

KCSE PREDICTIONS 2020

PHYSICS PAPER 2

SECTION A (25mks)

Answer **ALL** questions in this section in the spaces provided after each question.

1. What is the purpose of a fuse in domestic wiring system? (1mrk)

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2. Use the domain theory to explain briefly why a ferromagnetic material gets saturated when magnetized. (2mks)

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3. The **figure 1** below shows an object placed some distance from a biconcave lens.

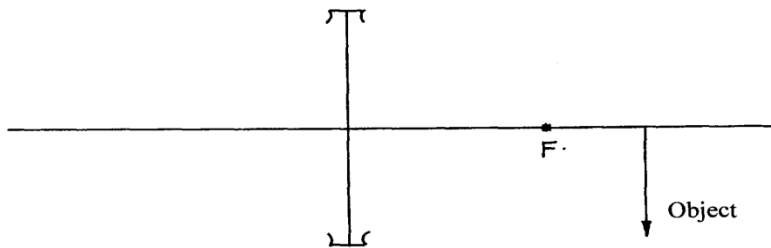


Figure 1

Construct the image on the diagram. (2mks)

4. What determines the hardness of X-rays? (1mk)

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5. Distinguish between the terms 'photoelectric' and 'thermionic' effect. (2mks)

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6. The **figure 2** below shows a light rod balanced due to the action of the forces shown. Q is a magnet of weight 4N and R is a permanent magnet which is fixed. Determine the force between Q and R and state whether it is attractive or repulsive. (3mks)

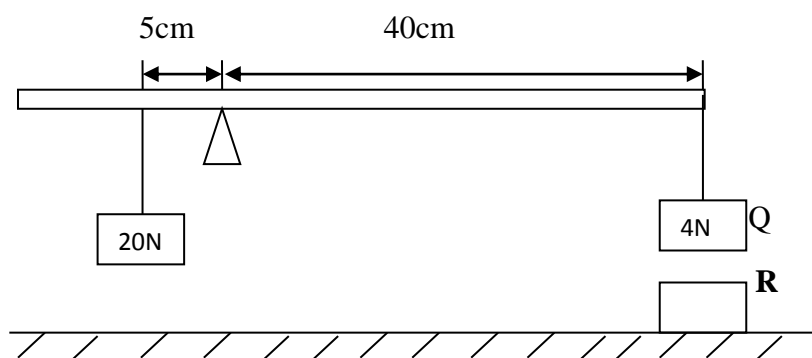


Figure 2

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7. Determine the ammeter reading when the potential difference of 3.0 volts is supplied across PQ in figure 3. (3mks)

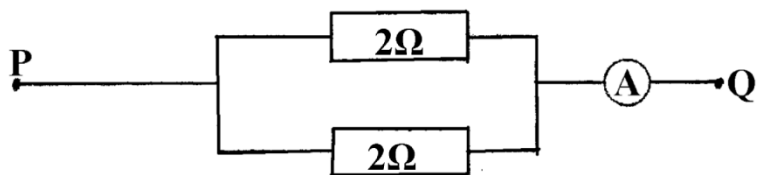


Figure 3

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8. The chart below shows an arrangement of different parts of the electromagnetic spectrum.

Radio	A	Visible	B	X – Rays	Gamma Rays
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Name the possible radiations represented by letter **B**. (1mk)

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9. A student stands at a distance 400m from a wall and claps two pieces of wood. After the first clap the student claps whenever an echo is heard from the wall. Another student starts a stopwatch at the first clap and stops it after the twentieth clap. The stopwatch records a time of 50 seconds. Find the speed of sound. (3maks)

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10. The **figure 4** below shows a plane mirror KL and an object B.

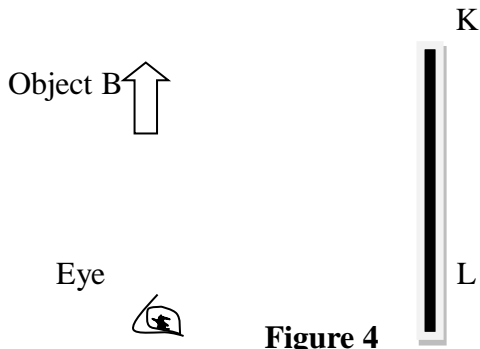
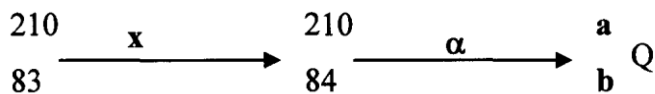


Figure 4

- a) Complete the ray diagram to show how the person sees the image. (2mks)
- b) State the nature of the image formed. (2mks)

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11. The following equation represents a decay series.



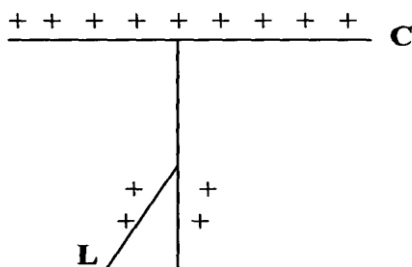
Identify the radiation **x** and determine the values of **a** and **b**. (2mks)

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12. A gold leaf electroscope is positively charged as shown in the diagram below where **C** is the cap and **L** is the gold leaf. State and explain what happens to **L** when a positively charged rod is brought near **C** without touching it. (2mks)



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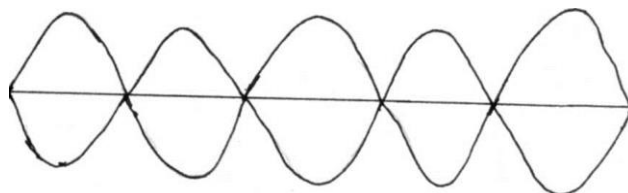
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SECTION B (55 MARKS)

Answer **ALL** questions in this section in the spaces provided after each question.

13. a) Differentiate between transverse and longitudinal waves. (2mks)
 b) **Figure 5** shows a transverse stationary wave along a string



i). Label the nodes and anti-nodes.
 ii). If the distance between an anti-node and consecutive node is $1.0 \times 10^{-3} \text{ m}$, determine the wavelength of the stationary wave. (2mks)

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c). Five successive wave frequency in a ripple tank are observed to spread a distance of 6.4cm. If the vibrator has a frequency of 8 Hz, determine the speed of the wave. (3mks)

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d). The **figure 6** below shows a displacement-time graph for a wave motion

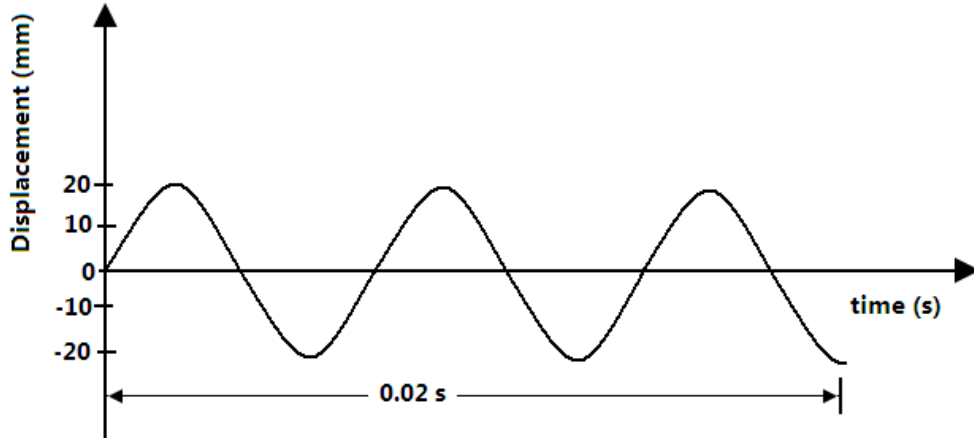


Figure 6

What is the frequency of the wave? (3marks)

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14. (a) What do you understand by the term **e.m.f** of a cell?. (1mk)

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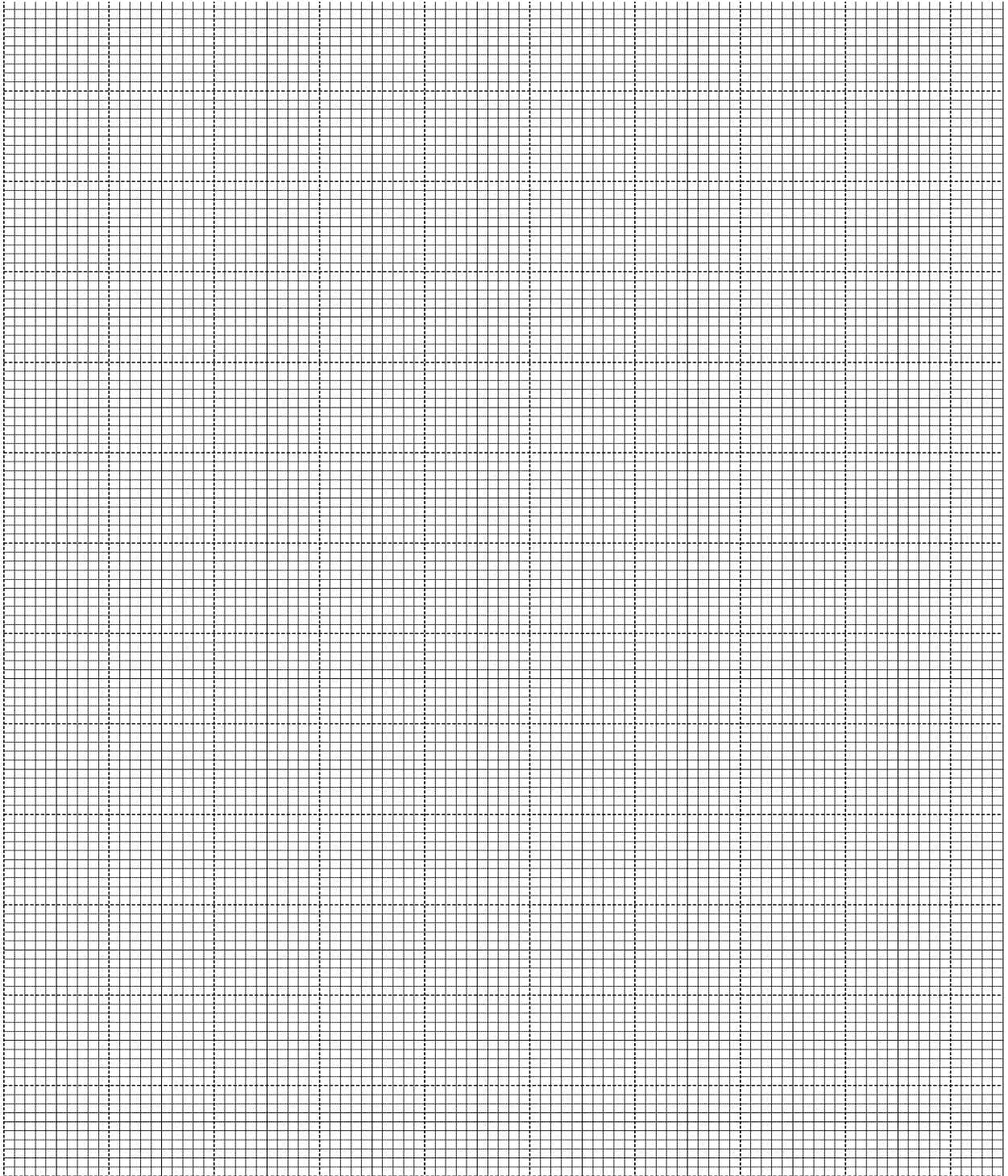
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(b) A cell of e.m.f **E** and internal resistance **r** is used to pass a current through various resistors **R** Ohms and the values of current recorded in the table below.

R(Ohms)	1.6	2.1	2.5	3.6	5.0	8.0
I(A)	1.0	0.8	0.7	0.5	0.37	0.34
1/i(A⁻¹)						

i. Complete the table for the values of **1/i** giving your answer to 3d.p. (3mks)

ii. Plot a graph of **1/i** versus **R**. (5mks)



iii. Given that the equation $E = I(R + r)$, use your graph to determine the values of E and r . (5mks)

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15. a) State **three** factors that determine the capacitance of a parallel plate capacitor. (3marks)

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b) Three capacitors of capacitance $200\mu f$, $300\mu F$ and $600\mu f$ are connected together in a circuit.

i. Draw a circuit diagram to show the arrangement of the capacitors which gives an effective capacitance of $100\mu f$. (2marks)

c) The figure 6 below shows a circuit where a battery of e.m.f $6V$, switches X and Y, two capacitors of capacitance $2\mu F$ and $4\mu F$ are connected.

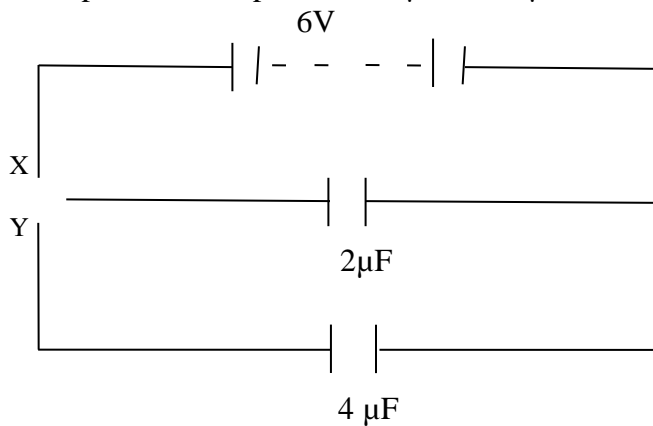


Figure 6

i. Determine the charge stored in the $2\mu F$ capacitor when switch X is closed and switch Y is open. (3marks)

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ii. When switch Y is finally closed and switch X is open, determine the potential difference across each capacitor. (3marks)

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d) Briefly explain how the lightening arrester works. (3mks)

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16. (a) Define the term 'work function'. (1mk)

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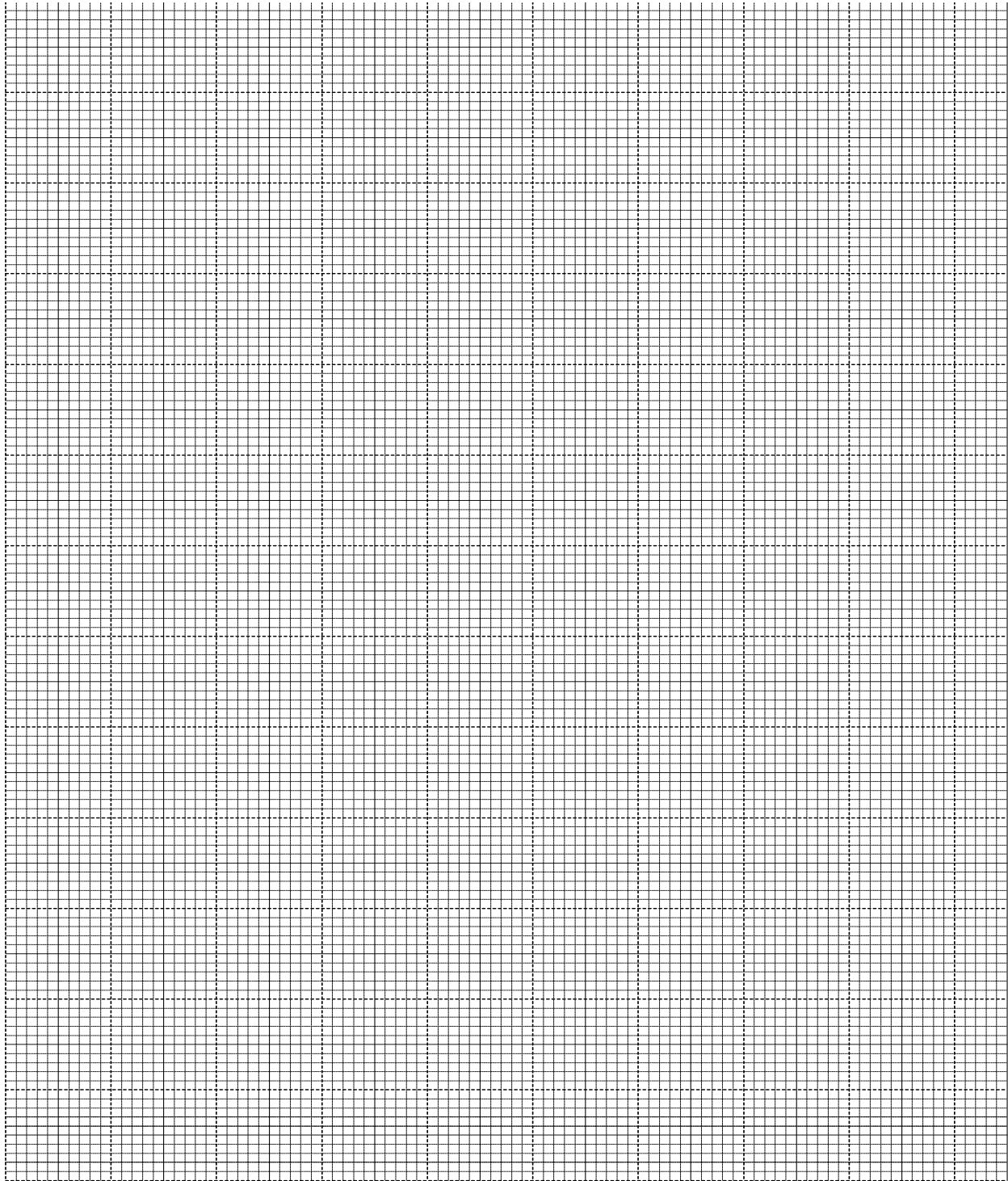
(b) List three factors which affect photoelectric effects. (3mks)

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(c) The table below shows the stopping potential and the corresponding frequencies for a certain photocell.

Stopping potential V_s (V)	0.2	0.6	1.10	1.42	1.83
Frequency f ($\times 10^{14}$ Hz)	4.0	5.0	6.0	7.0	8.0

Plot a graph of stopping potential against frequency. (5mks)



Use your graph to determine;

i) The threshold frequency.(2mks)

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ii) Plank's constant. (Take e to be $1.6 \times 10^{-19}C$) (2mks)

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iii) Work function. (2mk)

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