17-18 F.5
1st TERM UT
MATH CP
PAPER 1

2017 – 2018
Form 5 First Term Examination

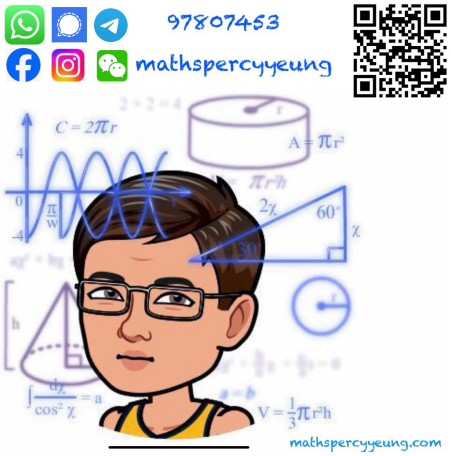
MATHEMATICS Compulsory Part

PAPER 1

Question-Answer Book

31st October, 2017.
8:15 am – 9:15 am (1 hour)

This paper must be answered in English.



Section	Marks
A (1 – 2, 7)	
A (3 – 6)	
A Total	**/30**
B Total	**/20**
TOTAL	**/50**

INSTRUCTIONS

1. Write your name, class and class number in the spaces provided on this cover.

2. This paper consists of THREE sections, A(1), A(2) and B.

3. Attempt ALL questions in this paper. Write your answers in the spaces provided in this Question-Answer Book. Do not write in the margins. Answers written in the margins will not be marked.

4. Unless otherwise specified, all working must be clearly shown.

5. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.

6. The diagrams in this paper are not necessarily drawn to scale.

Section A(1) (13 marks)

1. Simplify $\dfrac{x^3}{(x^{-5}y)^4}$ and express your answer with positive indices. (3 marks)

2. Make h the subject of the formula $b = \dfrac{3h}{h-4}$. (3 marks)

3. If $\cos\theta = -\dfrac{3}{4}$, for $0° \le \theta \le 180°$, find sin θ and tan θ. Give the answer in surd form.

(3 marks)

Answers written in the margins will not be marked.

4. Simplify $\dfrac{\cos(270^\circ+\theta)}{\sin(180^\circ+\theta)}-\tan(90^\circ+\theta)\tan\theta$. (4 marks)

Section A(2) (17 marks)

5. **(a)** Solve the compound inequality $\dfrac{15-2x}{7}\le 12+3x$ and $16-8x>0$. Represent the solutions graphically. (4 marks)

(b) Write down the greatest integers satisfying the compound inequality in **(a)**. (1 mark)

Answers written in the margins will not be marked.

6. Let $f(x) = -x^2 + bx + (b-3)$, where b is a real number.

(a) Express the discriminant of the equation $f(x) = 0$ in terms of b. (2 marks)

(b) If $f(x) = 0$ has real roots, find the range of values of b. (2 marks)

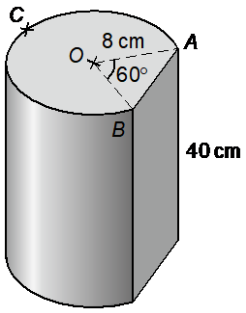
Answers written in the margins will not be marked.

7. As shown in the figure, a portion of metal is cut vertically away from a cylindrical metal bar of base radius 8 cm.

(a) Find the length of AB. (2 marks)

(b) Find the length of $\overset{\frown}{ACB}$. (Express your answer in terms of π.) (2 marks)

(c) Find the total surface area of the remaining metal bar. (Give your answer correct to 3 significant figures.) (4 marks)



Answers written in the margins will not be marked.

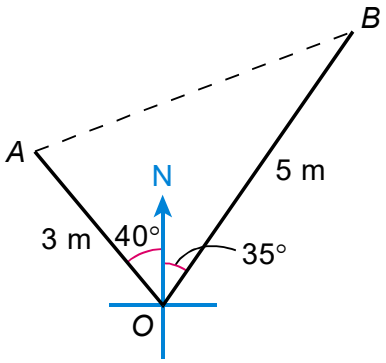
Section B (20 marks)

8. In the figure, O, A and B lie on the same horizontal plane. OA = 3 m and OB = 5 m. It is given that the bearings of A and B from O are N40°W and N35°E respectively.

(a) Find the length of AB. (2 marks)

(b) Find the true bearing of B from A. (3 marks)

(c) A boy walks from A to B. Peter claims that the distance between the boy and the point O is longer than 2.8 m. Do you agree? Explain your answer. (3 marks)



Answers written in the margins will not be marked.

9. An earthquake of Richter scale 6.5 had happened in city A. Two days later, another earthquake of Richter scale 5.4 happened. The energy E(in J) and the magnitude M of the earthquake is related by $\log E = 1.5M + 4.8$.

(a) Find, correct to 3 significant figures, the ratio of the energies released by the two earthquakes. (4 marks)

(b) If the energy released in the third earthquake is 5 times the first one, will the magnitude be also 5 times the first one? Explain your answer. (2 marks)

Answers written in the margins will not be marked.

10. **(a)** Solve the equation $(6x+1)(\frac{4}{x}-1)=18$. (3 marks)

(b) Hence, solve the equation $(6\sin\theta+1)(\frac{4}{\sin\theta}-1)=18$, for $0° \le \theta \le 360°$. (3 marks)

END OF PAPER

Answers written in the margins will not be marked.