

**PIEAS WRITTEN TEST BS (Computer & Information Sciences)
SESSION 2015-19 (SAMPLE)**

Pakistan Institute of Engineering and Applied Sciences

ADMISSION TEST – 2015

TIME ALLOWED: Three (3) Hours

Roll Number: _____ Question Book No: _____

Name: _____ Exam City: _____
(Use BLOCK Letters)

Signature: _____ Date: _____

Please read the following instructions carefully before attempting the question paper.

1. **Make sure that the question book given to you contains one hundred (100) questions in all, i.e., twenty five (25) questions in each Section I, II, III and IV.**
2. **Check if you are provided with an answer sheet consisting of one page only.**
3. **Do not bend, roll or fold the printed answer sheet.**
4. **You must write your Roll No., Name, Exam city and put your signature in the spaces provided on this page and also on the answer sheet.**
5. **On the printed answer sheet, there are FOUR choices (i.e. A, B, C, and D) for each question. Fill the appropriate choice only with a fine tip black marker or ball point. Erasing is not allowed. Do not overwrite or fill more than one choice for a single question.**
6. **Each correct answer will carry THREE marks. For each incorrect answer ONE mark will be deducted.**
7. **The question paper is divided into Four Sections. As your performance in the written test depends on doing well in ALL the Four Sections, you are strongly advised to attempt as many questions as you can from each section.**
8. **You can do your rough work anywhere on the question paper. Do not use the answer sheet for any rough work.**
9. **Put your pens down as soon as you hear STOP WRITING, otherwise your paper may be cancelled.**
10. **After the test is over, place your printed answer sheet inside the question paper and return both the question paper and the answer sheet to the invigilator.**
11. **Mobile phones are strictly prohibited in the Examination Hall.**
12. **Use your own calculator only. Borrowing calculator or any other item is not allowed.**
13. **Anyone found using unfair means will be disqualified automatically.**

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SAMPLE TEST PAPER

Section (I): English (*Questions 1–25*)

Read the following passage and answer the questions given at the end.

Questions 1 – 5

The general principles of dynamics are rules that demonstrate a relationship between the motions of bodies and the forces that produce those motions. Based in large part on the work of his predecessors, Sir Isaac Newton deduced three laws of dynamics, which he published in 1687 in his famous *Principia*.

Prior to Newton, Aristotle has established that the natural state of a body was a state of rest, and that unless a force acted upon it to maintain motion, a moving body would come to rest. Galileo had succeeded in correctly describing the behavior of falling objects and in recording that no force was required to maintain a body in motion. He noted that the effect of force was to change motion. Huygens recognized that a change in the direction of motion involved acceleration, just as did a change of speed, and further, that action of a force was required. Kepler deduced the laws describing the motion of planets around the sun. It was primarily from Galileo and Kepler that Newton borrowed.

Q1. What was the main purpose of this passage?

- (A) To demonstrate the development of Newton's laws
- (B) To establish Newton as the authority in the field of physics
- (C) To discredit Newton's laws of motion
- (D) To describe the motion of planets around the sun

Q2. Which of the following scientists established that the natural state of a body was a state of rest?

- (A) Galileo (B) Kepler (C) Aristotle (D) Newton

Q3. Who was the first scientist to correctly describe the behavior of falling objects?

- (A) Aristotle (B) Newton (C) Kepler (D) Galileo

Q4. According to Huygens, when was acceleration required?

- (A) For a change in direction or in speed
- (B) Only for a change in speed
- (C) Only for a change in direction
- (D) Neither for a change in direction more for a change in speed

Q5. According to the passage, Newton based his laws primarily upon the work of

- (A) Galileo and Copernicus (C) Ptolemy and Copernicus
- (B) Huygens and Kepler (D) Galileo and Kepler

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- Q6. The current trend toward specialization in nearly all occupational groups is exactly the opposite of what is needed. World problems today are so diverse, complex and interrelated that only the generalist stands a chance of understanding the broad picture. Unless our schools stress a truly broad, liberal us as we each expertly perform our own narrow factions.**
Each of the following, if true, would weaken the conclusion drawn above, EXCEPT
- (A) Many of the world's problems can be solved only by highly specialization experts working on specific problems.
 - (B) Relatively few generalists are needed to coordinate the work of the many specialists.
 - (C) Increasingly complex problems require a growing level of technical expertise, which can only be acquired through specialization.
 - (D) Even the traditional liberal education is becoming more highly specialized.
- Q7. Aslam is standing to the right of Javaid. Anila is standing on the opposite side of Javaid. Since the opposite of right is wrong. Anila must be standing the wrong side of Javaid.**
Which of the following logical errors has the author of the argument above committed?
- (A) He has used a single term to mean two different things.
 - (B) He has confused cause and effect.
 - (C) He has assumed to be true what he wants to prove to be true.
 - (D) He has provided no factual evidence for his conclusion.
- Q8. "The people do not run the country, neither do elected officials. The corporations run the country. Heads of corporations routinely and imperiously hand down decisions that profoundly affect millions of people. The people affected do not vote on the decisions, or for the corporate oligarchs. Yet we are supposed to believe we live in a democracy".**
Which of the following statements, if true, would support the author's view?
- I. Corporate lobbies strongly influence the introduction and passage of legislation at all levels of government.
 - II. Growing numbers of the most talented college graduates are going to work for private corporations rather than for government.
 - III. Few legal requirement are imposed on corporations as to the responsibilities they must fulfill to their employees and their communities.
- (A) I only
 - (B) II only
 - (C) I and III only
 - (D) II and III only
- Q9. The only unemployment problem we have is not that people can't find work, but they won't work. Thousands of jobs go begging everyday but the unemployed are too lazy to go out and find them.**

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Section (II): Mathematics (Questions 26-50)

Q26. $\frac{d}{dx}(e^x \ln x) =$

- (A) $e^x \left(\frac{1}{x} + \ln x \right)$ (B) $\frac{1}{x}(e^x + \ln x)$ (C) $e^x + \frac{\ln x}{x}$ (D) $\frac{e^x}{x} + x$

Q27.
$$\begin{vmatrix} 0 & 0 & 1 & 2 & 3 \\ 1 & 2 & 3 & 4 & 5 \\ 0 & 0 & 0 & 3 & 4 \\ 0 & 1 & 0 & 2 & 3 \\ 0 & 0 & 0 & 0 & 2 \end{vmatrix} =$$

- (A) -6 (B) -3 (C) 6 (D) 0

Q28. $\int_0^{\frac{2}{3}} e^{-(3t-2)^2} dt =$

- (A) $3 \int_0^{\frac{2}{3}} e^{-u^2} du$ (B) $3 \int_0^2 e^{-u^2} du$ (C) $\frac{1}{3} \int_{-2}^0 e^{-u^2} du$ (D) $3 \int_{-2}^0 e^{-u^2} du$

Q29. If $y^3 + xy^2 - 2x = 0$ defines y implicitly as a function of x , then the value of $\frac{dy}{dx}$ at the point $(4, -2)$ is

- (A) $-\frac{1}{2}$ (B) $-\frac{1}{8}$ (C) $\frac{1}{4}$ (D) $\frac{1}{2}$

Q30. If $a + d \neq 0$ and $\begin{pmatrix} a & b \\ c & d \end{pmatrix}^2 = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, then ad is

- (A) -1 (B) 0 (C) 2 (D) 1

Q31. $\lim_{x \rightarrow 0} \frac{1}{x} \left[\cos\left(\frac{\pi}{6} + x\right) - \cos\frac{\pi}{6} \right] =$

- (A) $-\frac{\sqrt{3}}{2}$ (B) $-\frac{1}{2}$ (C) $\frac{1}{2}$ (D) Undefined

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Q32. What is the y-intercept of the line tangent to the graph of $y = \frac{1}{x}$ at $(2, \frac{1}{2})$?

- (A) $-\frac{1}{2}$ (B) 0 (C) $\frac{1}{2}$ (D) 1

Q33. The number of values of x where the function $f(x) = \cos x + \cos(\sqrt{2} x)$ attains its maximum value is

- (A) 0 (B) 1 (C) 2 (D) ∞

Q34. If $f(x) = x^3 - 3x + 3x$ then $f(\sqrt[3]{7} + 1)$ equals

- (A) 6 (B) 7 (C) 8 (D) 9

Q35. If the number of subsets with 4 elements of a set A is equal to the number of subsets with 5 elements of the set, then the number of subsets with 3 elements of this set is:

- (A) 64 (B) 84 (C) 128 (D) none of the above

Q36. If $f(a.b) = f(a) + f(b)$ and $f(2) = 3$, then $f(32)$ equals

- (A) 9 (B) 12 (C) 15 (D) none of the above

Q37. If $f(x) = x-2$ and $g(x,y) = y^2 + x$, then $g(3, f(4))$ is

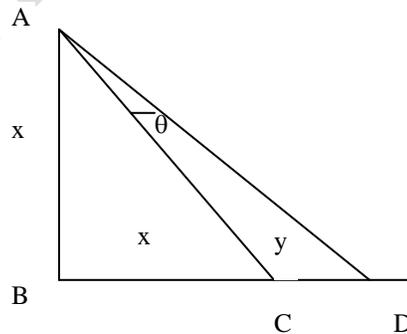
- (A) 7 (B) 14 (C) 21 (D) 28

Q38. If m men can do a job in d days, then m+r men can do the job in:

- (A) d-r days (B) $\frac{md}{m+r}$ days (C) $\frac{d}{d+r}$ days (D) none of the above

Q39. Tan θ in the accompanying diagram is:

- (A) $\frac{y}{y+2x}$
 (B) $\frac{x}{y+x}$
 (C) $\frac{y}{y+x}$
 (D) $\frac{y}{x}$



Q40. How many different 3-digit number divisible by 5 can be formed using the elements of the set $A = \{1,2,3,4,5,6\}$

- (A) 36 (B) 24 (C) 40 (D) none of the above

Q41. The sum of the integral values of x so that the function $f(x) = \frac{\sqrt{5-x}}{\sqrt{x-1}}$ is defined in

- the set of real numbers is:
 (A) 14 (B) 15 (C) 5 (D) none of the above

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Q42. If $f(x) = 4^x$ then $f(x+1) - f(x)$ equals

- (A) 4 (B) $f(x)$ (C) $2f(x)$ (D) $3f(x)$

Q43. The sum of roots of equation $x^2 - x + 1 = 0$ is:

- (A) 2 (B) 1 (C) -2 (D) -1

Q44. $\sum_{n \rightarrow 0}^{\infty} \left(\frac{1}{4}\right)^n =$

- (A) $\frac{1}{4}$ (B) $\frac{3}{4}$ (C) $\frac{2}{4}$ (D) none of the above

Q45. Minimum number of points required to define a plane are

- (A) 1 (B) 2 (C) 3 (D) 4

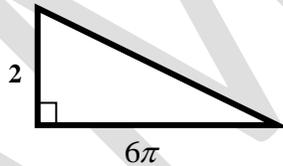
Q46. If $x = 1 + i$ where $i = \sqrt{-1}$, then x^5 is:

- (A) $2-2i$ (B) $2+2i$ (C) $-2-2i$ (D) $-2+2i$

Q47. $\log_2 x = \log_c x$ /?

- (A) $\log_2 2$ (B) $\log_2 c$ (C) $\log_c 2$ (D) $\log_c c$

Q48. What is the radius of the circle with area equal to the area of the following right triangle?



- (A) $\sqrt{3}$ (B) $2\sqrt{3}$ (C) $\sqrt{6}$ (D) $2\sqrt{6}$

Q49. Twelve students in a class average 70% on a certain test. Eighteen others average 80%. What is the overall average of the thirty students as a percent?

- (A) $74\frac{3}{4}$ (B) $75\frac{1}{4}$ (C) 76 (D) $77\frac{1}{8}$

Q50. If $y = x^{x^2}$ then $\frac{dy}{dx} =$

- (A) x^{x^2+1} (C) $[2 \ln x + 1]$
(B) $x^{x^2+1} [2 \ln x + 1]$ (D) $x^2 x^{x^2-1}$

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Section (III): Physics (Questions 51-75)

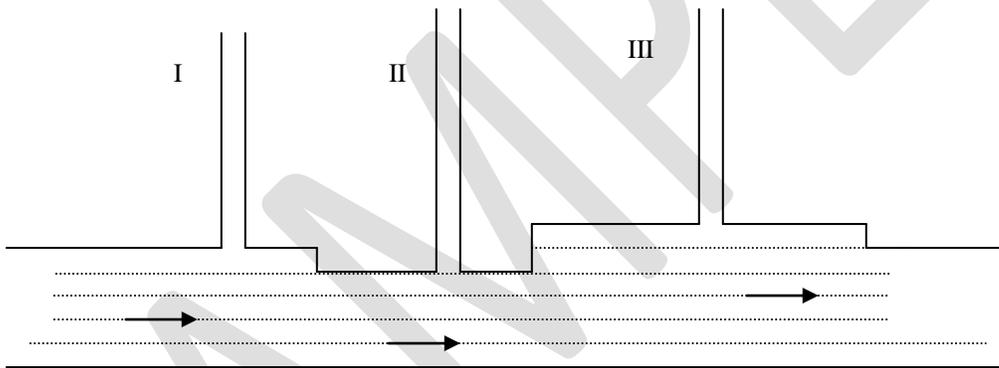
- Q51. Of the following subatomic particles, the particle which has the same charge as the positron is;**
(A) Photon (C) Electron
(B) Alpha particle (D) Proton
- Q52. A ball is projected vertically upward from the surface of the earth and reaches its maximum height in 4.0 seconds. The ball's initial speed, in meters per second is approximately**
(A) 20 (B) 40 (C) 80 (D) 100
- Q53. The conductivity in metallic wires depends on**
(A) Free electrons only
(B) Positive ions only
(C) Negative ions only
(D) Positive ions, negative ions and electrons
- Q54. Momentum is a quantity whose unit might be the**
(A) foot-pound (C) erg
(B) newton (D) gram centimeter per second
- Q55. Two rectangular tanks stand next to each other on a horizontal table. The area of the bottom of the first tank is 40 square centimeters; that of the second tank is 80 square centimeters. Both tanks are filled with water to the same height. The ratio of the liquid pressure on the bottom of the second tank to that of the bottom of the first tank is**
(A) 1 (B) 2 (C) 4 (D) 16
- Q56. Two freely falling objects, one 10 kg and one 20 kg, are dropped from the same height at the same time. Air resistance is negligible. Which of the following statements is (are) true?**
I. Both objects have the same potential energy at the top.
II. Both objects fall with the same acceleration.
III. Both objects have the same speed just before hitting the ground.
(A) III only (B) I and II only (C) II and III only (D) I, II, and III
- Q57. If a stone at the end of a string is whirled in a circle, the inward pull of the string on the stone**
(A) is inversely proportional to the speed of the object
(B) is inversely proportional to the square of the speed
(C) is proportional to the speed
(D) is proportional to the square of the speed
- Q58. A change in temperature of 450 C corresponds to a change in Fahrenheit degrees of**
(A) 25 (B) 45 (C) 81 (D) 113
- Q59. The bending of a bimetallic strip when heated is primarily due to**
(A) the good conductivity of the two metals
(B) the large coefficient of expansion of both metals
(C) the unequal expansion of the two metals
(D) the effect of gravity

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- Q60.** If a gas is heated at constant pressure, which of the following descriptions will apply?
- I.** Its volume increase is proportional to the temperature
 - II.** The kinetic energy of the molecules decreases
 - III.** The kinetic energy of the molecules increases
- (A) I only (C) I and II only
(B) I and III only (D) II and III only
- Q61.** A 20 ohm and a 60 ohm resistor are connected in series to a DC generator. The voltage across the 20 ohm resistor is 80 volts. The current through the 60 ohm resistor
- (A) cannot be calculated with the given information
(B) is about 1.3 A
(C) is 4.0 A
(D) is 5.0 A
- Q62.** An object is placed 10 centimeters from a concave spherical mirror whose radius of curvature is 12 centimeters. The distance of the image from the mirror is
- (A) 5 cm (B) 10 cm (C) 15 cm (D) 20 cm
- Q63.** Two frequencies sounded together produce 3 beats per second. If one of the frequencies is 400 vibrations per second, the other frequency will be?
- (A) 1200 vib/sec (C) 403 vib/sec
(B) 397 vib/sec (D) 133.33 vib/sec
- Q64.** X rays consist of
- (A) a stream of neutrons (C) a stream of electrons
(B) radiation similar to radon (D) radiation similar to gamma rays
- Q65.** During the time that sound travels 1100 feet in air, light can travel in vacuum a distance of about
- (A) 1100 miles (B) 200000 miles (C) 20000 miles (D) 11000 km
- Q66.** A spacecraft is approaching the earth. Relative to the radio signals it sends out, the signal received on the earth have
- (A) a lower frequency (C) a higher velocity
(B) a shorter wavelength (D) all of the above
- Q67.** All of the following pure elements are good electrical conductors except
- (A) copper (B) aluminum (C) silver (D) iron
- Q68.** Which of the following examples of electromagnetic radiation has the most energy per quantum?
- (A) Radio waves (B) Microwaves (C) visible light (D) X-rays
- Q69.** Three capacitors each of value 0.1F are connected in series, then there total capacitance is closest to
- (A) 0.0333F (B) 0.3333F (C) 0.3F (D) 3.0F
- Q70.** Atomic spectra can be explained by
- (A) The Bohr atomic model (C) Quantum Mechanics
(B) Quantized orbits of electrons (D) All of the above
- Q71.** When ${}_{92}^{235}\text{U}$ decays by alpha particle emission, the daughter nuclei formed is
- (A) ${}_{90}^{231}\text{Th}$ (B) ${}_{91}^{233}\text{Pa}$ (C) ${}_{91}^{234}\text{Pa}$ (D) ${}_{94}^{239}\text{Pu}$

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- Q72.** We can increase the capacitance of a parallel plate capacitor by
- (A) cooling the plates.
 - (B) bringing the plates closer together.
 - (C) decreasing the dielectric constant of the material between the plates.
 - (D) increasing the voltage across the plates.
- Q73.** Terminal velocity is usually defined as the
- (A) velocity of shock waves
 - (B) velocity of light in water
 - (C) velocity at which air resistance balances gravity
 - (D) All of the above
- Q74.** Our sun releases energy by nuclear fusion reactions. What actually happens?
- (A) Hydrogen is converted to helium
 - (B) Helium is converted to hydrogen
 - (C) Two nuclei change into one nucleus
 - (D) One nucleus splits into two nuclei
- Q75.** Water flowing through a tube having variable cross-sectional area is shown in the figure below.

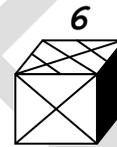
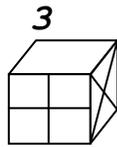
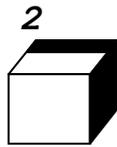
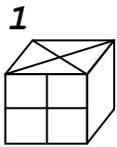
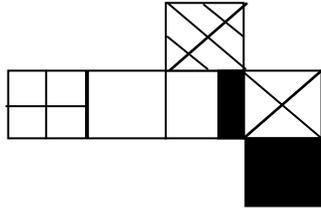


- The water will attain the maximum level in
- (A) tube I
 - (B) tube II
 - (C) tube III
 - (D) all the tubes.

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Section (IV): General Aptitude (Questions 76-100)

Q76. Below is the cut out shape which can be used to create three of the cubes shown. Which three cubes cannot be made from this shape?



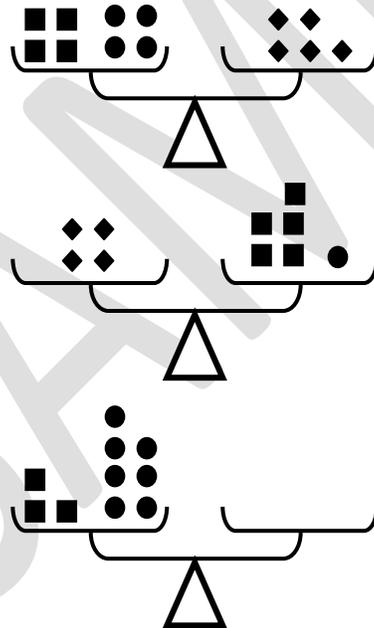
(A) 1, 3, 5

(B) 2, 4, 6

(C) 3, 4, 6

(D) 2, 3, 5

Q77. Can you tell how many symbols are missing from the bottom right hand balance?



(A) 4 symbols

(B) 5 symbols

(C) 6 symbols

(D) 7 symbols

Q78. At an art auction each painting cost the same price and each customer only bought one painting. There were more than 3 buyers but less than 100, and the auctioneers took Rs. 1698. Can you tell us how many customers there were and the price of each painting?

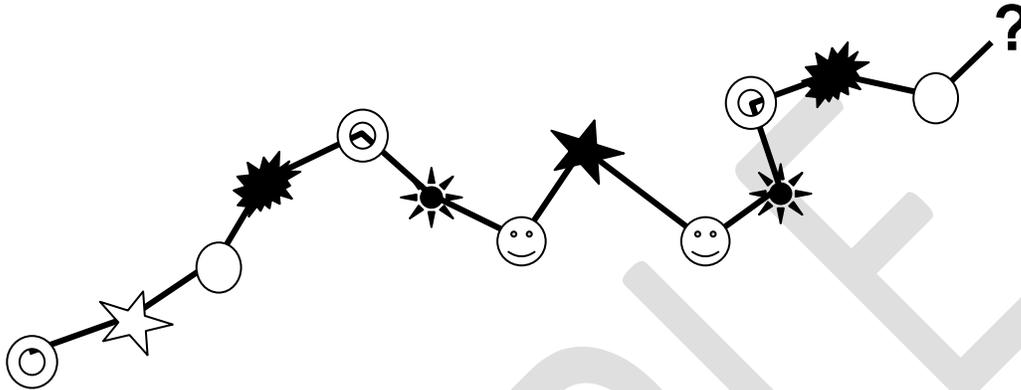
(A) 6 customers and each painting cost Rs. 283/-

(B) 4 customers and each painting cost Rs. 183/-

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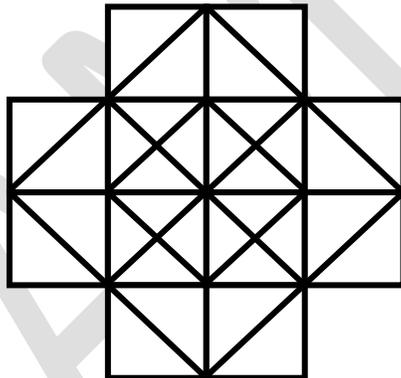
- (C) 6 customers and each painting cost Rs. 134/-
- (D) 5 customers and each painting cost Rs. 323/-

Q79. Look at the string of symbols below, and work out why they are strung like this. Having done that, tell us what the next symbol should be.



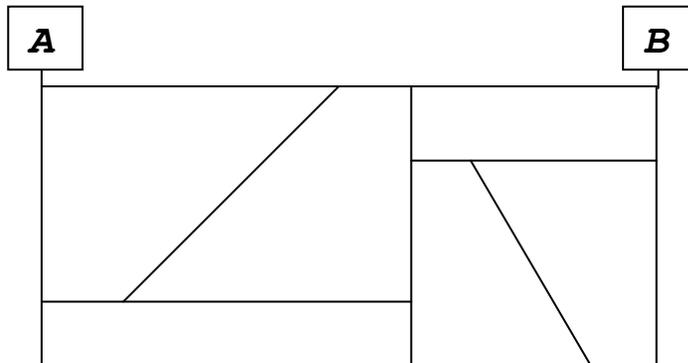
- (A)
- (B)
- (C)
- (D)

Q80. How many squares are there in the diagram below?



- (A) 25
- (B) 27
- (C) 29
- (D) 31

Q81. The diagram below is a simplified plan of a railway system, showing lines and points. How many different ways are there for a train to go from A to B without reversing?



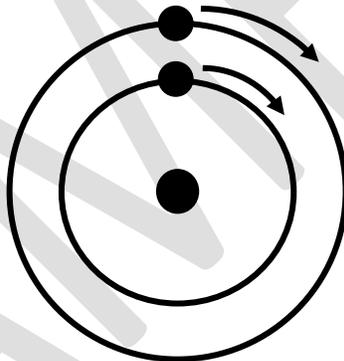
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- (A) There are 13 routes from A to B.
- (B) There are 14 routes from A to B.
- (C) There are 15 routes from A to B.
- (D) There are 16 routes from A to B.

Q82. Your clock is out of order. At 2:41 am it read 6:17am, at 6:17am it read 9:53am, whilst at 9:53am it read 1:29pm. What time will it read at 1:29pm?

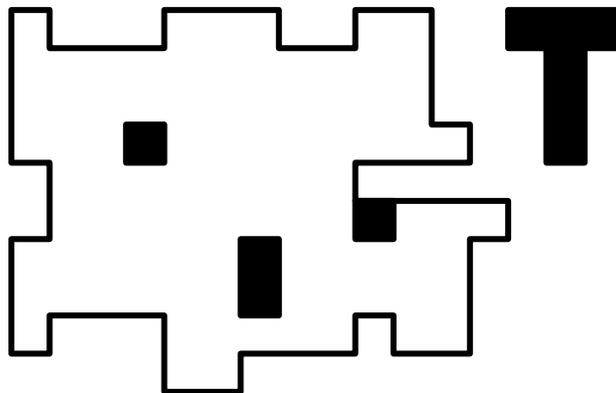
- (A) 5:05pm
- (B) 2:41am
- (C) 6:00pm
- (D) 7:13 am

Q83. Two planets are in orbit around the sun, as shown below. The inner planet takes eighteen years to complete one orbit, whilst the outer planet takes 45 years. If they both start moving now in a clockwise direction, how many years will pass before they are once again in line with each other and the sun?



- (A) 13 years
- (B) 14 years
- (C) 15 years
- (D) 16 years

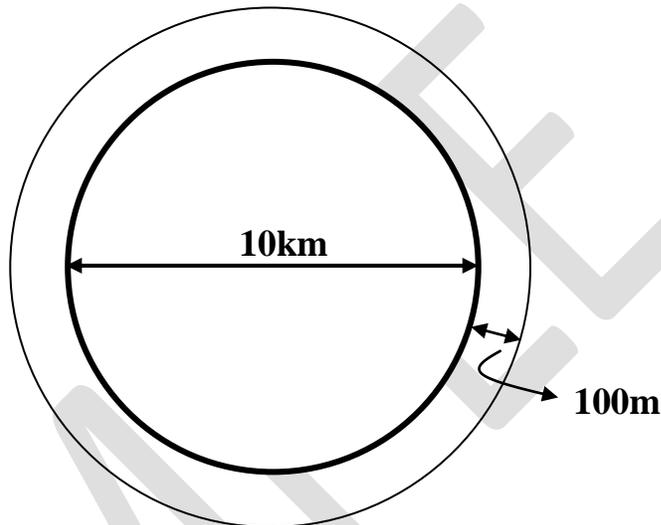
Q84. Using the black "T" shape, fill in the white area of the diagram below. How many T's are required in order that no gaps are left?



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- (A) 5 T's
- (B) 10 T's
- (C) 15 T's
- (D) 20 T's

Q85. You have a field which is circular and has a radius of 5km. You want to place a rope around the field which is 100 meters out from the edge all the way round. How long will the rope have to be?



- (A) 31.73km
- (B) 35.23km
- (C) 37.33km
- (D) 41.22km

Q86. Give the true statement “The Picnic on Sunday will not be held if the weather is not fair”. We can then conclude that

- (A) If the picnic is held, Sunday’s weather is undoubtedly fair.
- (B) If the picnic is not held, Sunday’s weather is possible fair.
- (C) If it is fair Sunday, the picnic may be held.
- (D) If it is fair Sunday, the picnic will be held.

Questions: (87-88)

Give the following boxes with the numbers

Box no.	1	2	3	4	5
Contents	3	5	-1	2	6

- Step (i) Take i equals to 1, j equals to 4 and k equals to 5.
- Step (ii) Add contents of box no. i and box no i+1 and store the result in jth box.
- Step (iii) If jth box has a value greater than the contents of kth box, then decrease j by 1.
- Step (iv) if i<j then increase i by 1.
- Step (v) Repeat steps (ii) to (iv) until i<j.

Q87. What are the values of i and j?

- (A) 2 and 4
- (B) 1 and 3

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- (C) 3 and 3 (D) 4 and 2

Q88. What are the contents of i th and j th Boxes?

- (A) 4 and 4 (B) 3 and 5
(C) 5 and 8 (D) 8 and 6

Q89. Ahmed, Bilal, Farhan, Danish and Ehsan are sitting in the following manner Farhan is sitting to the left of Ahmed and right of Bilal. Two persons are sitting between Ahmed and Bilal. Bilal and Danish are adjacent to each other.

What is the sitting arrangement of Ahmed, Bilal, Farhan, Danish and Ehsan?

- (A) Ahmed, Bilal, Farhan, Danish, Ehsan
(B) Ehsan, Bilal, Danish, Farhan, Ahmed
(C) Bilal, Danish, Farhan, Ahmed, Ehsan
(D) Ahmed, Farhan, Danish, Bilal, Ehsan

Q90. A rule to compare the number of rhombi “ n ” to the number of small triangles in the figures given below is given by

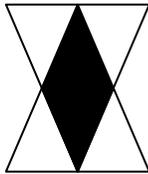


Figure 1

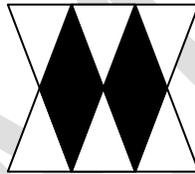


Figure 2

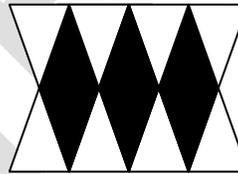


Figure 3

- (A) $2n$ (B) $2n+2$ (C) $4n$ (D) $2(n+1)/2$

Q91. Suppose you get a new job where you are able to choose one of two payroll plans. The first one pays \$1000 per day. The second one starts at \$0.01 per day but your salary doubles each day. If the job only lasts for 30 days, which payroll plan would be better?

- (A) First plan (C) Any of the two plans
(B) Second Plan (D) Cannot be decided from the given information

Q92. What will be the next number in the series

5, 11, 21, 35, ...

- (A) 75 (B) 53 (C) 56 (D) 67

Questions 93-95

The letters A, B, C, D, E, F and G not necessarily in that order, stands for seven consecutive integers from 2 to 8.

D is 3 less than A.

B is the middle term.

**PIEAS WRITTEN TEST BS (Computer & Information Sciences)
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F is as much less than B as C is greater than D.
G is greater than F.
A is 7.

Q93. The fifth letter is

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

Q94. The first integer is

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

Q95. Q30. If A=6 then the fifth letter is

- (A) A (B) D (C) E (D) No solution exists

Q 96 – 100 Not Included in This Sample Test
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