

Mid-Year Examination Specimen Paper 1

PART I (50 marks)

Duration: 1 hour

Marks Obtained
100

1 Simplify

(a) $5\frac{2}{3} - 2\frac{1}{4} \div 5\frac{2}{5} \times 6$, [1]

(b) $\frac{1.2 \times 0.025}{0.4 \times 50}$, [1]

(c) $\frac{2.3^2 + 23 \times \sqrt{0.49}}{9.2 \div 4}$. [1]

2 Express $24 \times 27 \times 50$ as a product of prime factors.

Hence, find $\sqrt{24 \times 27 \times 50}$. [3]

3 It is given that $-4 \leq x < 2$ and $3 < y \leq 7$, where x and y are integers. Find

(a) the least possible value of $(y - x)$, [1]

(b) the greatest possible value of $\frac{x^2}{2y}$. [2]

4 Given that $2p + r = \frac{q - 2}{p + 1}$, calculate the value of q when $p = 9$ and $r = -17.5$. [3]

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- 5** (a) Evaluate 2.31×0.00465 , correct to 2 significant figures.
Hence, state the value of 0.0231×4.65 . [2]
- (b) Round off $425\,011 \text{ m}^2$ to the nearest hectar. [1]

6 Evaluate $25 - [1.2 - (-5) \div 20 - 6] \times 2$. [3]

- 7** (a) Subtract $(4x^3 - 7x - 2)$ from $(3x^3 - 5x^2 + x + 13)$. [2]
- (b) Simplify $\frac{2xy - 1}{x} - \frac{3 - 7y}{4}$. [3]
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- 8** Complete the following number sequences:
- (a) 19, 23, 27, 31, _____, _____ [1]
- (b) 2, 6, 18, 54, _____, _____ [1]
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- 9** (a) Given that $\sqrt[3]{64} = x$, find the value of x^2 . [2]
- (b) The numerator of a fraction is 4 less than its denominator. Subtracting 1 from both its numerator and denominator gives $\frac{1}{2}$. Find the fraction. [3]
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- 10** Solve the following equations:
- (a) $3(x - 2) - 4(1 - x) = 8$ [2]
- (b) $\frac{y + 2}{5} + 1 = \frac{y + 1}{2}$ [3]

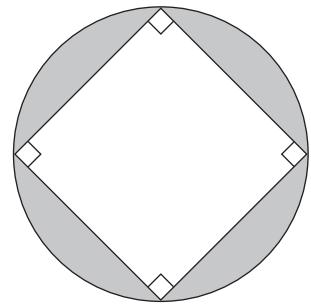
11 Jane is n years old and Jason will be twice as old as Jane in 5 years' time.

- (a) Write an expression for the difference in their ages. [2]
(b) If Jason is 13 years older than Jane, find Jason's present age. [3]

12 The figure below shows a square inscribed in a circle. The perimeter of the figure is 83.6 cm and the diameter of the circle is 14 cm. Find the area of the shaded region.

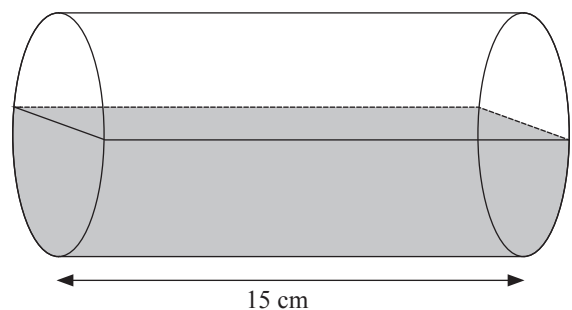
(Take $\pi = \frac{22}{7}$)

[5]



13 A cylindrical bottle is half-filled with 0.75 l of water. Taking $\pi = 3.142$ and giving your answers correct to two decimal places, calculate

- (a) the radius of the bottle, [2]
(b) the surface area of the bottle that is in contact with water. [3]



1 Estimate each of the following, giving your answer correct to 1 significant figure.

(a) $79.1 \div \sqrt{15.9} - 3.01^3$ [2]

(b) $\frac{\sqrt{0.04 \times (-0.81)^2}}{5.1}$ [2]

2 (a) Simplify $\frac{3b}{10} \times \left(-\frac{7}{8}\right) \div \frac{2a^3}{5}$. [2]

(b) If $u - v^2 = \frac{3 - w}{u + 1}$, calculate the value of w when $u = 4.5$ and $v = -2$. [2]

3 (a) Find the HCF and LCM of 18 and 34. [4]

(b) (i) Express 1224 as a product of prime factors. [1]

(ii) Hence, find the least value of k such that $1224k$ is a perfect square. [3]

- 4 (a) Calculate the exact value of $\sqrt[3]{\frac{0.008 \times 125}{0.027}}$. [2]
- (b) Factorise $2c - 6d - 12ad + 4ac$. [3]

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- 5 (a) Simplify $\frac{y-1}{2} - \frac{3-2y}{8} + \frac{y}{12}$. [3]
- (b) Solve the equation $\frac{1}{x} - \frac{2}{5x} = \frac{1}{2x-1}$. [4]

6 Consider the following pattern:

$$\begin{array}{rcccc} \frac{1}{1} & - & \frac{1}{3} & = & \frac{2}{1 \times 3} \\ \frac{1}{2} & - & \frac{1}{4} & = & \frac{2}{2 \times 4} \\ \frac{1}{3} & - & \frac{1}{5} & = & \frac{2}{3 \times 5} \\ & & \vdots & & \vdots \end{array}$$

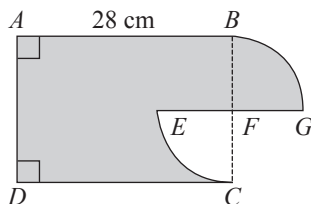
- (a) Write down the 10th line in the pattern. [1]
- (b) Hence, find the values of p and q if $\frac{1}{p} - \frac{1}{q} = \frac{1}{180}$. [3]
- (c) Evaluate $\frac{2}{1 \times 3} + \frac{2}{2 \times 4} + \frac{2}{3 \times 5} + \dots + \frac{2}{21 \times 23} + \frac{2}{22 \times 24}$. [3]

7 At 08 40, a car left Town P for Town Q at an average speed of 75 km/h. The car can travel 45 km further if it increases its average speed by 15 km/h for the same period of time. Find

- (a) the time of arrival to Town Q of the car, [3]
- (b) the distance between Town P and Town Q . [2]

8

In the figure, BFG and CEF are two identical quadrants and EFG is a straight line. It is given that $AB = 2AD$.

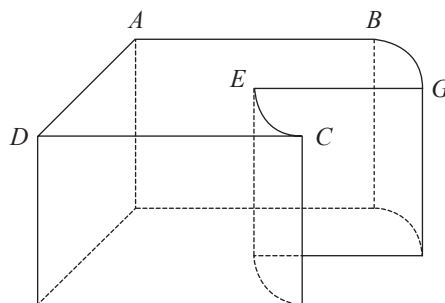


Taking $\pi = \frac{22}{7}$, calculate

- (a) the perimeter of the shaded region, [3]
 (b) the area of the shaded region. [2]

A container with a cross-sectional base $ABGFEC$ is shown in the figure below. The capacity of the tank is 19.6 litres. It is $\frac{3}{10}$ filled with water. Calculate

- (c) the height of the container, [2]
 (d) the water level if 4.9 litres of water is removed from the container. [3]



Mid-Year Examination Specimen Paper 2

PART I (50 marks)

Duration: 1 hour

Marks Obtained
100

- 1** Evaluate
- (a) $(45 - 18 \div 3) \div [8 - (-4) + 1]$, [2]
- (b) $3^2 \times 3 - 3^2 + (-3)^3$. [2]

- 2** Given that $d = 4$, $e = -2$ and $f = -1$, calculate the value of
- (a) $de - f$, [1]
- (b) $e^2 + 2d - f^3$, [2]
- (c) $\sqrt{\frac{5 + 7e}{4f - 2d^2}}$. [2]

- 3**
- (a) Express 98 and 210 as the product of prime factors. [2]
- (b) Hence, find the least possible integer k such that $98k$ is a multiple of 210. [2]

4 Find the exact value of

(a) $1\frac{7}{9} + \frac{5}{6} \times (-1\frac{3}{5})^2$, [2]

(b) $4.5 + 3.\dot{2}\dot{3} - 2.\dot{1}$. [2]

5 Solve the following inequalities:

(a) $3a < 27$ [1]

(b) $5 - 2b > \frac{1}{3}$ [1]

(c) $\frac{2}{9}c + 4 < -6$ [2]

6 (a) Simplify $3x + \frac{x}{2} - \frac{4 - 5x}{7}$. [2]

(b) Factorise $4ay - 2a + 4b(5 - 10y)$. [2]

7 Write down the next two terms in the following number sequences:

(a) 32, 34, 30, 32, 28, ... [2]

(b) $\frac{1}{2}, \frac{2}{3}, \frac{3}{5}, \frac{5}{8}, \dots$ [2]

8 Solve (a) $1 - \frac{2}{3}x = 0$, [1]

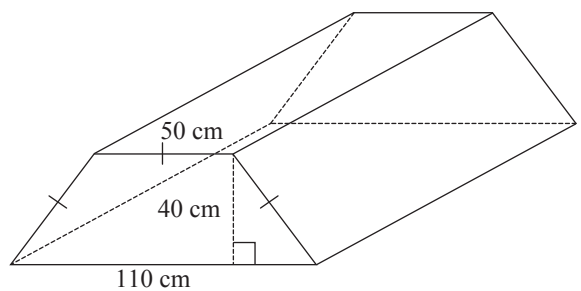
(b) $3.2x - 8.1 = 1.6(1 - x)$, [2]

(c) $\frac{x-1}{2} + 5 = \frac{1}{2} - \frac{3-12x}{6}$. [3]

9 There are 8 more boys than girls in a class. There will be 8 more girls than boys after $\frac{1}{4}$ of the boys walk out from the class. How many children are there in the class at first? [4]

- 10** A cubic tank of length 6 cm was 0.4 filled with water. An empty cylindrical beaker, of equal radius and height, can hold half of the water in the tank. Calculate
- (a) the capacity of the cylindrical beaker, [2]
- (b) the radius of the cylindrical beaker, correct to the nearest mm. [3]

- 11** The figure below shows a prism. The volume of the prism is 80 litres. Calculate
- (a) the cross-sectional area of the prism, [2]
- (b) the length of the prism. [1]
- (c) Given that the cost of painting is \$1 per 500 cm², find the total cost of painting 12 such similar prisms. [3]



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- 1** Mr Wong gives $\frac{2}{5}$ of his monthly income to his wife, saves $\frac{1}{6}$ of the remaining money and gives twice as much as his savings to his 3 children equally. He has \$450 left. Calculate
- (a) the fraction of his monthly income that he has left, [3]
 - (b) his monthly income, [1]
 - (c) the difference between the amounts received by his wife and each of his child. [2]

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- 2**
- (a) Simplify the algebraic expression $2xy - 6x(1 + \frac{3}{2}x - 7y)$. [2]
 - (b) Factorise $4a(2b - 6) - (3 - b)$. [2]
 - (c) Solve the algebraic equation $2 - \frac{4}{z^2} = -0.25$. [3]

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- 3** Given that $T = 4\pi\sqrt{\frac{L}{R-r}}$, find the value of R when $T = 44$, $\pi = 3\frac{1}{7}$, $L = 49$ and $r = 5$. [3]

- 4** Evaluate each of the following using a calculator, giving your answer correct to 2 decimal places:

(a) $\sqrt{2.034^3} - \frac{540.8}{14.9 \times 5.1^2}$ [2]

(b) $\frac{2}{1 - \frac{3}{1 + \frac{5}{9}}}$ [2]

- 5** Given that $0.052 \times 84.5 = 4.394$, find the value of

(a) 5.2×0.00845 , [1]

(b) $\frac{0.04394}{8.45}$. [2]

- 6** The total mass of 2 similar boxes is 550 g heavier than the total mass of 5 similar parcels. If the total mass of 5 boxes and 2 parcels is 6 kg 15 g, how much heavier is a box than a parcel? [4]
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- 7** The arc length of a semicircle is 40 cm longer than the perimeter of a square of length 1.55 m.

(a) Calculate the diameter of the semicircle. [3]

(b) Hence, find the area of the semicircle. [1]

(Take $\pi = \frac{22}{7}$)

8 Study the figures below:

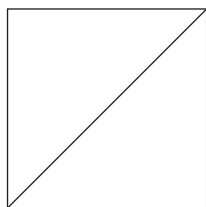


Figure 1

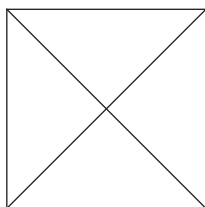


Figure 2

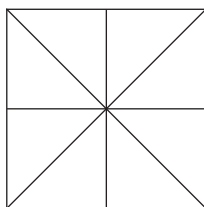


Figure 3

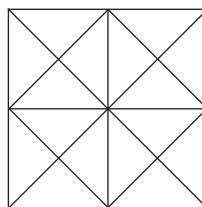


Figure 4

(a) Copy and complete the table below: [2]

Figure n	Number of diagonals, d	Number of identical triangles, T
1	1	2
2	2	4
3	4	
4	8	
...
9		

(b) Express (i) d in terms of n ,
(ii) T in terms of n . [2]

(c) Hence, find the number of triangles in Figure 21. [1]

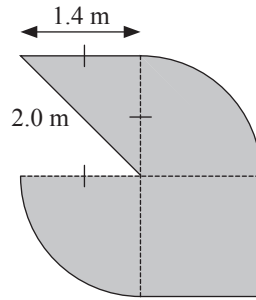
9 (a) Find the LCM of 30, 36 and 40. [2]

(b) A car manufacturer will launch a new series of cars, models X , Y and Z , every 30 months, 3 years and 3 years 4 months respectively. It launched these 3 models of cars at the same time in January 2007. When will the three models of cars be launched together again? [4]

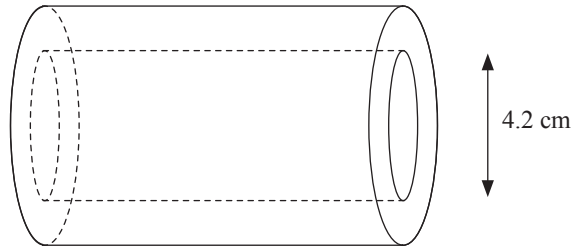
10 (Take $\pi = \frac{22}{7}$)

(a) Find the perimeter of the shaded region.

[3]



(b) A hollow bamboo of thickness 7 mm has a volume of 161.7 cm^3 . The internal diameter of the bamboo is 4.2 cm. Calculate



(i) its length,

[2]

(ii) its surface area.

[3]