

**THE AGA KHAN UNIVERSITY
SAMPLE AKU TEST PAPER 2019**

Bachelor of Medicine, Bachelor of Surgery

Science and Mathematics

Time allowed: 2 hours and 30 minutes

Candidate's Name: _____

Application No: _____

INSTRUCTIONS

Please read the following instructions carefully.

1. Make sure that you write your name and application number in the space above and on the given answer sheet.
2. Mark ONLY ONE answer to each question. No credit will be given for multiple answers.
3. If you change an answer, be sure that you completely erase the old answer before marking your new answer.
4. There will be 120 questions in five sub-sections:

Biology	(20 MCQs),
Chemistry	(20 MCQs),
Physics	(20 MCQs),
Science Reasoning	(30 MCQs),
Mathematics Reasoning	(30 MCQs).
5. Attempt all questions.
6. Questions can be attempted in any order.
7. In the Biology, Chemistry and Physics sub-section every wrong answer loses 0.25 marks.

Biology

1. Diagram 1 shows a plant and a human exposed to intense sunlight.

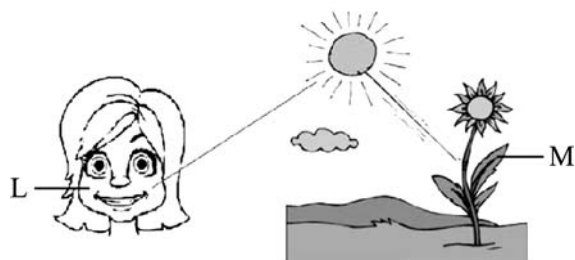


Diagram 1

Which pigment protects the parts L and M from the effect of intense sunlight?

- A. Chlorophyll a
- B. Chlorophyll b
- C. Xanthophyll
- D. Carotenoid

Answer: D

2. Diagram 2 represents a model of plasma membrane. Which of the labelled parts is hydrophobic in nature?

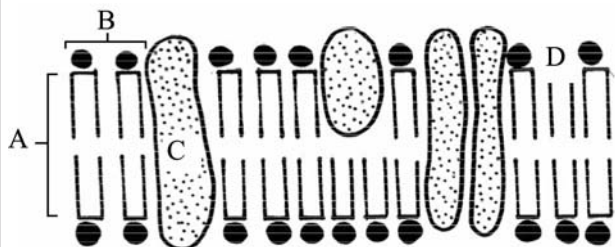


Diagram 2

Answer: A

Chemistry

3. Which of the following is a correct representation of Henderson's equation?

- A. $\text{pH} = \text{pKa} - \log \frac{[\text{salt}]}{[\text{acid}]}$
- B. $\text{pH} = \text{pKa} + \log \frac{[\text{salt}]}{[\text{acid}]}$
- C. $\text{pH} = \text{pKa} - \log \frac{[\text{acid}]}{[\text{salt}]}$
- D. $\text{pH} = \text{pKa} + \log \frac{[\text{acid}]}{[\text{salt}]}$

Answer: B

4. Which of the following carboxylic acids is more soluble in water?

- A. $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{COOH}$
- B. $\begin{array}{l} \text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \\ \text{CH}_2 - \text{COOH} \end{array}$
- C. $\begin{array}{l} \text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \\ \text{CH} - \text{COOH} \end{array}$
- D. $\begin{array}{l} \text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \\ \text{CH}_2 - \text{CH}_2 - \text{COOH} \end{array}$

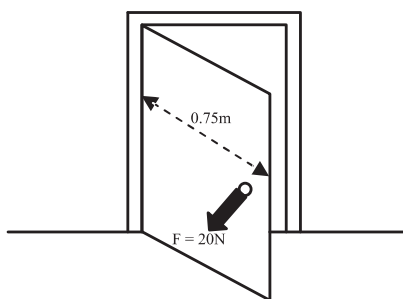
Answer: A

Physics

5. The mass-energy equivalence equation is $E = mc^2$. What is represented by the symbol c in this equation?
- The critical angle
 - The speed of neutrons
 - The speed of light in vacuum
 - The specific heat capacity of the material

Answer: C

6. A force of 20 N is applied to open the door. What torque will be produced?



- 10 Nm
- 15
- 20 Nm
- 25 Nm

Answer: B

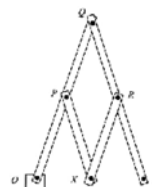
Science Reasoning

Questions 7-8 refer to the following information:

A pantograph is a four-bar linkage mechanism used for drawing. It consists of two long bars and two short bars pivoted to one another so that they can move freely in a plane. In the version shown in Figure 1 below, the short bars are half the length of the long ones.

The point O is held fixed. There is a pointer at X and a pencil at Y. As the pointer at X is traced over a shape, the pencil at Y draws the shape enlarged by a factor of two.

Figure 1: A Pantograph



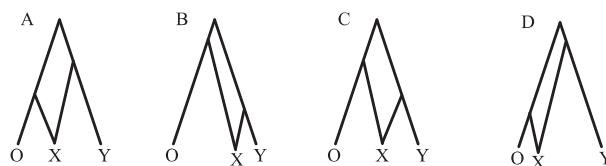
7. In Figure 1 if O and Q are both held fixed, the point Y

- cannot move.
- can move on a circular path.
- can move in a straight line.
- can move freely.

Answer: B

For Question 8 select the answer from the diagrams labelled A to D in Figure 2.

Figure 2



The size of the drawing traced out by the pencil depends upon the relative lengths of the bars in the pantograph.

8. Which of the pantographs in Figure 2 will produce the biggest enlargement of the original shape?

Answer: D

Mathematics Reasoning

Question 9 refers to the following information:

9. A farmer sold apples, pears, and tomatoes by the kilogram for a total receipt of Rs. 480.00. How many kilograms of apples did the farmer sell?

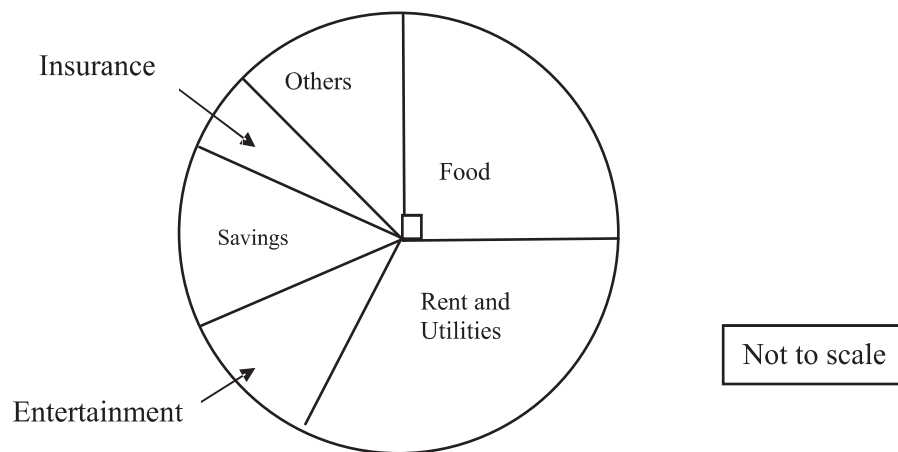
Which **two** of the following statements **together** provide sufficient information to answer the question?

- I. Apples and pears were each sold at Rs.0.50 per kilogram
 - II. A total of 780 kilograms of pears and tomatoes was sold.
 - III. The total receipt for apples was equal to the combined receipt for pears and tomatoes.
 - IV. The total receipt for apples was 4 times the total receipt for pears.
 - V. The total receipt for tomatoes was 3 times the total receipt for pears.
- A. I and IV
 - B. II and IV
 - C. III and V
 - D. I and III

Answer: D

Question 10 asks you to compare two quantities with the help of the information given below.

Distribution of the monthly budget of Rs. 4,500 for Salim's family



Quantity X: the monthly budget for food

Quantity Y: Rs. 1,000/-

10. Based on the above information, which of the following statements is correct for X and Y?
- A. Quantity X is greater than Quantity Y.
 - B. Quantity Y is greater than Quantity X.
 - C. Quantities X and Y are equal.
 - D. The relationship cannot be determined from the information given.

Answer: A

END OF PAPER

Please use this page for rough work