

DISCOVER THAILAND'S ASTRONAUT SCHOLARSHIP

2016

SPACE CAMP APTITUDE TEST

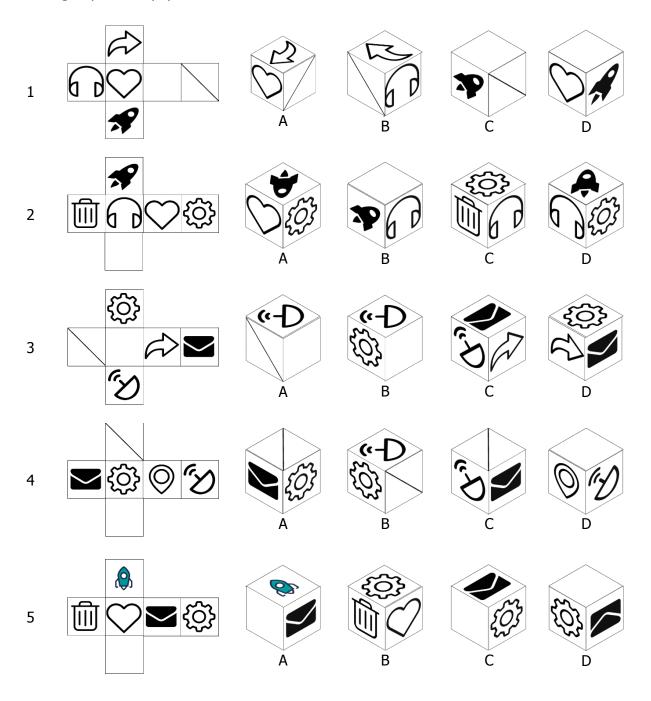
SCAT is a 100 multiple-choice exam. The test is on physics, dynamics, logics, and history of space exploration, current development and the future of Mars colonization.

ANSWERS

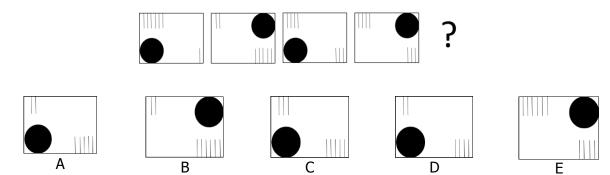


Part1: Abstract & Visual Tests

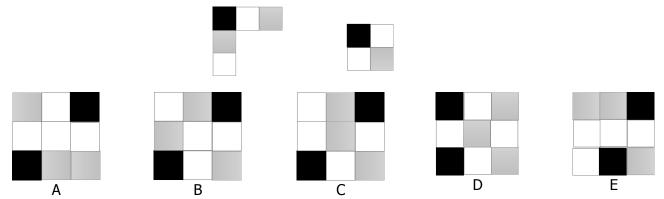
The paper sheet on the left hand side can fold into a box .Select a following box that fold according to provided paper sheet.



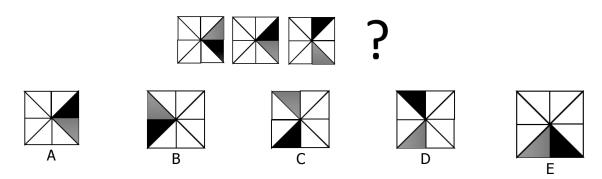
6. Which picture should come next to complete the following series?



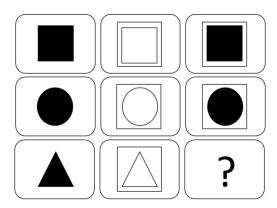
7. Which larger shape would be made if the two sections are fitted together?

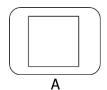


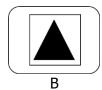
8. Which picture should come next to complete the following series?

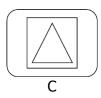


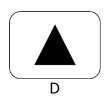
9. Which figure logically belongs on the spot of the question mark?

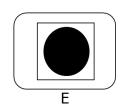








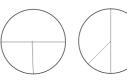




10. Which picture should come next to complete the following series?

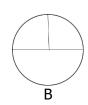




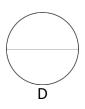


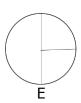












Part2: Abstract Verbal Tests

11. Which one of the five choices makes the best comparison? GIVEN is to NEVIG as 46251 is to:

A. 15264

B. 46251

C. 46252

D. 12654

E. 14652

12. Mary, who is sixteen years old, is four times as old as her brother. How old will Mary be when she is twice as old as her brother?

A. 24

B. 25

C. 20

D. 28

E. 21

13. Which number should come next in the series?

3 - 3 - 6 - 9 - 15 - 24

A. 21

B. 26

C. 34

D. 39

E. 30

14. Which one of the numbers does not belong in the following series?

1 - 2 - 3 - 6 - 7 - 8 - 14 - 15 - 30

A. 3

B. 1

C. 8

D. 15

E. 30

15. John needs 17 bottles of milk from the store. John can only carry 4 at a time. What's the minimum number of trips John needs to make to the store?

A. 5

B. 6

C. 4 1/2

D. 3

E. 4 1/4

Read following paragraph and answer question 16 -17

In a five-storey apartment, Peter lives next to Jane's room. John is live on the first floor. Emma lives on the floor above Jack. Sara lives on the floor below Jack, whereas Peter lives below Sara.

16. Who lives on the top floor?

A. Emma

B. Jack

C. Sara

D. Peter

E. Jane

- 17. Who lives on the same floor?
 - A. Emma and Jack
 - B. Sara and Peter
 - C. Jack and John
 - D. Emma and Sara
 - E. None of these

Read following paragraph and answer question 18 -20

All the Children love to watch movie. Everyone like drama movie except Jane. Sally Joe and Jane like horror movie, while Toby and Jane like romantic movie. Both Sam and Sally like fantasy

- 18. Who likes romantic and drama movie?
 - A. Toby
- B. Sam
- C. Jane
- D. Joe
- E. Sally

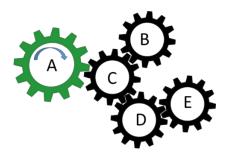
- 19. Which sentence is correct?
 - A. Toby and Jane don't like horror movie
 - B. Joe and Jane like same genres of movie.
 - C. Jane doesn't like romantic and horror movie.
 - D. Sally like Fantasy but doesn't like drama movie
 - E. Sally like both drama and fantasy movie
- 20. Who like drama, horror and fantasy movie?
 - A. Sam, Sally and Toby
- B. Sam and Sally

C. Sally

- D. Jane
- E. Toby

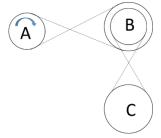
Part3: Mechanical tests

21. If gear A turns clockwise, which gears also turn clockwise?



- A. Gear B and C
- B. Gear B and D
- C. Gear B and E
- D. Gear D only

22. If wheel A turns clockwise, which wheels also turn clockwise?



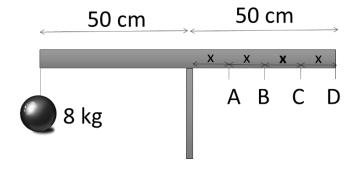
- A. Wheel A and B
- B. Wheel A and C
- C. Wheel A, B and C
- D. Cannot Say

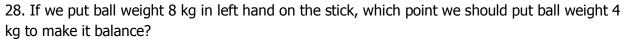
Use following picture to answer question 23 - 25



- 23. There are ball A, B and C in different size. If ball A is heavier than B and B is heavier than C. Which ball can floating?
 - A. Ball A
- B. Ball B
- C. Ball B and C
- D. Cannot say
- 24. If ball B can float when put it in water, what will happened to ball A if ball A, B and C are weigh the same?
 - A. Ball A will float
- B. Ball A will sink
- C. Cannot say
- 25. If ball B can float when put it in water, what will happened to ball C if ball A, B and C are weigh the same?
 - A. Ball C will float
- B. Ball C will sink
- C. Cannot say
- 26. If we through a ball weight 1 kilogram and a piece of paper from the 2nd floor of a building. Which one can reach to ground first?
 - A. Ball reach first
 - B. Paper reach first
 - C. Both can reach to ground at the same time
 - D. Cannot say
- 27. If we through a ball weight 1 kilogram and a piece of paper from altitude of 10 meter in vacuum chamber. Which one can reach to ground first?
 - A. Ball reach first
 - B. Paper reach first
 - C. Both can reach to ground at the same time
 - D. Cannot say

Use following picture to answer question 28 - 29





A. A B. B

C. C

D. D

E. Cannot make it balance

29. If we put ball weight 8 kg in left hand on the stick, which point we should put ball weight 16 kg to make it balance?

A. A

B. B

C. C

D. D

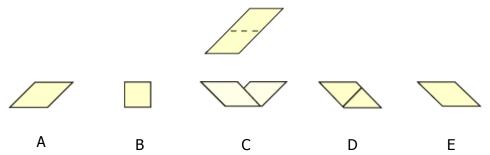
E. Cannot make it balance

30. If we throw a ball from a moving car, which one can go farthest from the throwing point?

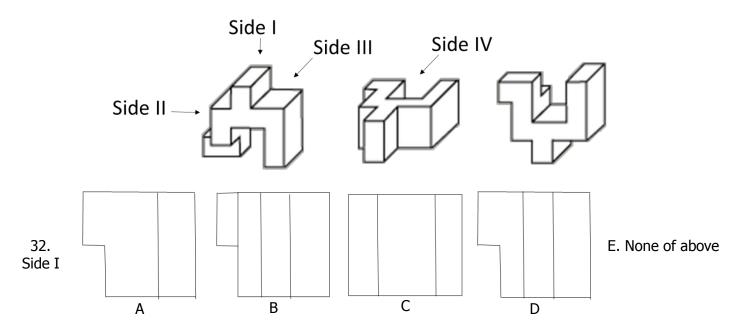


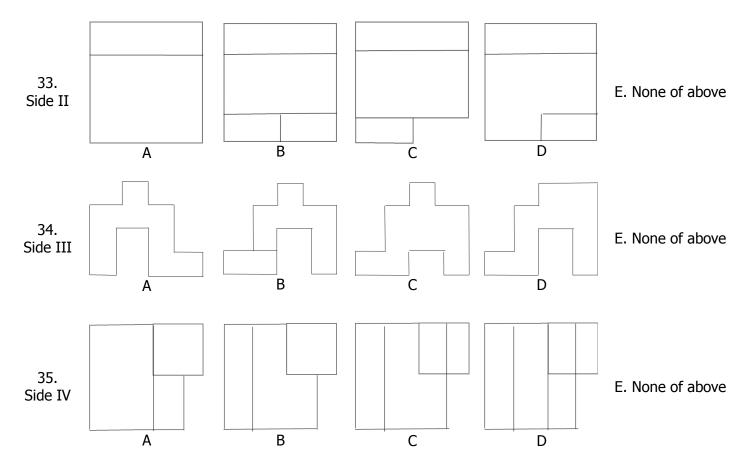
Part4: Spatial tests

31. If you fold the following image along the dotted line, which shape will result?



There is a 3D model represents in 3 different layout. Answer questions 32 – 35 of which 2D shape corresponds to them.





Part 5 Practical & Abstract numerical tests

- 36. What is 50% of one third of 18?
 - A. 1
- B. 2

C. 3

D. 6

E. 8

- 37. What is a quarter of 32 divided by 8?
 - A. 1
- B. 2

C. 3

D. 4

E. 5

- 38. What is a quarter of 20% of 40?
 - A. 4
- B. 8

C. 2

D. 6

E. 9

- 39. What is half plus a quarter plus one third?
 - A. More than one
 - B. Less than one
 - C. Equal to one
 - D. More than one and half
 - E. None of the above
- 40. Company A has a market share of 3/16 of total electronic market share. If total cost of market is 2.34 billion USD, how much does company A has market share in percentage?
 - A. 4.38%
- B. 43.87%
- C. 18.75%
- D. 1.87%
- E. 12.75%

41. By the time a ma bath. What was the a	•		inflated by around /	% to 2.5 million
A. 2.43 million	B. 2.33 million	C. 2.36 million	D. 2.41 million	E.2.00 million
42. Calculate followi ? * 11.5 = 92				
A. 6	B. 7	C. 8	D.9	E.10
43. Calculate followin ? + 112 = 13	•			
A44.5	B. 40.5	C. 44.5	D40.5	E. 41.30
44. What is the missi 1 - 8 - 27 - ? - 12	_	equence shown bel	low?	
A. 36	B. 45	C. 46	D. 64	E. 99
45. Choose the num	ber that is 1/5 of 1,	/4 of 1/2 of 200:		
A. 2	B. 5	C. 10	D. 9	E. 11
Part 6-8 Space Ex	xplorations			
percent of that sunlighted Earth needs in a more A. 130 terawate B. 13 terawates C. 108.33 terawate D. 10.8 terawate	ght could satisfy Ear nth? ts s watts	-	of solar power. Harne n a year. How much p	
•	500 million metric to a flight daily?	•	hydrogen and oxyge ny flights can we laun	•
48. By the laws of Ph motion will move in v A. Straight	what nature?	nterference of an u	nbalanced force, the E. Serrated	objects in
_				
49. In what laws do B	uddha and Sir Issac	Newton state in a si	imilar wav?	

A. Force equals mass multiplied by acceleration.

	B.			ery single other poi	nt mass by a fo	rce pointing along
			ecting both poi			
		-		equal and opposite		
	D.	It is impossible	e for the two to	state the same la	WS.	
		e mass of you nmediate resu		ses as the propella	nt in the engine	is consumed, what will
	A.	Explosion				
	B.	Acceleration in	ncreases			
	C.	Acceleration of	lecreases			
	D.	Fall				
	E.	Steady				
51.	A	A Astronaut : C	pen the Helium	n valves.		
	E	3 Astronaut : R	loger.			
	٧	What does B m	ean to say?			
	A.	Roger is wor	king on it.			
	В.	Please repea	at your words a	gain, Roger.		
	C.	I will do it.				
	D.	The name of	f the valves is F	Roger.		
	E.	This is none	sense.			
52.	Wha	t is the reason	to go to Mars	Planet?		
	A.	Exploration	_			
	B.	Colonization				
	C.	Resource Ex	traction			
	D.	Avoid Extinc	tion			
	E.	All of the ab	ove			
53.	All o	f these are rela	ated to the NAS	SA's Space Program	ns, except.	
		. Mercury	B. Gemeni	C. Sagittarius	D. Apollo	E. Orion
54.	"One	e small step fo	r a man, one gr	reat leap for	" Please fill	in the blank.

54.	"One	small step	o for a man,	one great	leap for _	"	Please f	ill in	the t	olank.
	Α.	The Wor	ld							

- B. America
- C. Us all
- D. Mankind
- E. The free world
- 55. Who said the words on question No.54?
 - A. John F. Kennedy
 - B. Neil Armstrong
 - C. Buzz Aldrin
 - D. Albert Einstein

E.	Issac Newton				
A. B. C. D.	Virgin Galactic Bigelow Aeros SpaceX Lunar Base C	space			
A. B. C. D.	was the second Buzz Aldrin Wernher von Robert Godda Alan Shepard Gus Grissom	ard	ioon after Neil Arn	mstrong?	
Station? A. B. C. D.	Virgin Galactic Bigelow Aeros SpaceX Blue Origin Scaled Compo	c space	space company to	reach the Internat	cional Space
A. B. C. D	is the name of World War II Cold War Trade War Space War Star Wars	f the era that defir	ned Space Race?		
	n Apollo was th Apollo 1	ne first to land on t B. Apollo 11	the moon? C. Apollo 13	D. Apollo 17	E. Apollo 18
	is the last Apo Apollo 11	ollo that landed on B. Apollo 13	the moon? C. Apollo 17	D. Apollo 18	E. Apollo 19
62. Which	Pathfinder Columbia Orion Discovery	me of the Space S	huttles?		

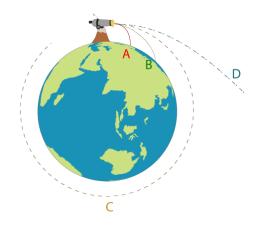
63. Space suit (Extravehicular Mobility Unit – EMU) is not for					
A. Debris protection					
B. Pressure-proof					
C. Oxygen provider					
D. Rain protection					
E. Radiation protection					
64. What is not related to Columbia disaster?					
A. Storm					
B. Foam					
C. Heat					
D. Explosion					
E. None of the above					
65. What Orbiter is the last that closed the era of the	ho Spaco Shutt	lo Program?			
A. Pathfinder	ie space silutti	ie Flograiii:			
B. Columbia					
C. Orion					
D. Discovery					
E. Atlantis					
66. Which President challenged the free world in th	e Space Race?				
A. John F. Kennedy	•				
B. Nikita Khrushchev					
C. Dwight Eisenhower					
D. Joseph Stalin					
E. Ronald Reagan					
67. Who was the first person to enter space?					
A. Alan Shepard					
B. Gus Grissom					
C. John Glenn					
D. Yuri Gagarin					
E. Andrei Borisenko					
68. What did "Ham" mean during the Cold War?					
	D. Dog	E A norcon			
A. Food B. Pig C. Monkey	D. Dog	E. A person			
69. How is "Laika" known for in space context?					
A. Dog B. Camera C. Monkey	D. A tool	E. Food			
70. What is equal in size to a football field?					
A. Gemini capsule					
B. Orion					

- C. International Space Station
- D. Hubble
- E. Sky Lab
- 71. What is the name of the NASA's space program that is planned to reach Mars?
 - A. Space Launch System
 - B. Space Launch Vehicle
 - C. Space Shuttle Program
 - D. Space Orbiter Program
 - E. Orion Capsule
- 72. What is the name of the Mars rover that is working actively at the moment?
 - A. Pathfinder
 - B. Curiosity
 - C. Spirit
 - D. Lunokhod
 - E. Sojourner
- 73. Which of the following is true?
 - A. Apollo Program was for deep space exploration.
 - B. Space Shuttle Program was for deep space exploration.
 - C. Mercury Program was for deep space exploration.
 - D. All of the answer is true.
 - E. All of the answer is wrong.
- 74. What caused the Space Race to ensue?
 - A. Karl Marx
 - B. Sputnik
 - C. Yuri Gagarin
 - D. Mercury
 - E. Neil Armstrong
- 75. What is the name of the spacecraft that entered Jupiter in this year?
 - A. SpaceX
 - B. Dragon
 - C. Cassini-Huygens
 - D. Juno
 - E. Curiosity

Part 9 Newton & Rocketry Skills

How satellite orbit the earth Read following article and answer question 76 - 77

Newton's cannonball is a hypothesis from Isaac Newton. It explains planetary motion including the motion of how satellite orbit earth.



The theory explains a cannon on top of a high mountain and the direction of cannonball when it is fired. As a gravitational force acts on the cannonball, it will follow a different path depending on its initial velocity as follows:

- 1. if the speed is low, it will simply fall back on earth (A, B)
- 2. if speed is the orbital speed, more than A and B but less than 11.2 km/s, it will go on orbiting (circling) around the earth.
- 3. if speed is more than 11.2 km/s, it will leave the earth (D)
- 76. Recently, Russian satellites Kosmos have fell to the earth after orbiting the earth for more than 30 years. What is the main reason?
 - A. Kosmos had been launched from rocket that had initial speed less than orbital speed.
 - B. There were some external factors decreasing the speed of Kosmos until its speed was less than orbital speed.
 - C. Kosmos run out of nuclear energy resulting in its ability to control itself in orbital speed.
 - D. Kosmos lost their mass from burning of energy, then it lost their inertia to control itself in orbital speed.
- 77. International Space Station (ISS) orbits the earth at the altitude of 350 km with speed of about 7 km/s. What would happen if an astronaut drop tool box off from ISS?
 - A. Tool box will fall to earth
 - B. Tool box will float in space since there is no gravity.
 - C. Tool box will still orbit earth with same speed and altitude of ISS
 - D. None of the above is correct

Gravitation

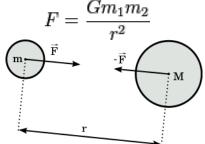
Read following article and answer question 78 - 80

Gravity is a natural phenomenon by which all things with energy are brought toward one another and can be explained with the following equation.

F = force

G = gravitational constant (6.67 x 1011 Nm2/kg2) m1 and m2 are the masses of the objects interacting

r = the distance between the centers of the masses



78. Which situation can make gravitation disappear?

- A. The earth stops spinning. It affect centrifugal force which is gravitational force
- B. The earth lose its magnetic field.
- C. The earth lose its mass.
- D. Every choices are correct.

79. Why does an astronaut feel weightless on ISS?

- A. ISS is in status of falling towards earth but just keeps missing. The acceleration of falling has delete acceleration of gravity.
- B. Distance of ISS is 350 kilometers from earth which out is of earth's gravitation.
- C. At ISS, gravity from moon and sun cancel earth gravity
- D. Gravity disappears in vacuum.

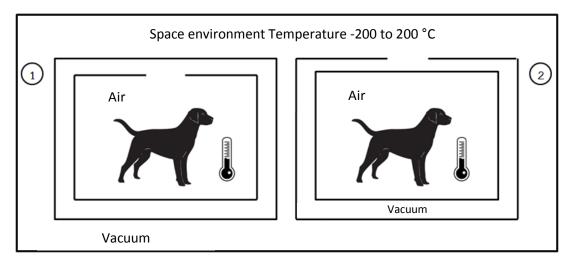
80. From both articles, which one is correct?

- Satellite which has altitude of 300 kilometers can orbit forever since it is out of earth's gravity.
- B. Moon doesn't get any effect from earth gravity. Then, it does not fall to earth.
- C. If the earth stops spinning or spinning slower, the moon will not orbit the earth.
- D. Moon has gravity of 1/6 of earth since its mass and size less than earth

Launch dogs to Space

Read following article and answer question 81 - 82

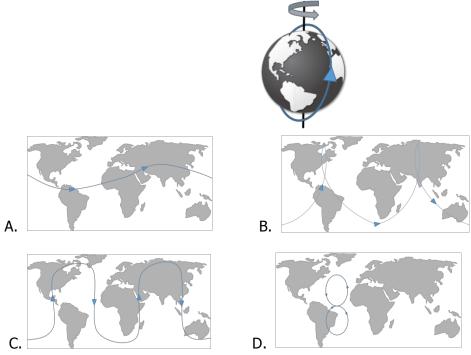
Engineers want to launch a dog to space at altitude of 300 km above from sea level. They design 2 spacecraft boxes as shown on following. At altitude of 300 km, there is no air and temperature is between -200 to 200 degree Celsius.



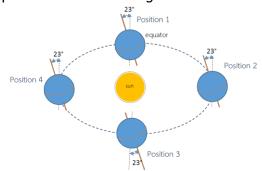
Determine Thermal conductivity of AIR

- is 0.025W/M*K, at air pressure 50% of air pressure on ground
- is 0.015W/M*K, at air pressure 1% of air pressure on ground

- 81. Which box can protect heat from outside?
 - A. Spacecraft Box 1
 - B. Spacecraft Box 2
 - C. Both of spacecraft box can protect heat from outside.
 - D. Both of spacecraft box cannot protect heat from outside.
- 82. Which box can protect cold from outside?
 - A. Spacecraft Box 1
 - B. Spacecraft Box 2
 - C. Both of spacecraft box can protect cold from outside.
 - D. Both of spacecraft box cannot protect cold from outside.
- 83. Ground track is the path on earth's surface directly below satellite. Which picture represent the ground track of the satellite orbit which is shown on following picture.

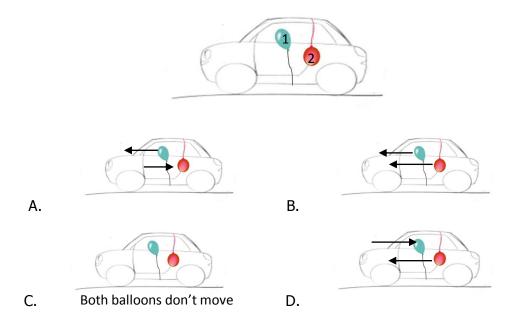


84. The seasons result from the Earth's axis being tilted to its orbital plane in angle of approximately 23.5 degrees. During winter in polar region, daytime is shorter than night time. However, during summer, that polar region receive sunlight in long duration. What is the position of earth during Christmas?



- A. Position 1
- B. Position 2
- C. Position 3
- D. Position 4

85. Newton's first law is the law of motion or referred as the law of inertia. When a car moves forward everything moves backward including air. This make air density at rear more than in front. If we tie a helium balloon (a lighter than air balloon) in number1 and an air balloon number 2. What are the directions of these 2 balloons if we move car forward with high speed?

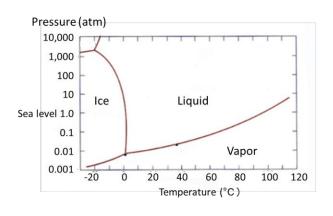


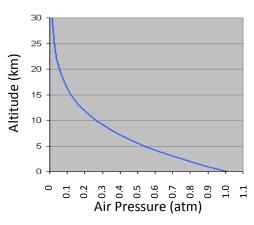
Topic 10. Science Analysis

Air Pressure

The following graphs are for questions 86 – 88

Graph 1 represents water status in different air density. Graph 2 represents air pressure vs altitude





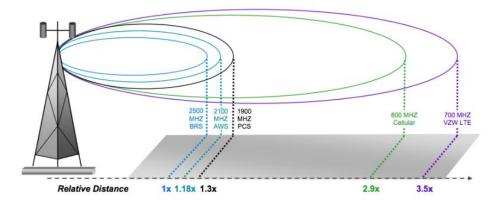
86. Atmospheric density on Mars is only 1% of air density on earth at sea level. What cannot be detected on Mars?

- A. Ice
- B. Purified water
- C. Salty water
- D. There is not any form of water on mars.

- 87. If an astronaut go outside spacecraft at altitude of 350 km with temperature of -50°C, then he opens a bottle of water temperature of 20°C. What will happened?
 - A. Water is boiling immediately.
 - B. Water transform to be ice in a sudden.
 - C. Water slowly evaporates.
 - D. Nothing happens to water.
- 88. A study found that Pathogen can be destroyed at temperature of 120 degree Celsius for 15 minutes. How to generate this situation?
 - A. Boiling water in vacuum for 15 minutes
 - B. Boiling water at pressure of 200mbar for 15 minutes
 - C. Boiling water at pressure of 1000mbar for 15 minutes
 - D. Boiling water at pressure of 5000mbar for 15 minutes

Telephone frequency

The following picture represents distance that receivers can receive signal from provider's antenna in different frequency. Use it to answer questions 89 - 90



- 89. If a provider wants to place antennas to cover large area with fewest number of antennas, which frequency they should use?
 - A. Frequency 2100 MHz 2500 MHz
 - B. Frequency 1800 MHz 1900 MHz
 - C. Frequency 850 MHz 1900 MHz
 - D. Frequency 700MHz 800MHz
- 90. Which one is correct?
 - A. High radio frequency can reach to maximum distance.
 - B. High radio frequency can reach to minimum distance.
 - C. To cover the same area size, we need to put more antennas for frequency 800 MHz than frequency 2100 MHz
 - D. Bothe B and C are correct.

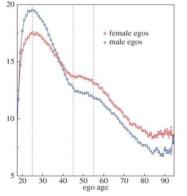
Infrared

Read following article and answer questions 91 – 92

Infrared is an electromagnetic radiation. It is an invisible light with longer wave length than nominal red of visible spectrum. Its behaviors are similar to visible light that can reflect, refract and diffract. If we use an infrared camera, we can see thermal radiation emitted from high

temperature objects more than low temperature. And if object is radiated, it will also get higher temperature.

- 91. We use aluminum foil to keep food warm for a long time. Which factor of foil make it warm?
 - A. Its shiny aluminum can reflect
 - B. Foil acts as an insulator
 - C. Foil can bring heat from outside to inside
 - D. Aluminum foil is strengthen
- 92. If we have to put ice cream bucket outdoor, which bucket color is the best to can keep ice cream frozen and why?
 - A. Black because it can absorb heat from outside
 - B. Shiny silver because it can reflect heat.
 - C. Blue because its frequency band is far from red.
 - D. Transparent to protect cold radiate to outside.
- 93. Which one is correct refer to science study?
 - A. Cooling powder makes us fell cold because it endothermic react to humidity on skin and make temperature decrease.
 - B. A metal can absorb cold better than wood. We observe by touching both of them when they were in low temperature.
 - C. The moon is closest to earth when it nearby earth horizon. We can observe it by naked eyes during the night.
 - D. Wearing necklace doesn't attract lightning. There was an experiment that put similar size of metal and wood sticks in simulated lightning machine and they were all lightning stroked.
- 94. Mr.Somsak has just put a speedometer on his bike which can tell his distance he travels and his average speed for a trip. Mr.Somsak rode his bike from home to the school, which is 5 km away. It took her 9 minutes. Then, he rode to a park which distance is 3 km. This only took him 6 minutes. What was Mr.Somsak average speed, in km/h?
 - A. 28 km/h
- B. 36 km/h
- C. 32 km/h
- D. 40km/h
- 95. Scientists have revealed that men and women continue to make more friends until age of 25, then they start to lose their friends since as new focuses such as children and careers. The following graph if axis X is 'age', what axis Y should be?



- A. The number of friends that keep in touch on phone per year.
- B. The number of classmate or workmate per year.
- C. The number of telephone calls to a friend per year.
- D. The number of participating in conference or seminar per year.

96. There was an experiment to find out if a magnet really make a credit card fail to work. We used the magnet of different strength: weak, medium and strong strip on the back of credit card. Then, we used the credit card machine to test which one were still readable (all cards were tested and functioning properly before experiment). The result was only the second card didn't work.

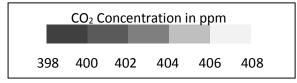
How can we conclude this experiment?

- A. Magnet cannot destroy a credit card.
- B. Magnet can destroy a credit card.
- C. The strength of the magnet isn't only the factor that can damage credit card.
- D. The credit card machine doesn't work properly
- 97. The walking trail up Phu kradung National park is about 6 kilometres (km) long and need to walk on plain route to campus for 3 km. Mr.Somsak estimates that he can walk up the mountain at 1.5 kilometres per hour on average, and plain route at twice that speed. These speeds take into account meal breaks and rest times. Using Mr.Somsak's estimated speeds, what is the latest time he can begin his walk so that he can reach campus by 6 pm?
 - A. 3pm
- B. 11am
- C. 1pm
- D. 10am
- 98. The table below shows the atmosphere CO2 growth rate by decade

Decade	Atmospheric CO2 Growth Rate
2005 - 2014	2.11 ppm per year
1995 - 2004	1.87 ppm per year
1985 - 1994	1.42 ppm per year
1975 - 1984	1.44 ppm per year
1965 - 1974	1.06 ppm per year

Source: NOAA-ESRL annual mean CO2 concentrations at Mauna Loa.

This following figures show the global carbon dioxide (CO2) Concentration in part-per million (ppm). Arrange figure number from 2011 to 2014



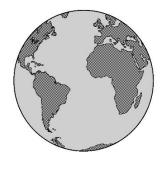


Fig.1



Fig.2



Fig.3

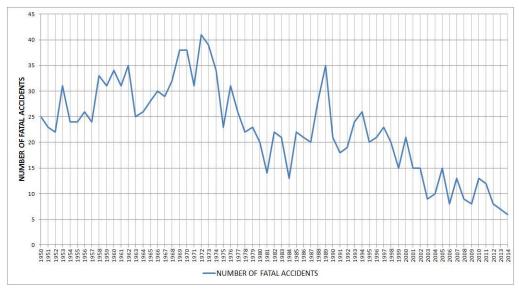


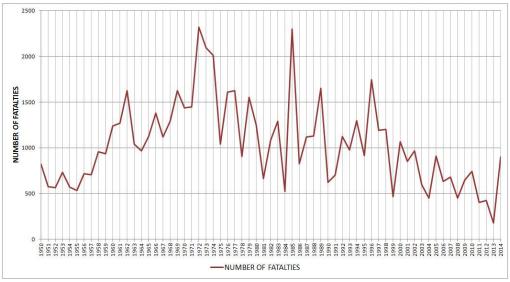
Fig.4

	2011	2012	2013	2014
Α.	Fig.1	Fig.3	Fig.2	Fig4
B.	Fig.2	Fig.1	Fig.4	Fig.3
C.	Fig.3	Fig.4	Fig.1	Fig.2
D.	Fig.4	Fig.2	Fig.3	Fig.1

Read following article and answer question 99 - 100

The following are aircraft accident statistic from 1950 to 2014. The graph describes number of fatal accidents and number of fatalities from civil aircrafts with 19 or more passengers. In the year 2014, there were recorded a total of 21 fatal airliner accidents, resulting in 990 fatalities. One of the flight that is still missing is MH370. It disappeared from radar over the Gulf of Thailand





- 99. Which one is correct about aviation year 2014?
 - A. The rate of accidents for 2014 is at the lowest since 1950
 - B. Year 2014 is highest annual fatality because there are many airlines do not meet the standard.
 - C. Rate of hijacks in year 2014 is highest since 2005 and result of high rate of accidents.
 - D. No correct answer
- 100. Which one is incorrect or the given data is not enough to conclude?
 - A. The crashes which happened in 2014 were particularly severe in terms of lives lost compare to year 2013
 - B. The death rate of year 2013 is lowest
 - C. Number of accidents decreased during 2011 to 2014
 - D. Since the number of flights increase every year, then the number of accidents also increasing