

GC INTERNATIONAL STEM OLYMPIAD - LEVEL FOUR SAMPLE PAPER

Question 1

During the final steps of the formation of sedimentary rocks sediments are glued together. What is the scientific name for this process?

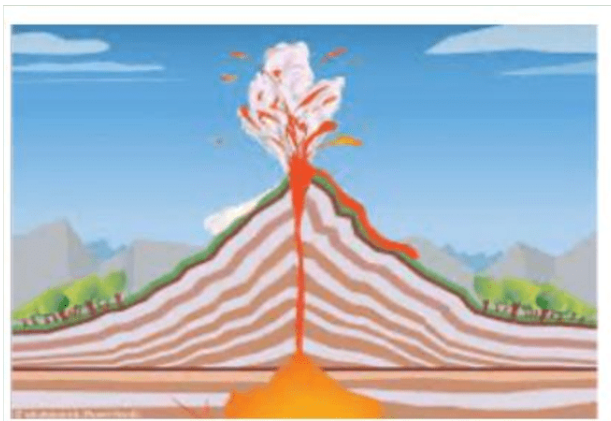


- A. sedimentation B. fermentation C. lithification D. cementation

Key: C

Question 2

The Earth is made up of 4 different layers: the crust, the mantle, the outer core and the inner core. The magma deep within the liquid outer core is circulated by which process?

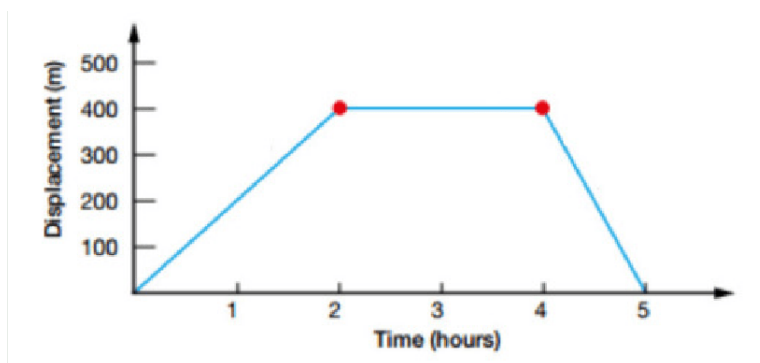


- A. magma circulation
B. convection currents
C. electric currents
D. hydrothermal circulation

Based on the displacement versus time graph, which scenario might be correct?

Key: B

Question 3

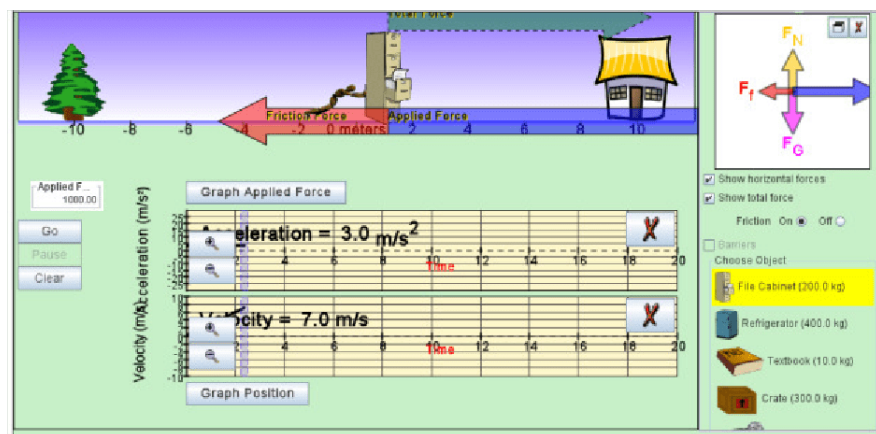


Which of these statements best describes the above graph ?

- A. Teddy walked 200m to his office in 2 hours and worked for 2 hours and came home with same speed in 1 hour
- B. Teddy walked 400m to his office in 1 hour and worked for 2 hours and came home with same speed in 2 hours
- C. Teddy walked 200m to his office in 1 hour and worked for 2 hours and came home with slower speed in 1 hour
- D. Teddy walked 400m to his office in 2 hours and worked for 2 hours and came home with higher speed in 1 hour

Key: D

Question 4



In the picture above, a file cabinet is being pushed horizontally with a 1000 N force on a rough surface. Given the acceleration and velocity values, what is the total distance travelled?

- A. 7.18 m
- B. 3.5 m
- C. 8.17 m
- D. 10 m

Key: C

Question 5

One of the techniques developed uses laboratory made proteins called monoclonal antibodies, which mimic the immune system's ability to fight off harmful antigens.



What is true for monoclonal antibodies?

- A. These antibodies are obtained from one parent and used for one antigen
- B. Obtained from different parents and used for one antigen
- C. Antibodies obtained from one parent and used for many antigens
- D. Obtained from many parents and used for many antigens

Key: A

Question 6

Convert the Hex number "FE" to binary.

- A. 11001010
- B. 11011011
- C. 11011010
- D. 11111110

Key: D

Question 7

A screenshot of a Microsoft Word document. The menu bar at the top includes File, Edit, View, Insert, Format, Tools, Table, Add-ons, and Help. The ribbon below shows options like 100%, Heading 1, Arial, 20, and More. The document content starts with "Dear *|Fullname|*,", followed by "Can you kindly confirm that the following information in our records are still valid?". Below this is a table with two rows: "Home Address:" with the field code *|Address|*, and "Landline:" with the field code *|Home Line|*.

In this image, the document includes fields for a Fullname, Address and Home Line. Which feature are the fields using?

- A. Mail Merge
- B. Formatting
- C. Table Setting
- D. Twx boxes

Key: A

Question 8

B6		
	A	B
1	Subject	Score
2	Maths	100
3	ICT	80
4	Science	90
5	English	100
6	AVERAGE:	=

What is the correct formula to calculate cell B6?

- A. =SUM(B1:B6) B. =AVERAGE(B2:B5)
C. =MIDDLE(B2:B5) D. =GET(B6)

Key: B

Question 9



```
1 ....
2 repeat 2:
3   forward(a)
4   turn(right)
5   forward(a-1)
6   turn(left)
7   forward(a-2)
```

Look at the challenge above and find the correct code to fill in the blank?

- A. a=1 B. forward(a) C. a=3 D. turn(right)

Key: C

Question 10

The led lightbulb is considered perhaps one of the top technological advances of the 21st century. what does “led” stand for?

- A. Long-lasting electronic display
B. Light-emitting diode
C. Liquid energy device
D. The inventor was a huge fan of the rock band Led Zeppelin.

Key: B

Question 11

Mr. Wilk is a high school math teacher whose salary is \$33,660 for this school year, which has 180 days. In Mr. Wilk's school district, substitute teachers are paid \$85 per day. If Mr. Wilk takes a day off without pay and a substitute teacher is paid to teach his classes, how much less does the school district pay in salary by paying a substitute teacher instead of Mr. Wilk for that day?

- A. \$57
- B. \$85
- C. \$102
- D. \$114

Key: C

Question 12

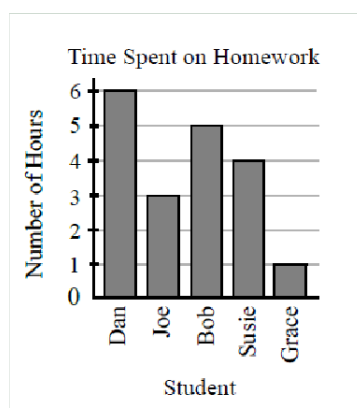
The original price of a shirt is reduced by 50% to obtain a second price. The store advertises an additional sale, and so this second price is reduced by 40% to obtain a third price. What is the discount of the third price off the original price?

- A. 80%
- B. 10%
- C. 70%
- D. 65%

Key: C

Question 13

The number of hours spent by five students on homework is shown on the graph. Which two students, adding their individual times together, spent the same amount of time on homework as Dan?

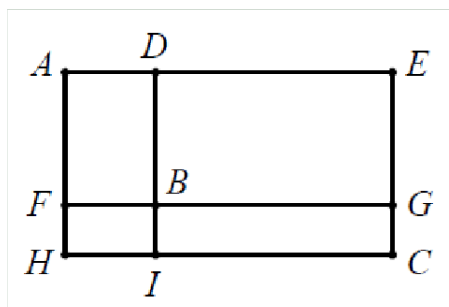


- A. Joe and Grace
- B. Joe and Bob
- C. Bob and Grace
- D. Dan and Bob

Key: C

Question 14

An ant begins its path at A, travels only right or down, and remains on the line segments shown. The number of different paths from A to C that pass through B is



- A. 2
- B. 3
- C. 4
- D. 5

Key: C

Question 15

Alexis took a total of 243 000 steps during the 30 days in the month of April. What was her mean (average) number of steps per day in April?

- (A) 7900
- (B) 8100
- (C) 8000
- (D) 7100

Key: B

Question 16

Abdul is 9 years older than Susie, and Binh is 2 years older than Susie. How many years older is Abdul than Binh?

- (A) 11
- (B) 9
- (C) 14
- (D) 7

Key: D

Question 17

To encode a message, James first replaces each letter within the message with its corresponding number, where A = 1, B = 2, ..., Y = 25, and Z = 26. Next, James multiplies each number by 3 and then subtracts 5, and continues this process a total of n times. For example, when $n = 2$ the letter D is encoded to the number 16. If James encoded a four letter message to the four numbers 367 205 853 1339, what is the value of n that he used?

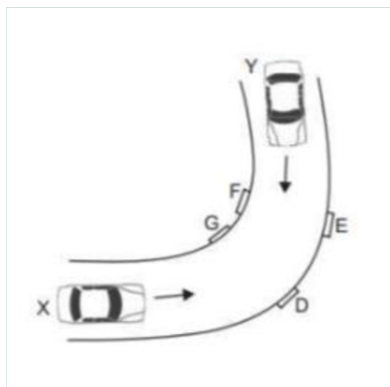
- (A) 2
- (B) 3
- (C) 4
- (D) 5

Key: C

Question 18

Two cars X and Y are travelling in opposite directions on a narrow road as shown here.

Four possible positions for placing a mirror are labelled D, E, F and G. In order to avoid an accident, a mirror could be placed at position _____.



- A.E
- B.D
- C.G
- D.F

Key: D

Question 19

A bolt cutter has long handles with handle grips that are located as far away as possible from the neck. Which statement provides the best reason for this design?

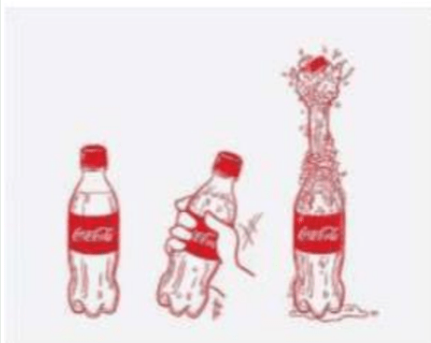


- A. Longer handles make the cutting blade move faster.
- B. It provides mechanical advantage which allows cutting through thick bolts.
- C. The appearance of the tool is significantly more aesthetic with longer handles.
- D. It makes the bolt cutter more durable when dropped accidentally.

Key: B

Question 20

John bought a bottle of a carbonated cold drink and shook it before opening bottle, after opening the cap of the bottle he observed the explosion and half of the contents of the bottle came out, what could be the suitable reason for the same?



- A. Because of the pressure increases inside the bottle after shaking the bottle.
- B. Because of the pressure decreases inside the bottle after shaking the bottle.
- C. Because of nucleation of CO₂ bubbles inside the bottle after shaking.
- D. Because of pressure increase outside the bottle

Key: C

Question 21

A farmer places a sprinkler on top of a platform in the middle of a field. Water is pumped to the sprinkler from a water supply tank. The spray from the sprinkler, however, does not reach the edges of the field. Which of the following should the farmer do to increase the range of the sprinkler?



- A. Place the sprinkler at ground level.
- B. Reduce the diameter of the sprinkler nozzle.
- C. Move the water supply tank closer to the field.
- D. Increase the diameter of the water supply tank.

Key: B

Question 22

What's the difference between a client and a server?

- A. A server is connected to the Internet. A client is not.
- B. A server is a large computer, a client is a small computer.
- C. A server is a computer, a client is a human user.
- D. A server provides services, a client uses them.

Key: D

Question 23

An IP address is most similar to which of the following?

- A. A home address
- B. A mail carrier
- C. An electrical generator
- D. A television network

Key: A

Question 24

Organisations can't use data for any other purpose without your

- A. Date of Birth
- B. Photograph
- C. Consent
- D. Fingerprint

Key: C

Question 25

Which of the following is TRUE of the difference between malware and adware?

- A. Antivirus software protects against malware types except for adware.
- B. Adware exists to steal user information, while malware is designed to destroy information.
- C. Adware exists to make money for the author, but not necessarily cause harm or steal information.
- D. None of these

Key: C

Question 26

Trojan Viruses ...

- A. Trick people into downloading malicious software
- B. Put computers in a network to control
- C. Melt down the computer to a point of no function
- D. Spread other malicious programs

Key: A

Question 27

You found a Facebook page that had pictures and very negative comments about a friend that was posted by a classmate at Grant. What should you do?

- A. Call the classmate and make threatening remarks.
- B. Create a page about the classmate that was just as bad.
- C. Inform an adult at home or at school.
- D. None of these

Key: C

Question 28

Which of the following is legal when you buy a music CD?

- A. You can burn copies of the CD and give it all your friends.
- B. You can load the CD on any number of computers or MP3 players.
- C. You can only load the CD on one computer and one MP3 player.
- D. None of these

Key: C

Question 29

Which is the best way to evaluate whether or not a web site has a high level of authority?

- A. Find out the number of people have visited the page.
- B. Find out about the qualifications of the author or publisher of the information.
- C. Count the number of good pictures and graphics.
- D. Scroll down to see how long the article is.

Key: B

Question 30

Rosie is saving money. She has \$120 in her account today and will begin saving by making \$30 deposits into her account. If she makes m such deposits, the expression that best represents the number of dollars in her account is

- (A) $120 + m$
- (B) $30m$
- (C) $30 + 120m$
- (D) $120 + 30m$

Key: D

Question 31

Joshua is reading a 396-page book. He has read the first third of the book only. How many pages does he have left to read to finish the rest of the book?

- (A) 264
- (B) 124
- (C) 250
- (D) 199

Key: A

Question 32

A piano has 52 white keys that occur in a repeating pattern of ABCDEFG. The first white key is A. What letter is associated with the 33rd white key?

- (A) A
- (B) B
- (C) C
- (D) E

Key: D

Question 33

Canadian currency has coins with values \$2.00, \$1.00, \$0.25, \$0.10, and \$0.05. Barry has 12 coins including at least one of each of these coins. What is the smallest total amount of money that Barry could have?

- (A) \$3:75
- (B) \$3:90
- (C) \$3:70
- (D) \$3:40

Key: A

Question 34

Kathy owns more cats than Alice and more dogs than Bruce. Alice owns more dogs than Kathy and fewer cats than Bruce. Which of the statements must be true?

- (A) Bruce owns the fewest cats.
- (B) Bruce owns the most cats.
- (C) Kathy owns the most cats.
- (D) Alice owns the most dogs.

Key: D

Question 35

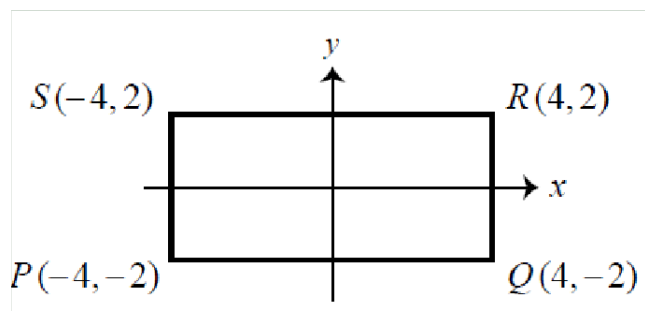
A rectangle has length x and width y . A triangle has base 16 and height x . If the area of the rectangle is equal to the area of the triangle, then the value of y is

- (A) 16
- (B) 4
- (C) 8
- (D) 12

Key: C

Question 36

In the diagram, what is the area of rectangle PQRS?



- (A) 36
- (B) 32
- (C) 40
- (D) 20

Key: B

Question 37

If doubling the voltage across a resistor doubles the current through the resistor then

- A. the resistor value decreased
- B. the resistor value does not change
- C. the resistor value increased
- D. it is impossible to determine the change in the resistor value

Key: B

Question 38

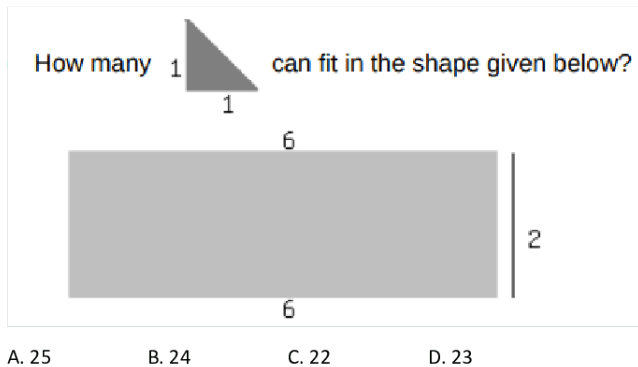
Which is the odd one out in this set:

HLQ, VZE, IMR, WAH

- A. WAH
- B. HLQ
- C. VZE
- D. IMR

Key: A

Question 39



Key: B

Question 40

Which of the following would you NOT expect to experience during fasting or starvation?

- A. Increase in ketone body formation
- B. Decrease in plasma fatty acid levels
- C. Depletion of glycogen
- D. Increased use of ketones for ATP production in the brain

Key: B

Question 41

Programming a robot by physically moving it through the trajectory you want it to follow is called:

- A. contact sensing control
- B. continuous-path control
- C. robot vision control
- D. pick-and-place control

Key: B

Question 42

Can you combine the following two statements into one?

```
char *p;  
p = (char*) malloc(100);
```

- A. char p = *malloc(100);
- B. char *p = (char) malloc(100);
- C. char *p = (char*)malloc(100);
- D. char *p = (char *) (malloc*)(100);

Key: C

Question 43

What is the unit of measurement used to describe the expansion of the universe?

- A. The Hubble Constant
- B. Light year
- C. Big bang constant
- D. None of these

Key: A

Question 44

When one device can communicate with an appliance, we call this technology:

- A. Multi-Communications Protocol
- B. The Internet of Things
- C. Communications software technology
- D. Networking technology

Key: B

Question 45

The technology used for wireless "Tap and Pay" devices/objects:

- A. RFID
- B. WiFi
- C. Bluetooth
- D. NFC

Key: D

Question 46

Pointing to a man in a photograph, a woman said, "His brother's father is the only son of my grandfather." How is the woman related to the man in the photograph?

- A. Mother
- B. Aunt
- C. Sister
- D. Daughter

Key: C

Question 47

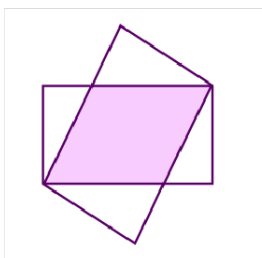
A train, traveling at a uniform speed for 3060 km, would have taken 2 hours less to travel the same distance if its speed were 5 km/h more. Find the original speed of the train.

- A. 78 km/hour
- B. 80 km/hour
- C. 91 km/hour
- D. 85 km/hour

Key: D

Question 48

Two identical rectangles overlap in such a way that a rhombus is formed, as indicated in the diagram. The area of the rhombus is five-eighths of the area of each rectangle. What is the ratio of the length of the longer side of the rectangle to the length of its shorter side?



- A. 7:4
- B. 2:1
- C. 1:2
- D. 4:7

Key: B

Question 49

Mr. and Mrs. Parker went to a puppet show with their 4 children. The children were charged with half of the entrance fee. If the total fee charged was \$32, what is the entrance fee for each adult?

- A. \$6
- B. \$8
- C. \$10
- D. \$12

Key: B

Question 50

A lending library has a fixed charge for the first 20 days and an additional charge for each day thereafter. Sarah paid \$376 for a book she kept for while Gill paid \$96 for the book she kept for 30 days . Find the fixed charge and the charge for each extra day

- A. \$26, \$7 B. \$29, \$12 C. \$28, \$11 D. \$27, \$9

Key: A

Question 51

Which of the following foods has the highest energy density?

- A. Lean meat of a rabbit
B. Cell wall of celery
C. Pericarp of an apple
D. Butter churned from milk

Key: D

Question 52

What is the power generated by a circuit with a total current of 6 amperes running through two resistors in parallel, of 2 and 6 ohms?

- A. 40 Watts
B. 54 Watts
C. 66 Watts
D. 70 Watts

Key: B

Question 53

What is a chief difference between an electrolytic cell and a galvanic cell?

- A. Galvanic cells convert electrical energy into chemical energy, electrolytic cells convert chemical energy into electrical energy
B. Galvanic cells spontaneously produce an electrical current; an external voltage must be applied to an electrolytic cell
C. Oxidation occurs at the anode for a galvanic cell and at the cathode for an electrolytic cell
D. Reduction occurs at the anode for a galvanic cell and at the cathode for an electrolytic cell

Key: B

Question 54

A car leaves its original location traveling due west at a speed of 60 miles per hour and arrives at its destination in 3 hours. Later that day, the car returns to its original location. At what speed, in miles per hour, did it travel to cover the same distance in 2 hours?

- A. 60 mph B. 75 mph C. 90 mph D. 120 mph

Key: C

Question 55

While eating out, you and your friend both tip the server 2 dollars. Your tip is 10% of your bill, while your friend's is 20%. What is the difference, in dollars, between your bills?

- A. 2
B. 4
C. 5
D. 10

Key: D

Question 56

Dylan has a stamp collection. When Michael asked how many stamps he had, Dylan replied, "When I count by twos, threes, fours, fives, and sixes, there is always one stamp left over, but if I count by sevens, then there are none left over." What is the fewest number of stamps Dylan might have?

Key: 301

Question 57

If an object immersed in water experiences a buoyant force of 19.6×10^3 newtons, assuming that the density of water is 1000 kilograms per meter cubed, what is the immersed volume of the object?

- A. 2.0 m^3
B. 1.0 m^3
C. 2.0 cm^3
D. 1.0 cm^3

Key: A

Question 58

If the ambient temperature drops 10 degrees Celsius, what would happen to the body temperature of a rabbit and a snake, respectively?

- A. It would drop linearly for the rabbit and exponentially for the snake
- B. It would stay the same for the rabbit and drop linearly for the snake
- C. It would stay the same for the rabbit and drop exponentially for the snake
- D. It would drop linearly for the rabbit and for the snake

Key: B

Question 59

Which of the following is probably the most significant limitation for PET scans being used in remote rural hospital sites:

- A. lack of properly trained personnel
- B. the proximity to production facilities for short-lived radioisotopes
- C. the high level of radiation requiring special training and increased radiation risk
- D. difficulty in PET radiotracers binding to receptors when imaging certain human tissues

Key: B

Question 60

Which of the following is a problem that affects most plants growing in very acidic soil:

- A. iron deficiency
- B. accumulation of excess salt in their foliage
- C. aluminum toxicity to their roots
- D. excess calcium and magnesium ion uptake

Key: C