BMTSC Exam. 2016 (Swarup Patil) Solution

Q.1. Choose One correct alternative.

Multiple choice question. Each question carries 2 marks.

1. Four bells ring at intervals of $3, 7, 12\&14$ mins respectively. All four bells rang together at 12 noon. when will they ring together next time?

   A) $1:24$ p.m. B) $12:24$ p.m. (C) $2:24$ p.m. (D) 1 p.m.

   Solution: : LCM of $3, 7, 12, 14$ is 84.

   They ring together after every 84 min interval.

   $84\,\text{min} = 60 + 24\,\text{min} = 1$ hr. $24\,\text{min}$

   They will ring together next time after 12 noon at $1:24$ p.m.

   Answer : A

2. 15% of students of a school were absent on a specific day. If there were 1020 students present in the school that day, find the total no. of students in the school.

   A) 5780 B) 12000 C) 1250 D) 1180.

   Solution : Let x be the total no. of students in the school. Then no. of present students on that day is

   $$\begin{aligned} 85\% \text{ of } x &= \tfrac{85}{11} \times x &= 1020 \\ \therefore x &= \tfrac{1020\times100}{85} &= 1200 \end{aligned}$$

   Answer : B

3. A man purchased 150 oranges at the rate of 3 oranges for Rs.20/- and another 160 oranges at the rate of 4 oranges for Rs.30/-, and sold all of them, an orange for Rs.6/- rate, whether he will have profit or loss, by what amount?

   A) profit, Rs.120 B) Loss, Rs.620 C) profit, Rs.320 D) Loss, Rs.340

   Solution: Cost price of 150 oranges $= 150 \times \frac{20}{3} =$ Rs 1000

Cost price of 160 oranges $= 160 \times \frac{30}{4} =$ Rs 1200

Total cost price of $150 + 160 = 310$ oranges is Rs.$(1000 + 12000) =$ Rs 2200.

Total selling price of 310 oranges is Rs. $6 \times 310 =$ Rs 1860

$\therefore$ Loss = cost price - selling price = Rs $(2200 - 1860) =$ Rs 340.

Answer : D

4. In figure A, five squares with sides $1cm, 2cm, 3cm, 4cm$ and $5cm$ are arranged in the ascending order. In figure B, they are arranged as shown. By how much does the perimeter of the figure B exceed that of A?

A) $0cm$ B) $4cm$ C) $10cm$ D) $14cm$.

Answer : B

Perimeter of fig. A is $40cm$ that of fig. B is $44cm$.

5. A fan switch is in the off mode. A boy turns it continuously to slow, medium, high, off, slow, medium, $\cdots$ in the same direction, for each operation counting $1, 2, 3, 4, 5, 6, \cdots$. After 210 operations, in which position will the switch be?

A) off B) slow C) medium D) high.

Solution : $\begin{array}{cccccc} \text{Slow} & \text{Medium} & \text{High} & \text{Off} & \text{Slow} & \text{Medium} \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ 1 & 2 & 3 & 4 & 5 & 6 \end{array}$ $\therefore$ No.s which leave remainder 2 after division by 4 correspond to medium mode and 210 is one such no.

Answer : C

6. In a piece of paper there is a simple equation of nos. written. A drop of

ink fell on it and made a stain, covering an arithmetic symbol or a digit. The equation looked like $121 - 23 - 41 + 123 = 0$.

The symbol or number under the stain is $\cdots$.

A) x B) -1 C) $+$ D) 0.

Solution : $-23 = -123 - 121 + 41 = -203$

$\therefore$ no. under the stain is 0.

Answer : D

7. Line $AD \|$ line $BC \cdot A(\triangle ABC) = 12$. What is the $A(\triangle BDC)$?

A) 13 (B) 24 C) 12 D) 21.

Solution : Area of a triangle is $\frac{1}{2} \times$ base $\times$ height. Here, lengths of base and height of $\triangle ABC$ and $\triangle BDC$ are same.

$\therefore$ $\triangle ABC$ and $\triangle BDC$ have equal areas.

Answer : C

8. If the product $42 \times \square$, is divisible by 9, which smallest no. is in place of $\square$?

A) 9 B) 6 C) 1 D) 3.

Elimination Method.

Answer : D

9. To open a sate, some three digit code needs to be used. It is known that only three digits $0, 1, 2$ exist in this code. The sum of the digits used in the code should be 2. Find the no. of ways this code can be set. (You can repeat the digits)

A) 3 B) 6 C) 9 D) 12.

Solution:

only possible combinations are 002

020

011

101

110

200

Answer : B

10. $\square ABCD$ is a square. $\angle ABE = 2\angle DAE = 30^\circ$. The side of the square is $10cm$. Find the length of EC.

A) greater than $10cm$. B) equal to $10cm$. C) less than $10cm$.

D) not possible to calculate with the given information.

Answer : B

Solution :

$\angle EAB = \angle DAB - \angle DAE = 90 - \frac{30}{2} = 75^\circ$

$\angle AEB = 180 - \angle EAB - \angle ABE = 180 - 75 - 30 = 75^\circ$

$\therefore \triangle ABE$ is iscosceles triangle.

$\therefore \ell(AB) = \ell(EB) = 10cm$

In $\triangle EBC, \ell(EB) = \ell(BC) = 10cm$

$\therefore \angle BEC = \angle BCE$

$\therefore \angle BEC = 180 - \angle EBC - \angle BCE$

$\therefore \angle BEC = \frac{1}{2}(180 - \angle EBC) = \frac{1}{2}(180 - 60) = 60^\circ$

$\therefore \angle BEC = \angle BCE = 60^\circ = \angle EBC$

$\therefore \triangle EBC$ is equilateral triangle.

$\therefore \ell(EB) = \ell(BC) = \ell(EC) = 10cm.$

11. If $\hat{5} = 4 + 6 - 5$, $\hat{12} = 11 + 13 - 12$ and $\hat{23} = 22 + 24 - 23$, then what is the value of $\hat{40} + \hat{41} + \hat{43} + \hat{44} + \cdots + \hat{49} + \hat{50}$?

A) 505 B) 495 C) 455 D) 465.

Answer : B

$\hat{n} = (n-1) + (n+1) - n = n$

$\therefore$ Addition of nos. from 40 to 50 is 495.

12. Find the remainder when the number 2016201620162018 is divided by 2016.

A) 2008 B) 1 C) 2007 D) 2.

Answer : D

13. The average of ten different positive integers is 10. The smallest is 5. which can be the biggest of these nos?

A) 55 B) 49 C) 25 D) 19.

Answer : D

Solution : Average of ten nos. is 10.

$\therefore$ Sum of ten nos. is $10 \times 10 = 100$.

We will choose smallest nine nos. starting from 5 so that the remaining last no. has to be the largest possible no.

$$\begin{aligned} \therefore \text{ Largest No.} &= 100 - (5+6+7+8+9+10+11+12+13) \\ &= 100 - 81 \\ &= 19. \end{aligned}$$

14. The no. $111\cdots111$ is 29 digit no. It is Multiplied by 2009. The third digit from the left of the product is

A) 1 B) 2 C) 3 D) 9.

Answer : C

$$\begin{array}{lr} & 1111\cdots111 \\ \times & 2009 \\ \hline & 9999\cdots99999 \\ & 2222222\cdots22000 \\ \hline & 22[3]2222\cdots21999 \end{array}$$

15. Find the next alphabet in the sequence A, H, I

    A) J B) K C) M D) N.

    Answer : C

    All alphabets in given sequence have axis of symmetry. The only alphabet with this property from options is M.

Q.2. Write the answer with short justification.

1. A bus can accommodate 78 passangers. The bus starts out empty and picks up 1 passenger at the first stop, 2 passengers at second stop, 3 passangers at third stop, and so forth. After how many stops the bus will be full?

   Solution :
   $$\begin{aligned} 1+2+3+\cdots+n = \tfrac{n(n+1)}{2} &= 78 \\ \therefore n(n+1) &= 156 \\ \therefore n &= 12 \end{aligned}$$
   Thus, at 12th stop, bs will be full.

2. A certain natural no. is divisible by 3 and also by 5. When the no. is divided by 7, the remainder is 4. which is the smallest no. that satisfies these conditions?

   Solution : The number should be Multiple of 15.

   $15, 30, 45, 60$ This is the smallest Multiple of 15 which gives remainder 4 when divided by 7.

3. In $\triangle ABC$, side BC is extended. Point D is on the extended segment BC, as shown in the figure. $\angle ACD$ is 120° and $\angle A = 2\angle B$. Find $\angle A$ and $\angle B$.

   Solution :

   $\angle A + \angle B = \angle ACD = 120^\circ$

   As, $\angle A = 2\angle B$

$\therefore 2\angle B + \angle B = 120°$

$\therefore \angle B = 40°$

and $\angle A = 2\angle B = 80°$

4. Each of the nine paths in a park as given in the figure are $100m$ long. Abida wants to 90 from A to B without going along the same path more than once. What is the length of the longest path?

   Solution : $A - F - D - E - F - B$, $A - F - E - D - F - B$, $A - F - E - D - C - B$ are the longest possible paths each of which has length $500m$.

5. A fruit seller bought 11 dozen mangoes for a certain cost. After selling 10 dozen of the mangoes at a certain rate he recovered the cost price. If he sold all the mangoes at the same rate, what was his percent profit?

   Solution : Let cost price of 1 dozen mangoes be Rs. x.

   $\therefore$ Total cost price of 11 dozen mangoes is Rs. $11x$.

   Let selling price of 1 dozen mangoes be Rs. y.

   $\therefore$ Selling price of 10 dozen mangoes is Rs. $10y$.

   And, $10y = 11x$

   $\therefore y = \frac{11}{10}x$

   Thus, fruit seller has profit of Rs. $\frac{11}{10}x$ on Rs. $11x$

   $\therefore$ percent profit $= \frac{\frac{11x}{10}\times 100}{11x} = 10\%$

6. The neighbours of a two digit number are a prime number and a perfect square. How many such two digit numbers are there?

   Solution : There are four such numbers which are $10, 24, 48, 80$. We just need to check the neighbours of perfect squares $9, 16, 25, 36, 49, 64, 81, 100$.

7. $1704AB26$ is divisible by 99. Find A and B.

   Solution : Given number is divisible by 9.

   $\therefore 1 + 7 + 0 + 4 + A + B + 2 + 6 = A + B + 20$ is divisible by 9.

$\therefore A+B=7$ or $A+B=16$.

Also, given number is divisible by 11.

$\therefore (1+0+A+2)-(7+4+B+6)$ is divisible by 11.

i.e. $A+3-17-B=A-B-14$ is divisible by 11.

$\therefore A-B-14=-11$

$\therefore A-B=3$

$\therefore A=3+B$

$A+B=7$ gives $3+B+B=7$

$\therefore B=2$

$\therefore A=3+B=5$.

$A+B=16$ gives $3+B+B=16$

$\therefore 2B=13$ which is not possible.

8. Simplify $\frac{1}{491\times 332}+\frac{1}{491\times 159}-\frac{1}{159\times 332}$.

Solution : $=\frac{159}{491\times 332\times 159}+\frac{332}{491\times 159\times 332}-\frac{491}{159\times 332\times 491}$

$=\frac{159+332-491}{491\times 332\times 159}=\frac{0}{491\times 332\times 159}=0$.

9. In $\triangle ABC, \angle A$ is larger than $\angle C$ by some degrees and $\angle A$ is smaller than $\angle B$ by same amount. If $\angle B=67^\circ$, then find the measure of $\angle C$.

Solution : Let $\angle A-\angle C=x^\circ \quad \therefore \angle A=\angle C+x^\circ$

$\therefore \angle B-\angle A=67^\circ-\angle A=x^\circ$

$\therefore 67^\circ-(\angle C+x)^\circ=x^\circ$

$\therefore \angle C=67^\circ-2x^\circ$

In $\triangle ABC, \angle A+\angle B+\angle C=180^\circ$

$\therefore \angle A+67^\circ+67^\circ-2x^\circ=180^\circ$

$\therefore 67^\circ-x^\circ+67^\circ+67^\circ-2x^\circ=180^\circ$

$\therefore 3x^\circ=(201-180)^\circ=21^\circ$

$\therefore x^\circ=7^\circ$

Thus,$\angle C=67-2x^\circ=67^\circ-2(7)^\circ=53^\circ$.

10. Among 7 men, 11 women and 5 boys Rs. 140 are divided such that,

    a) A man gets thrice as much as a boy gets.

    b) one woman gets the amount equal to the sum of the amounts that a man and a boy gets.

    Find how much a man, a women and a boy gets.

    Solution : Le a boy gets Rs. x.

    $\therefore$ a man gets Rs. $3x$ and a woman gets Rs. $(x + 3x) =$ Rs. $4x$.

    Thus,

$$\begin{aligned} 7(3x) + 11(4x) + 5(x) &= 140 \\ \therefore 70x &= 140 \\ \therefore x &= 2 \end{aligned}$$

    $\therefore$ a man gets Rs. 6. a woman gets Rs. 8 and a boy gets Rs. 2.

Q.3. Write the answer with justification. Each question carries 3 marks.

1. Four cards, each having a number written on one side and a phrase on the other side. The numbers written are $7, 2, 12$ and 5. The phrases are,

   I) divisible by 7; II) Prime; III) odd; IV) greater than 100.

   On each card the number DOES NOT correspond to the phrase on it. Find the number on the card with the phrase greater than 100. If possible.

   Solution : As, the number on each card does not correspond to phrase on it.

   $\therefore$ The number written on backside of phrase II must be 12 as all other numbers are primes.

   Also, the number written on backside of phrase III can be either of 2 and 12 but 12 is on the card with phrase II.

   Thus, the number written on backside of phrase III must be 2.

   Now, the number written on backside of phrase I cannot be 7 and as $2, 12$ are already used, it must be 5.

And hence the number on the card with the phrase greater than 100 must be 7.

2. A block of cheese is cut into many pieces. Number of mice came and stole different number of pieces each. Lazy mary watched this and noticed that each mouse stole less than 10 pieces and no mouse stole exactly twice the number of pieces stolen by any other mouse. What is the largest number of mice, Mary could have noticed?

   Solution : We divide the numbers from 1 to 9 in three sets.
   $A = \{1, 2, 4, 8\}$, $B = \{3, 6\}$, $C = \{5, 7, 9\}$. We want to choose maximum possible numbers from sets A, B and C such that no number from chosen set of numbers is twice the number from remaining chosen numbers.
   From set C, we can take all the numbers.
   From set B, we can choose exactly one number.
   From set A, we can choose exactly two numbers.
   For, if we choose 1, we cannot choose 2 but we can choose exactly one of 4 and 8.
   And if we choose 2, we cannot choose 1 or 4 but we can choose 8.
   Thus, in all we can choose at most 6 numbers from the sets A, B and C.
   Thus, the largest number of mice, Mary could have noticed is 6.

3. Find the largest number so that when each of $430, 910, 1830$ is divided by that number, leaves same remainder.

   Solution : Let m be the largest number so that when each of $430, 910, 1830$ is divided by that number, leaves same remainder.

$$\begin{aligned} \therefore 430 &= mq_1 + r && (1) \\ 910 &= mq_2 + r && (2) \\ 1830 &= mq_3 + r && (3) \end{aligned}$$

   where q_1, q_2, q_3 are quotients when $430, 910, 1830$ are divided by m respectively and r is the remainder which is same in each case.

from equations (1) and (2),

$$\begin{aligned} 430 - mq_1 &= 910 - mq_2 \\ \therefore m(q_2 - q_1) &= 910 - 430 = 480 \end{aligned}$$

$\therefore m$ is a divisor of 480.

from equations (2) and (3),

$$\begin{aligned} 910 - mq_2 &= 1830 - mq_3 \\ \therefore m(q_3 - q_2) &= 1830 - 910 = 920 \end{aligned}$$

$\therefore m$ is a divisor of 920.

from equations (1) and (3),

$$\begin{aligned} 430 - mq_1 &= 1830 - mq_3 \\ \therefore m(q_3 - q_1) &= 1830 - 430 = 1400 \end{aligned}$$

$\therefore m$ is a divisor of 1400.

As, m is largest such number, m should be GCD of $480, 920$ and 1400 which is 40.

4. Assume for simplicity that the area of circle is given by $\frac{22}{7} \times r^2$, where r is the radius of the circle. In the figure, the radius of all the circles is $14cm$. Find the area of the shaded region.

   Solution : Area of shaded region in given figure is equal to the area of shaded region in fig. (a) which is equal to area of square $AEOF$ minus area of a circle i.e.

   $28^2 - \frac{22}{7} \times 14^2$

   $= 787 - 616$

   $= 168\text{cm}^2$

5. In a bag, there are 481 coins of Rs.5, Rs.2, Rs.1 and 50 paise coins denomination. The total value of each type of coins is the same. How many coins of Rs.5, Rs.2, Rs.1 and 50 paise each are there?

   Solution : Let x, y, z, w be the no. of coins of Rs.5, Rs.2, Rs.1 and 50 paise respectively.

Thus, according to given conditions,

$x + y + z + w = 481 \qquad (1)$

and $5x = 2y = z = 0 \cdot 5w$

$\therefore x = \frac{z}{5}, \quad y = \frac{z}{2}, \quad w = \frac{z}{0\cdot5} = 2z$

equation (1) becomes,

$$\begin{aligned} \tfrac{z}{5} + \tfrac{z}{2} + z + 2z &= 481 \\ \therefore 2z + 5z + 10z + 20z &= 4810 \\ \therefore 37z &= 4810 \\ \therefore z &= \tfrac{4810}{37} = 130 \end{aligned}$$

$\therefore x = \frac{z}{5} = 26, \quad y = \frac{z}{2} = 65, \quad w = 2z = 260.$

$\therefore$ there are 26 coins of Rs.5, 65 coins of Rs.2, 130 coins of Rs.1 and 260 coins of 50 paise.

6. ABD, BAC, DCE are 3 digit squares. $A = 5$. Find the possible digits for B, C, D and E. Fill up the adjacent square.

A	B	D
B	A	C
D	C	E

Solution : Only 3 digit squares starting with 5 are 576 and 529.

If $ABD - 576$ then $D = 6$ and only 3 digit squares starting with 6 are 625 and 676.

$\therefore c = 2$ or 7 which is not possible c is last digit of a perfect square.

5	2	9
2	5	6
9	6	1

If $ABD - 529$ then $B = 2$ and $D = 9$.

$\therefore BAC = 25C$.

The 3 digit square starting with 25 is 256.

$\therefore C = 6$ and $DCE = 96E$

The 3 digit square starting with 96 is 961

$\therefore E = 1.$

7. In rectangle $ABDE$ shown below, $AB = 5, BC = 7$ and $CD = 3$. Find the (A) area of triangle BCF (B) length of AD (C) If area of $\triangle AFB$ is 12, find FE.

Solution :

(A) area of

$$\begin{aligned} \triangle BCF &= \tfrac{1}{2} \times BC \times AB \\ &= \tfrac{1}{2} \times 7 \times 5 \\ &= 17 \cdot 5 \end{aligned}$$

(B) In right angled triangle ABD,

$AB = 5, \quad BD = BC + CD = 7 + 3 = 10$

$\therefore$ By Pythagoras theorem,

$$\begin{aligned} \text{length of } AD &= \sqrt{AB^2 + BD^2} \\ &= \sqrt{5^2 + 10^2} \\ &= \sqrt{125} \end{aligned}$$

(C) area of

$$\begin{aligned} \triangle AFB &= \tfrac{1}{2} \times AF \times AB \\ \therefore 12 &= \tfrac{1}{2} \times AF \times 5 \\ \therefore AF &= 4 \cdot 8 \end{aligned}$$

As, $\square ABDE$ is rectangle, $10 = BD = AE = AF + FE$

$\therefore FE = 10 - AF = 10 - 4 \cdot 8 = 5 \cdot 2.$

8. In the figure, if $AB = AC = CD$ and $m\angle BAC = 32°$, then find $\angle BAD$.

Solution : In $\triangle ABC, AB = AC$

$\therefore m\angle ABC = m\angle ACB$

$\therefore m\angle ABC + m\angle BAC + m\angle ACB = 180°$ gives

$2m\angle ABC = 180° - 32°$

$\therefore m\angle ABC = m\angle ACB = \frac{140°}{2} = 74°.$

$$\begin{aligned} \therefore m\angle ACD &= 180^\circ - m\angle ACB \\ &= 180^\circ - 74^\circ = 106^\circ \end{aligned}$$

In $\triangle ACD, AC = CD$

$\therefore m\angle CDA = m\angle CAD$

$\therefore m\angle CDA + m\angle ACD + m\angle CAD = 180^\circ$ gives

$$\begin{aligned} 2m\angle CAD &= 180^\circ - m\angle ACD \\ &= 180^\circ - 106^\circ \\ &= 74^\circ \\ \therefore m\angle CAD &= 37^\circ \\ \text{Now, } m\angle BAD &= m\angle BAC + m\angle CAD \\ &= 32^\circ + 37^\circ \\ &= 69^\circ. \end{aligned}$$

9. If the measure of each of the acute angles in the figure above is the same, find the measure.

   Solution : In any triangle, sum of the measures of all the angles is 180°. As, each acute angle in given figure has same measure, measure of an angle in an acute angled triangle is $\frac{180^\circ}{3} = 60^\circ$.

10. There is a fruit having weight of 120 gm, which contains 98% water. When the fruit was kept under the sun for some time, a part of water evaporate. The water then was 95% of the fruit weight. Find the weight of the fruit at present?

    Solution : Let x be the weight of water evaporated. Total weight of water in a fruit $= \frac{98}{100} \times 120 = 117 \cdot 6gm$

    weight of water in fruit after evaporation $= (117 \cdot 6 - x)gm$

    weight of fruit after evaporation $= (120 - x)gm$

    $\therefore$ according to given condition,

$$\begin{aligned}
117 \cdot 6 - x &= \tfrac{95}{100}(120 - x) \\
\therefore 11760 - 100x &= 95(120) - 95x \\
\therefore 5x &= 360 \\
\therefore x &= 72gm
\end{aligned}$$

Thus, weight of fruit at present (after evaporation)

$= (120 - x)gm = (120 - 72)gm = 48gm.$

Q.4. Write the answer with justification. (Any 4)

Each question carries $7\frac{1}{2}$ marks.

1. $AABB$ is four digit perfect square. Find A and B.

   How did you find it?

2. In the given figure, six circles are shown. Place digits from 1 to 6, on the circles, such that no two circles have same number. The sum 's' of the numbers on each side is the same. Give combinations having three different sums 'S'.

3. 50 students are standing on a circle, having numbers 1 to 50. student no. 1 has a ball in his hand. He pats student to his right side which is no. 2, at the start. So that student no. 2 sits down and is out of the game. Then 1 passes the ball to the next standing student to his right, no.3. Now 3 pats no. 4, he sits down. No.3 passes the ball to No.5 and so on. Same procedure is repeated over and over. In each round about half the students go out of the game, eventually only one student is left standing with the ball. Who is this last student?

   Solution : At the end of the first round, all even numbered students are out of the game. Student no.49 pats 50 and passes the ball to student no.1.

   In the second round, No.1 pats 3 and passes the ball to No.5, No. 5 pats 7 and passes the ball to No. 9 and so on. Thus, at the end of second round, students numbered $3, 7, 11, 15, 19, \cdots, 43, 47$ are out of the game. Student No. 49 pats 1 and passes the ball to student No. 5.

When third round starts, students numbered $5, 9, 13, 17, 21, \cdots, 45, 49$ are in the game. No.5 pats 9 and passes ball to No.13, No.13 pats 17 and passes ball to 21 and so on.

So, at the end of third round, students numbered $9, 17, 25, \cdots, 41, 49$ are out of the game. No. 45 pats 49 and passes ball to No.5.

When fourth round starts, students numbered $5, 13, 21, 29, 37, 45$ are in the game. No.5 pats 13 and passes ball to No.21, No.21 pats 29 and passes ball to No.37, No.37 pats 45 and passes ball to No.5.

Now, only students in the game are nos. $5, 21, 37$. No.5 pats 21 and passes ball to No.37, No.37 pats 5 and No.37 is the last student who is lelf standing with the ball.

4. Every triangle is equilateral. If area of shaded triangle is 1 sq. unit. Find the sum of areas of all the equilateral triangles.

Solution:

$$\begin{aligned}
A(\triangle GIH) &= 1 \text{ sq. unit } = A(\triangle GEI) = A(\triangle HIF) = A(\triangle DGH) \\
A(\triangle DEF) &= A(\triangle DGH) + A(\triangle GEI) + A(\triangle GIH) + A(\triangle HIF) \\
&= 4A(\triangle GIH) = 4 \text{ sq. units} \\
\therefore A(\triangle DEF) &= A(\triangle JED) = A(\triangle ELF) = A(\triangle DFK) = 4 \text{ sq. units} \\
A(\triangle JLK) &= A(\triangle JED) + A(\triangle DEF) + A(\triangle ELF) + A(\triangle DFK) \\
&= 4A(\triangle DEF)16 \text{ sq. units} \\
\therefore A(\triangle JLK) &= A(\triangle AJK) = A(\triangle JBL) = A(\triangle KLC) = 16 \text{ sq. units} \\
A(\triangle ABC) &= A(\triangle AJK) + A(\triangle JBL) + A(\triangle JLK) + A(\triangle KLC) \\
&= 4A(\triangle JLK)64 \text{ sq. units}
\end{aligned}$$

Now, sum of areas of all equilateral triangles is

$A(\triangle GIH) + A(\triangle DGH) + A(\triangle GEI) + A(\triangle HIF) + A(\triangle DEF) +$
$A(\triangle GED) + A(\triangle ELF) + A(\triangle DFK) + A(\triangle JLK) + A(\triangle AJK) +$

$A(\triangle JBL) + A(\triangle KLC) + A(\triangle ABC)$

$= 1 + 1 + 1 + 1 + 4 + 4 + 4 + 4 + 16 + 16 + 16 + 16 + 64$ sq. units

$= 148$ sq. units.

5. There are 240 pupils in a school. There are three news papers, $P1, P2, P3$ in the town.

   a) 60% read $P1$.

   b) 50% read $P2$.

   c) 50% read $P3$.

   d) 20% read $P1$. and $P2$.

   e) 30% read $P2$. and $P3$.

   f) 25% read $P3$. and $P1$.

   g) 10% read all the three $P1, P2, P3$.

   How many read only $P1$?