

**AGA KHAN UNIVERSITY EXAMINATION BOARD
HIGHER SECONDARY SCHOOL CERTIFICATE**

CLASS XII

ANNUAL EXAMINATIONS 2022

Biology

Total Time: 2 hours 10 minutes

Total Marks: 65 (50-Theory & 15-Alternate to Practical)

INSTRUCTIONS

1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 65 only.
4. Question Distribution:

Theory	Alternate to Practical (ATP)
50 MCQs	15 MCQs

5. In each question, there are four choices A, B, C, D. Choose ONE. On the answer grid, black out the circle for your choice with a pencil as shown below.

Correct Way	Incorrect Ways
1 (A) (B) (C) (D)	1 (A) (B) (C) (D)
	2 (A) (B) (C) (D)
	3 (A) (B) (C) (D)
	4 (A) (B) (C) (D)

Candidate's Signature

6. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
7. DO NOT write anything in the answer grid. The computer only records what is in the circles.
8. The marks obtained on the 50 MCQs will be equated to the total marks of 85 for the theory examination results.
9. You may use a scientific calculator if you wish.

THEORY (Questions 1-50)

1. Presence of aerenchyma in the leaves, stem and roots of plants is an anatomical adaptation in

- I. hydrophytes
- II. mesophytes
- III. halophytes

- A. I only.
- B. II only.
- C. I and III.
- D. II and III.

2. The option that CORRECTLY identifies the process of osmoregulation (water intake and excretion of salts) in marine bony fishes is

	Water Intake	Excretion of Salts
A	large amount	active uptake of salts by gills into capillaries
B	large amount	active excretion of salts by gills into the environment
C	nil	active excretion of salts by gills into the environment
D	nil	active uptake of salts by capillaries into gills

3. Which of the following is an example of excretion in plants?

- A. Flowering plants release chemicals that attract pollinators.
- B. A plant releases acid from its roots to destroy competing species.
- C. Auxins produced in the apical cells diffuse into the zone of elongation.
- D. Carbon dioxide produced in respiration diffuses out of leaves by stomata.

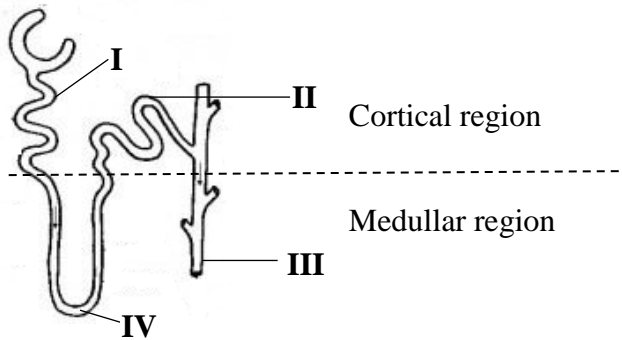
4. Consider the given biomolecules.

- I. Carbohydrates
- II. Proteins
- III. Lipids
- IV. Nucleic acid

The groups of biomolecules that are broken down to form nitrogenous excretory products in mammals are

- A. I and II.
- B. I and III.
- C. II and IV.
- D. III and IV.

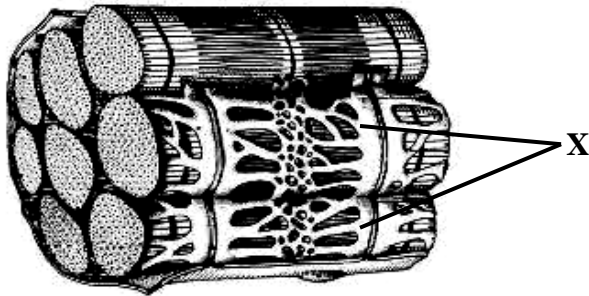
5. The given diagram shows a nephron of human kidney.



Highly hypertonic filtrate is found in regions

- A. I and II.
B. I and III.
C. II and IV.
D. III and IV.
6. Arthropods need to shed their exoskeleton and replace it (periodically) in order to
- A. grow larger in size.
B. protect against enemies.
C. allow diffusion of gases.
D. prevent from desiccation.
7. The disease that can be treated by taking vitamin D supplements and exposing the skin to sunlight are
- A. rickets.
B. sciatica.
C. spondylosis.
D. osteoarthritis.
8. Troponin is one of the major proteins in the thin (actin) filaments of muscle fibres. It is a complex made up of three polypeptides with three binding sites for
- A. myosin, actin and ATP.
B. actin, tropomyosin and ATP.
C. actin, tropomyosin and calcium ions.
D. myosin, tropomyosin and calcium ions.

9. The given diagram shows an ultra-structure of striated muscle fibres.



During muscle contraction, the function of structure X is to

- A. provide ATP.
 - B. release calcium ions.
 - C. allow acetylcholine to bind with myofibril.
 - D. conduct impulses from the neuron down into the myofibril.
10. The given diagram shows the anatomy of an ankle joint.



The labelled part X is a

- A. bone.
 - B. tendon.
 - C. ligament.
 - D. cartilage.
11. Roots exhibit negative phototropism.
- To demonstrate the reason of this phenomenon, the roots of a potted plant are placed parallel to the soil. The result shows that auxin gathers in the
- A. lower half of the root and stimulates growth.
 - B. upper half of the root and stimulates growth.
 - C. lower half of the root and slows down the growth.
 - D. upper half of the root and slows down the growth.
12. The hormone used commercially to delay the process of ripening and to improve the storage life of bananas and grapefruits is
- A. auxin.
 - B. ethene.
 - C. cytokinin.
 - D. gibberellin.

13. The sensory receptors in human skin that receive deep pressure stimulus are
- A. erector muscles.
 - B. Pacinian corpuscles.
 - C. Meissner's corpuscles.
 - D. epidermal nerve endings.
14. The CORRECT information about relay neurons in the human nervous system is that
- A. they have a single dendron.
 - B. their dendrites synapse with receptors.
 - C. their dendrites synapse with other neurons.
 - D. they are present outside the central nervous system.
15. The role of sodium-potassium pump (embedded in the neurilemma), during the propagation of nerve impulse is to
- A. stimulate depolarisation.
 - B. maintain long-term resting potential.
 - C. trigger the release of neurotransmitter.
 - D. propagate electrical signals in one direction.
16. In humans, one of the functions of sympathetic nervous system is to
- A. constrict pupils.
 - B. contract the bladder.
 - C. reduce digestion.
 - D. decrease the heartbeat.
17. A 50-year-old patient showing, symptoms of tremor, loss of motor movement, and muscle rigidity, is diagnosed with the death of neurons in the midbrain that normally releases dopamine
- The symptoms and diagnosis show that the patient is suffering from
- A. epilepsy.
 - B. Graves' disease.
 - C. Alzheimer's disease.
 - D. Parkinson's disease.
18. The hormone that antagonises the function of insulin is
- A. progesterone.
 - B. parathormone.
 - C. glucocorticoid.
 - D. tetraiodothyronine (T4).

19. In a human body, the luteinising hormone (LH) acts on

- I. ovaries
 - II. testes
 - III. mammary glands
- A. I only.
 - B. III only.
 - C. I and II.
 - D. II and III.

20. A toddler who burnt his hand by touching a hot stove once will less likely touch the stove again.

In the given example, the type of learned behaviour is categorised as

- A. latent learning.
- B. insight learning.
- C. classic conditioning.
- D. operant conditioning.

21. In a sheep, white coat colour (**A**) is dominant over brown coat colour (**a**), and smooth wool (**B**) is dominant over rough wool (**b**).

A male sheep that is homozygous dominant for the trait (**A**) and heterozygous for the trait (**B**) is mated with a female sheep that is homozygous recessive for both.

The probability that they will have an offspring who is heterozygous for both traits is

- A. 0%.
- B. 25%.
- C. 50%.
- D. 100%.

22. In a pea plant, the yellow seed colour (**Y**) is dominant over the green seed colour (**y**) and smooth texture of seed (**S**) is dominant over wrinkled seed (**s**).

The gametes produced by a heterozygous pea plant with yellow seed colour and smooth texture would be

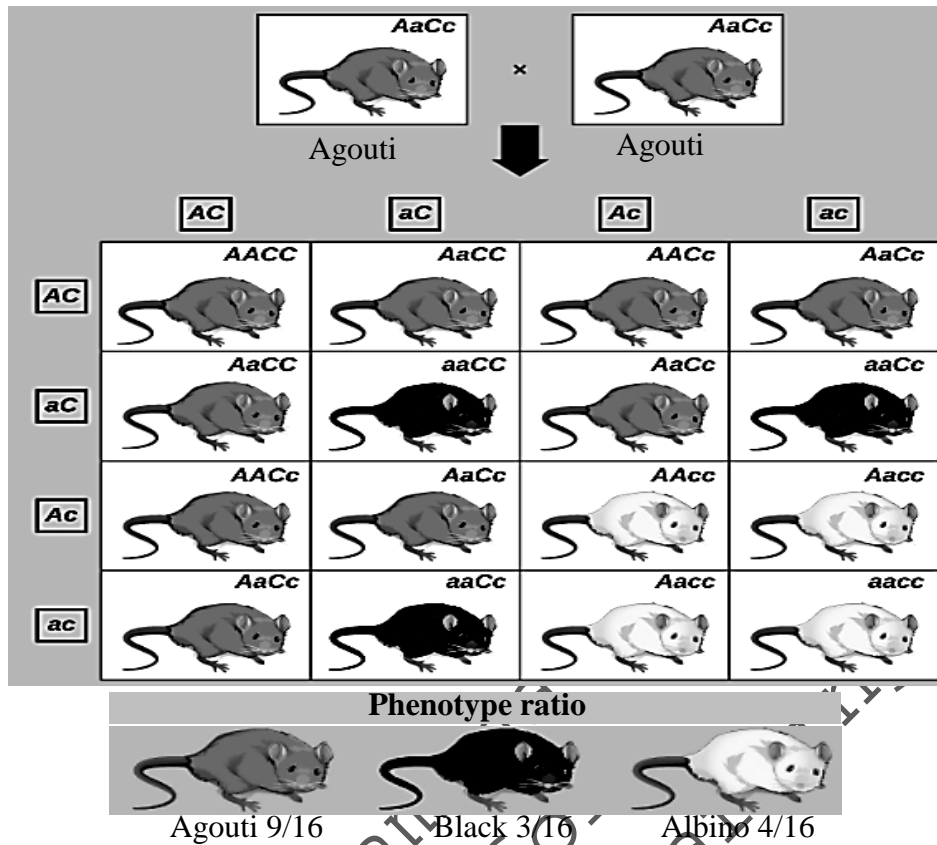
- A. Yy, Ss.
- B. Y, y, S, s.
- C. YS, Ys, yS, ys.
- D. Yy, YY, SS, ss.

23. A couple has blood group **A** and **B**, respectively. The blood group of their son is **AB** and the daughter has blood group **O**.

The parents and the children have four different genotypes for the same trait because the

- A. blood type is controlled by multiple alleles.
- B. blood type is produced by the cumulative effect of many genes.
- C. alleles of blood group are not expressed as dominant or recessive.
- D. inheritance of blood group follows the laws of Mendelian genetics.

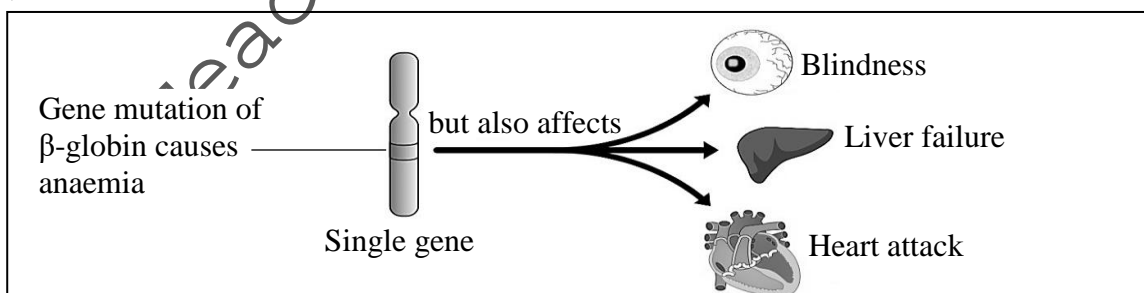
24. Consider the given cross.



Four of the offspring are albino because they lack an allele responsible for pigmentation that is denoted as

- A. C.
- B. A.
- C. a.
- D. c.

25. The given diagram shows mutation in a single gene of β -globin of haemoglobin affecting multiple organs that causes different health issues.

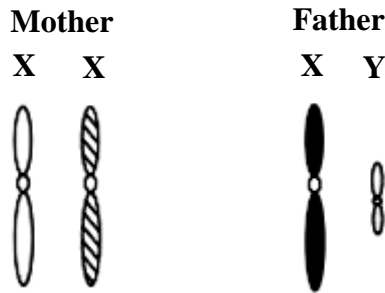


Based on the affects shown, beta-globin gene is categorised as a/ an

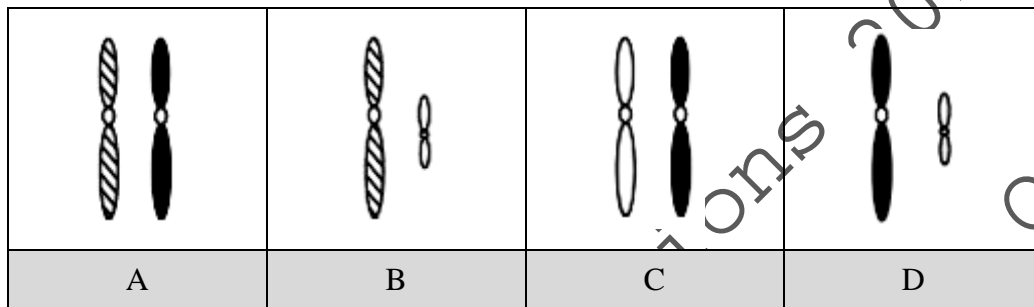
- A. epistatic gene.
- B. recessive gene.
- C. pleiotropic gene.
- D. hypostatic gene.

PLEASE TURN OVER THE PAGE

26. The given diagram represents the 23rd pair of sex chromosomes of a couple.



The combination of sex chromosomes that their son will inherit is



27. In humans XXY individual produced through non-disjunction is sterile male. However, in *Drosophila* (fruit-flies), XXY set of chromosomes produces a fertile female.

This happens because sex determination in *Drosophila* depends on the number of

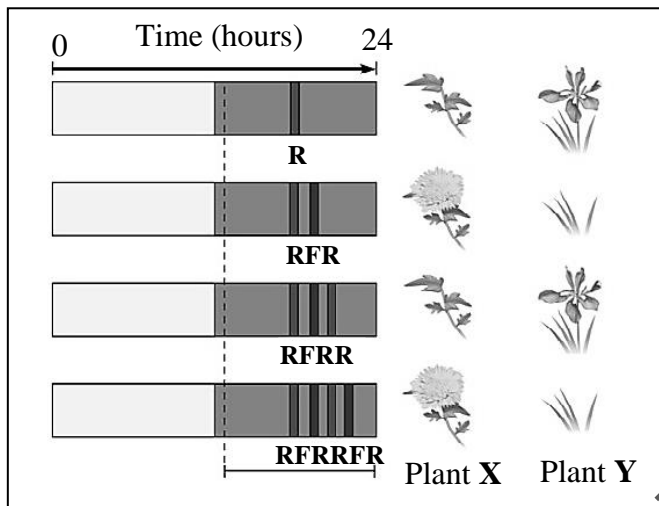
- A. X chromosomes relative to the number of autosomes.
 - B. Y chromosomes relative to the number of autosomes.
 - C. autosomes relative to the number of XY chromosomes.
 - D. Y chromosomes relative to the number of X chromosomes.
28. Haemophilia is a sex-linked recessive trait in humans.

In a family of three members, the father and son are both haemophiliacs, but the mother is normal so her genotype must be

(Note: H represents the normal allele and h represents the haemophiliac allele)

- A. XX.
 - B. X^hX^h.
 - C. X^HX^h.
 - D. X^HX^H.
29. Long-day plants normally do not flower during the winters.
- Horticulturalists can trigger the process of flowering in a long-day plant during winters by
- A. keeping the plant warm during the night-time.
 - B. exposing the plant to a light source during the night.
 - C. covering the plant with a black cloth for 12 hours a day.
 - D. covering the plant with a transparent plastic during the daytime.

30. The given diagram shows the red light (**R**) and the far red light (**FR**) flashes interrupting the night period and their effects on the flowering of plants **X** and **Y**.



Based on the provided information in the diagram, plants **X** and **Y** are identified as

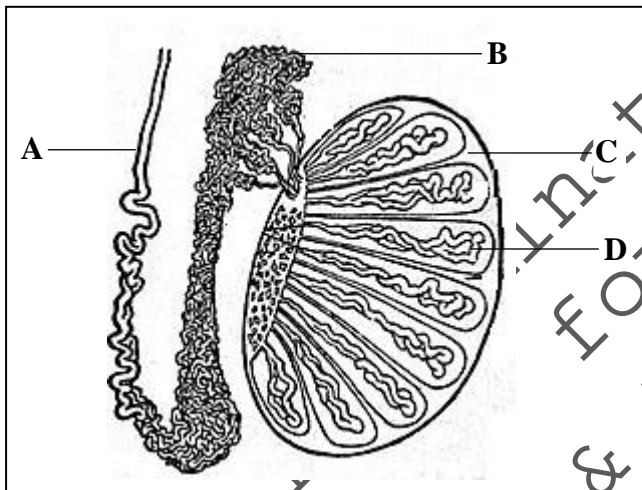
	Plant X	Plant Y
A	short-day	day neutral
B	long-day	short-day
C	short-day	long-day
D	long-day	day neutral

31. In angiosperms, during the development of male gametophyte the generative cell divides and forms
- two tube nuclei.
 - four microspores.
 - two male gametes.
 - eight microspores.
32. All of the following are methods to break the seed dormancy EXCEPT
- exposing the seeds to heat.
 - treating the seed coats with acid.
 - keeping the seed coats hard and dry.
 - giving low temperature treatment to seeds.

33. Biennials and perennial plants are stimulated to produce flowers by exposing them to low temperature.

In these plants, the low temperature stimulus is received by the

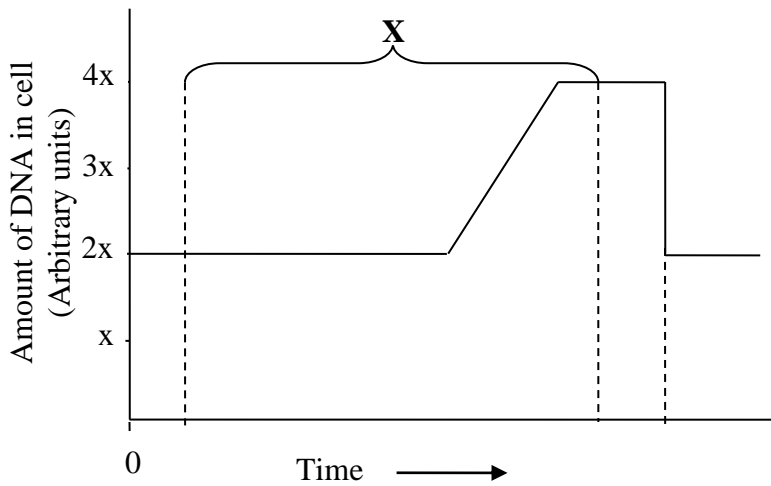
- I. shoot apex of a mature stem
 - II. embryo of the seed
 - III. leaves
- A. I only.
 - B. I and II.
 - C. III only.
 - D. II and III.
34. In the given diagram of the longitudinal section of human testis, the labelled structure where spermatogenesis takes place is



35. In contrast to centromere, the kinetochore is a
- A. primary constriction of a chromosome.
 - B. point where two sister chromatids meet.
 - C. region of DNA in the middle of a chromosome.
 - D. protein complex where spindle fibres are attached.
36. Nucleosome is a structural unit of a eukaryotic chromosome that consists of
- A. an octamer of histone proteins.
 - B. a length of RNA coiled around a core of histones.
 - C. a length of DNA coiled around a core of histones.
 - D. two polypeptide strands connected by histone proteins.
37. The number of phosphodiester bonds in a double stranded fragment of DNA with four nucleotides in each strand is
- A. 3
 - B. 4
 - C. 6
 - D. 8

38. The step(s) that occur(s) during DNA replication is/ are
- I. breakage of phosphodiester bonds
 - II. breakage and reformation of hydrogen bonds
 - III. binding of free nucleotides with their complementary bases
- A. I only.
 - B. I and II.
 - C. III only.
 - D. II and III.
39. The function of RNA polymerase enzyme is to synthesise
- A. mRNA from a DNA template.
 - B. a polypeptide from mRNA template.
 - C. mRNA from the molecules of tRNA.
 - D. a strand of DNA from mRNA template.
40. The characteristic feature that does NOT occur during amitosis is
- A. DNA duplication.
 - B. spindle formation.
 - C. cytoplasmic division.
 - D. daughter cells production.
41. A cell has 30 chromosomes in G₂ phase (sub-phase of interphase) of the cell cycle.
What would be the total number of sister chromatids in prophase-I of the same cell?
- A. 15
 - B. 30
 - C. 60
 - D. 90

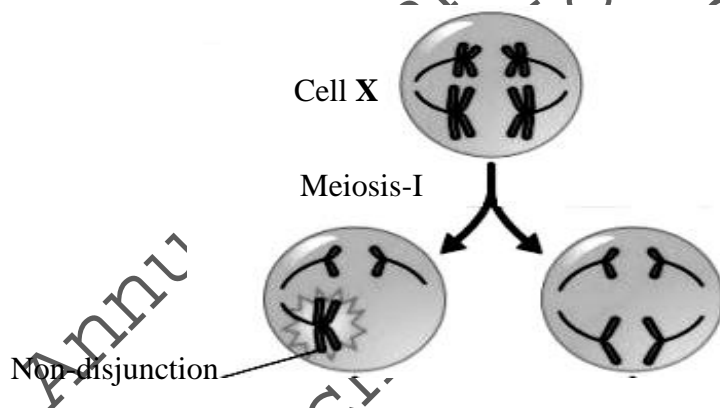
42. The given graph shows the amount of DNA in a cell during a cell cycle.



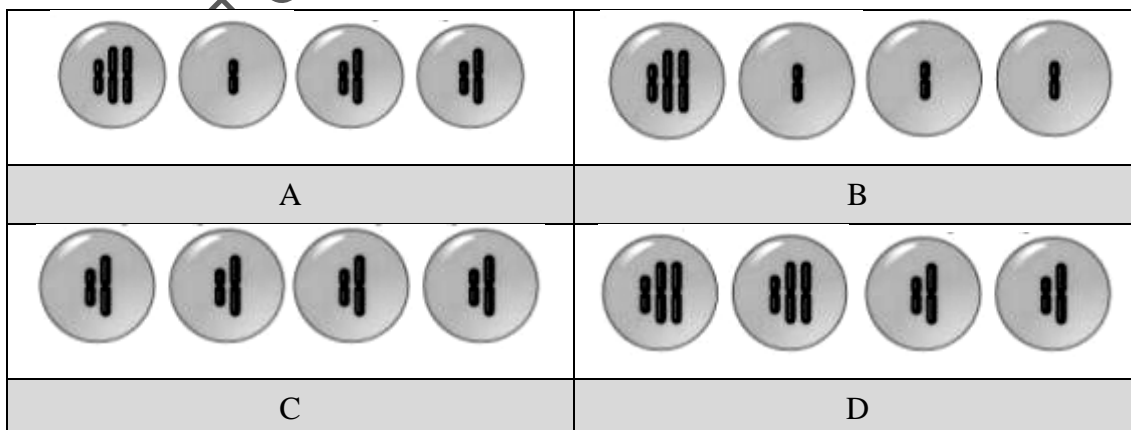
The stage **X** is identified as

- A. prophase.
- B. anaphase.
- C. interphase.
- D. metaphase.

43. The given diagram shows non-disjunction in a cell **X** during anaphase-II.



The possible resultant gametes produced when cell **X** completes meiosis-II are represented as



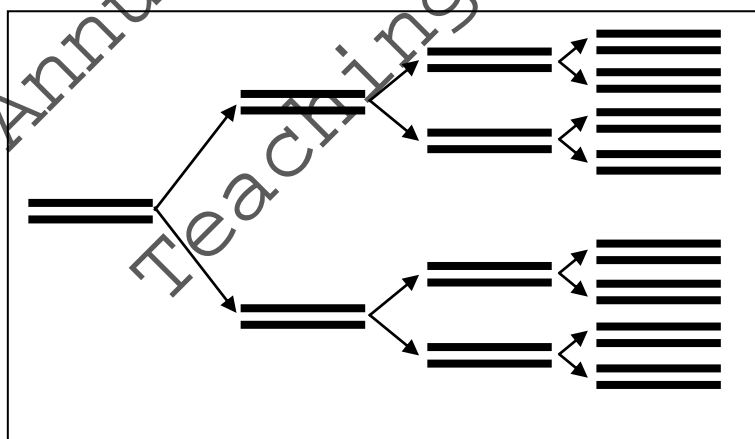
44. Meiotic division results in the formation of four daughter cells. Each daughter cell contains
- diploid number of duplicated chromosomes.
 - haploid number of duplicated chromosomes.
 - diploid number of unduplicated chromosomes.
 - haploid number of unduplicated chromosomes.
45. The sub-phase of prophase-I in which synapsis begin between homologous chromosomes is
- leptotene.
 - zygotene.
 - diplotene.
 - pachytene.

46. Which of the following base-pair sequences in the DNA could NOT be recognised by restriction endonuclease as a palindromic sequence?

GAATTC CTTAAG	ATCGAT TAGCTA	CTGCAG GACGTC	GCTTGC CGAACG
A	B	C	D

47. Sticky ends are produced when restriction enzymes cut fragments of DNA.
- The advantage of these sticky ends in recombinant DNA technology is to
- isolate the gene of interest.
 - identify the plasmids in bacteria.
 - synthesise the complementary DNA from mRNA.
 - facilitate the insertion of foreign DNA into vector.

48. The given diagram illustrates three cycles of polymerase chain reaction.



How many copies of double stranded DNA will be formed after performing the 6th cycle?

- 16
- 32
- 64
- 128

PLEASE TURN OVER THE PAGE

49. Given are the steps of DNA fingerprinting (southern blot test).

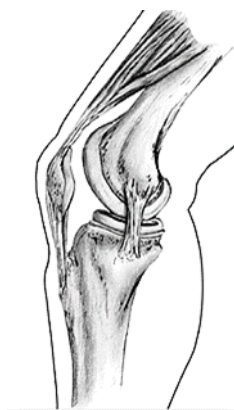
- I. X-ray film
- II. Electrophoresis
- III. Radioactive probing
- IV. Digestion with restriction enzyme

The CORRECT sequence in which these steps are followed is

- A. IV→III→ II→ I.
 - B. III→ IV→ I→ II.
 - C. IV→ II→ III→ I.
 - D. I→ IV→ III→ II.
50. In the annealing (second) step of polymerase chain reactions (PCR), temperature is lowered to 55-65°C. The reason for lowering the temperature is to
- A. activate the Taq polymerase enzyme.
 - B. extend the primers to synthesise new strands of DNA.
 - C. make single-stranded DNA template for the next step.
 - D. allow the binding of primers to their complementary sequences.

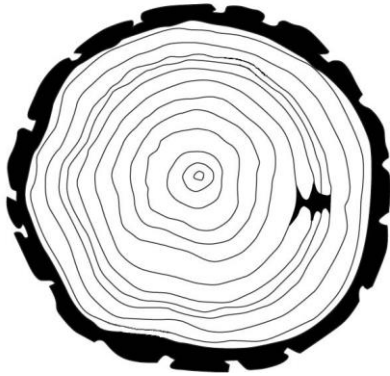
ALTERNATE TO PRACTICAL (ATP: Questions 51-65)

51. In the given diagram of human knee joint, the number of ligaments visible is



- A. 1
- B. 2
- C. 4
- D. 6

52. The given diagram shows the cross-sectional view of a woody stem.



Based on the examination of annual rings, it can be inferred that the age of this tree is

- A. 10 years.
- B. 12 years.
- C. 14 years.
- D. 16 years.

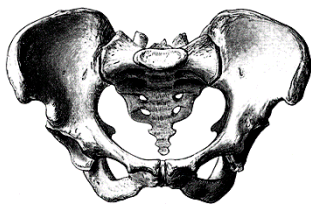
53. The experimental set-up that is used MAINLY to demonstrate positive geotropism in plants is

<p>Sun light Hole Dark chamber</p>	<p>Water Porous pot Sand Pea seedling Roots</p>
A	B
<p>Plasticine support</p>	<p>Support Weak stem</p>
C	D

54. In the human skeleton, clavicle (collar) bone is laterally and medially articulated with

	Laterally Articulated With	Medially Articulated With
A	outer end of the shoulder blade	sternum
B	humerus	sternum
C	outer end of the shoulder blade	ribs
D	humerus	ribs

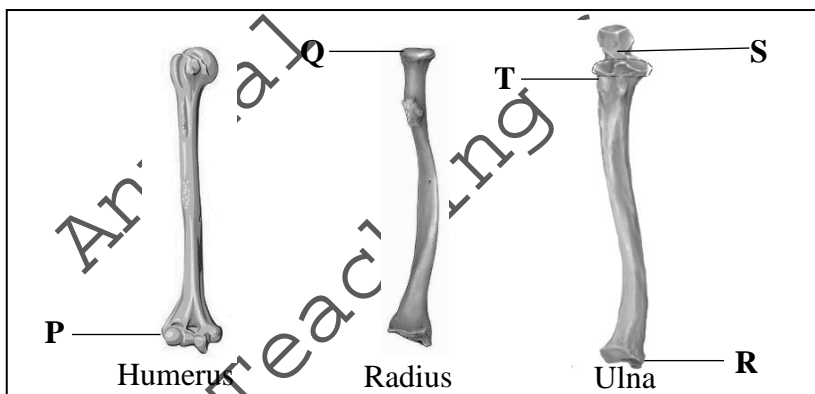
55. In a laboratory, students are provided with the shown model of human pelvic girdle to count the number of joints.



The CORRECT number of joints as counted by students within this pelvic girdle is

- A. 2
- B. 4
- C. 5
- D. 6

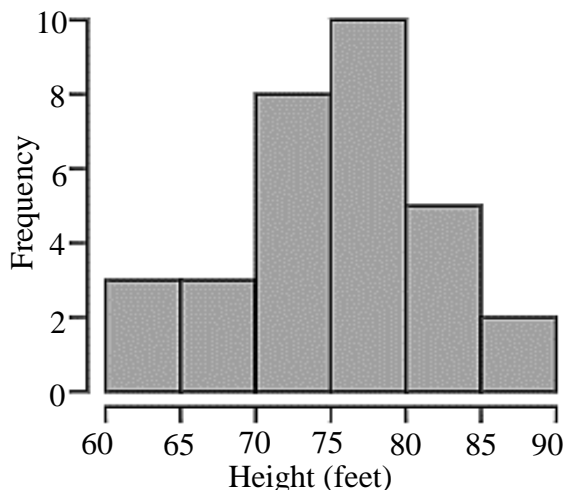
56. Given is the anterior view of bones of a human arm.



The option that CORRECTLY identifies the articulation of parts of ulna (**R, S** and **T**) with humerus at point **P** and with radius at point **Q** is

	P	Q
A	S	R
B	S	T
C	R	T
D	T	R

57. The given histogram shows the distribution of heights for apricot trees in a yard.



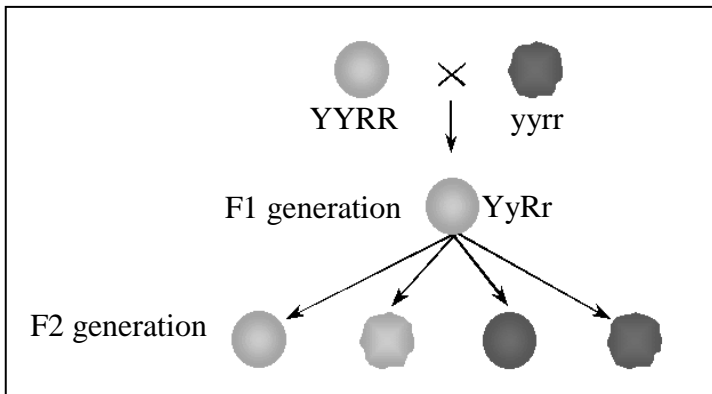
The total number of apricot trees in the yard is

- A. 10
- B. 28
- C. 30
- D. 31

58. The punnet square that CORRECTLY represents a dihybrid cross between two heterozygous $RrYy \times RrYy$ pea plants with round yellow seeds is

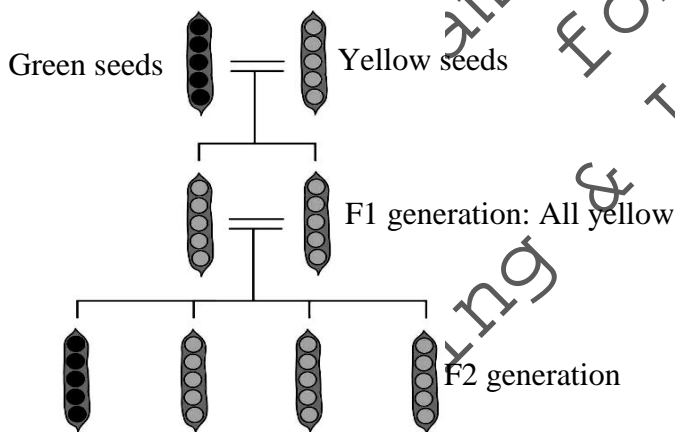
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th><i>RY</i></th> <th><i>Ry</i></th> <th><i>rY</i></th> <th><i>ry</i></th> </tr> </thead> <tbody> <tr> <th><i>RY</i></th> <td>RRYY</td> <td>RRYy</td> <td>RrYY</td> <td>RrYy</td> </tr> <tr> <th><i>Ry</i></th> <td>RRYy</td> <td>RRyy</td> <td>RrYy</td> <td>Rryy</td> </tr> <tr> <th><i>rY</i></th> <td>RrYY</td> <td>RrYy</td> <td>rrYY</td> <td>rrYy</td> </tr> <tr> <th><i>ry</i></th> <td>RrYy</td> <td>Rryy</td> <td>rrYy</td> <td>rryy</td> </tr> </tbody> </table> <p style="text-align: center;">A</p>		<i>RY</i>	<i>Ry</i>	<i>rY</i>	<i>ry</i>	<i>RY</i>	RRYY	RRYy	RrYY	RrYy	<i>Ry</i>	RRYy	RRyy	RrYy	Rryy	<i>rY</i>	RrYY	RrYy	rrYY	rrYy	<i>ry</i>	RrYy	Rryy	rrYy	rryy	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th><i>rY</i></th> <th><i>ry</i></th> <th><i>rY</i></th> <th><i>ry</i></th> </tr> </thead> <tbody> <tr> <th><i>RY</i></th> <td>RrYY</td> <td>RrYy</td> <td>RrYY</td> <td>RrYy</td> </tr> <tr> <th><i>Ry</i></th> <td>RrYy</td> <td>Rryy</td> <td>RrYy</td> <td>Rryy</td> </tr> <tr> <th><i>rY</i></th> <td>rrYY</td> <td>rrYy</td> <td>rrYY</td> <td>rrYy</td> </tr> <tr> <th><i>ry</i></th> <td>rrYy</td> <td>rryy</td> <td>rrYy</td> <td>rryy</td> </tr> </tbody> </table> <p style="text-align: center;">B</p>		<i>rY</i>	<i>ry</i>	<i>rY</i>	<i>ry</i>	<i>RY</i>	RrYY	RrYy	RrYY	RrYy	<i>Ry</i>	RrYy	Rryy	RrYy	Rryy	<i>rY</i>	rrYY	rrYy	rrYY	rrYy	<i>ry</i>	rrYy	rryy	rrYy	rryy
	<i>RY</i>	<i>Ry</i>	<i>rY</i>	<i>ry</i>																																															
<i>RY</i>	RRYY	RRYy	RrYY	RrYy																																															
<i>Ry</i>	RRYy	RRyy	RrYy	Rryy																																															
<i>rY</i>	RrYY	RrYy	rrYY	rrYy																																															
<i>ry</i>	RrYy	Rryy	rrYy	rryy																																															
	<i>rY</i>	<i>ry</i>	<i>rY</i>	<i>ry</i>																																															
<i>RY</i>	RrYY	RrYy	RrYY	RrYy																																															
<i>Ry</i>	RrYy	Rryy	RrYy	Rryy																																															
<i>rY</i>	rrYY	rrYy	rrYY	rrYy																																															
<i>ry</i>	rrYy	rryy	rrYy	rryy																																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th><i>RY</i></th> <th><i>RY</i></th> <th><i>RY</i></th> <th><i>RY</i></th> </tr> </thead> <tbody> <tr> <th><i>RY</i></th> <td>RRYY</td> <td>RRYY</td> <td>RRYY</td> <td>RRYY</td> </tr> <tr> <th><i>Ry</i></th> <td>RRYy</td> <td>RRYy</td> <td>RRYy</td> <td>RRYy</td> </tr> <tr> <th><i>rY</i></th> <td>RrYY</td> <td>RrYY</td> <td>RrYY</td> <td>RrYY</td> </tr> <tr> <th><i>ry</i></th> <td>RrYy</td> <td>RrYy</td> <td>RrYy</td> <td>RrYy</td> </tr> </tbody> </table> <p style="text-align: center;">C</p>		<i>RY</i>	<i>RY</i>	<i>RY</i>	<i>RY</i>	<i>RY</i>	RRYY	RRYY	RRYY	RRYY	<i>Ry</i>	RRYy	RRYy	RRYy	RRYy	<i>rY</i>	RrYY	RrYY	RrYY	RrYY	<i>ry</i>	RrYy	RrYy	RrYy	RrYy	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th><i>RY</i></th> <th><i>Ry</i></th> <th><i>RY</i></th> <th><i>Ry</i></th> </tr> </thead> <tbody> <tr> <th><i>RY</i></th> <td>RRYY</td> <td>RRYy</td> <td>RRYY</td> <td>RrYy</td> </tr> <tr> <th><i>Ry</i></th> <td>RRYy</td> <td>RRyy</td> <td>RRYy</td> <td>Rryy</td> </tr> <tr> <th><i>rY</i></th> <td>RrYY</td> <td>RrYy</td> <td>RrYY</td> <td>RrYy</td> </tr> <tr> <th><i>ry</i></th> <td>RrYy</td> <td>Rryy</td> <td>RrYy</td> <td>Rryy</td> </tr> </tbody> </table> <p style="text-align: center;">D</p>		<i>RY</i>	<i>Ry</i>	<i>RY</i>	<i>Ry</i>	<i>RY</i>	RRYY	RRYy	RRYY	RrYy	<i>Ry</i>	RRYy	RRyy	RRYy	Rryy	<i>rY</i>	RrYY	RrYy	RrYY	RrYy	<i>ry</i>	RrYy	Rryy	RrYy	Rryy
	<i>RY</i>	<i>RY</i>	<i>RY</i>	<i>RY</i>																																															
<i>RY</i>	RRYY	RRYY	RRYY	RRYY																																															
<i>Ry</i>	RRYy	RRYy	RRYy	RRYy																																															
<i>rY</i>	RrYY	RrYY	RrYY	RrYY																																															
<i>ry</i>	RrYy	RrYy	RrYy	RrYy																																															
	<i>RY</i>	<i>Ry</i>	<i>RY</i>	<i>Ry</i>																																															
<i>RY</i>	RRYY	RRYy	RRYY	RrYy																																															
<i>Ry</i>	RRYy	RRyy	RRYy	Rryy																																															
<i>rY</i>	RrYY	RrYy	RrYY	RrYy																																															
<i>ry</i>	RrYy	Rryy	RrYy	Rryy																																															

59. Consider the given cross between pure breeding yellow round and green wrinkled seeds of pea plants.



If total 568 pea plants are produced in the F2 generation, then the possible number of pea plants with green round seeds (yyRr) would be

- A. 35
 - B. 71
 - C. 105
 - D. 279
60. Consider the given monohybrid cross between pure breeding pea plants with green and yellow seeds.



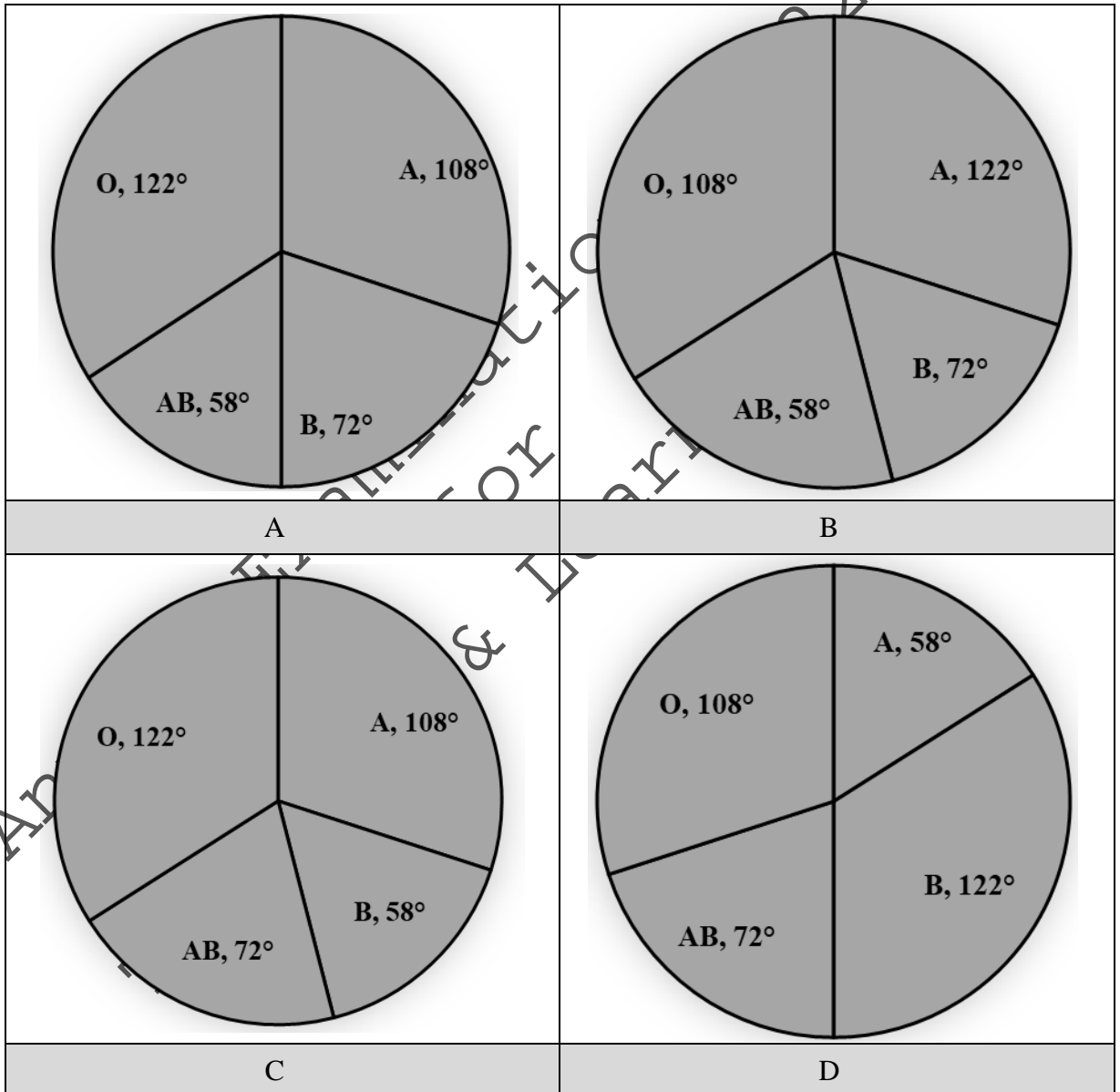
If total 76 pea plants are produced in the F2 generation, then the number of pea plants with yellow seeds would be

- A. 19
- B. 38
- C. 57
- D. 75

61. The given table shows the blood types of 50 donors of a blood bank.

Blood Type	A	B	AB	O
Number of Donors	15	10	8	17

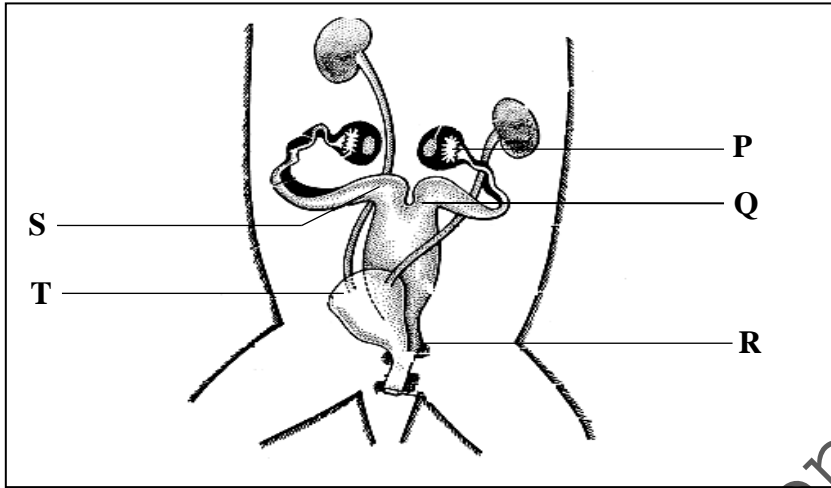
The pie chart that CORRECTLY represents the information given in the table (as the number of degrees) is



PLEASE TURN OVER THE PAGE

Use the given diagram to answer Q.62 and Q.63.

The given diagram shows dissected reproductive system of a female rabbit.



62. The labelled part where the embryo implants is

- A. P.
- B. Q.
- C. R.
- D. S.

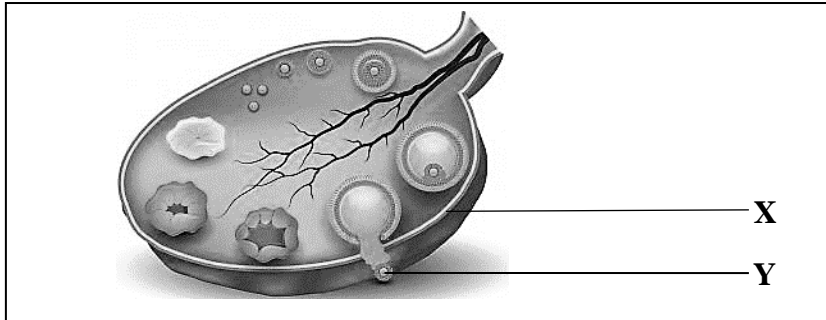
63. The labelled part Q is

- A. cervix.
- B. vagina.
- C. oviduct.
- D. bladder.

Annual Examinations 2022
Teaching & Learning Only

Use the given diagram to answer Q.64 and Q.65.

The given diagram shows the internal structure of mammalian ovary.



64. The hormone which MAINLY triggers the release of structure labelled as Y is

- A. estrogen.
- B. progesterone.
- C. luteinising hormone.
- D. follicle stimulating hormone.

65. The labelled part X is the

- A. vitelline membrane.
- B. germinal epithelium.
- C. follicular epithelium.
- D. peritoneal membrane.

Annual Examinations 2022
Teaching & Learning Only

Please use this page for rough work

Annual Examinations 2022
Teaching & Learning Only

Please use this page for rough work

Annual Examinations 2022
Teaching & Learning Only

Please use this page for rough work

Annual Examinations 2022
Teaching & Learning Only