and creative ideas.

~~X~~

~~over~~





रीसक द्वारा प्रदत्त अंक	प्रश्न संख्या	परीक्षार्थी उत्तर

BSR/165/2019