

SINGAPORE POLYTECHNIC MATHS ENTRANCE TEST

Name : _____ In chinese (if applicable): _____

Passport / ID No: _____ Seat No: _____

Test Venue: _____ Date: _____

Time Allowed: 1½ hours**Instructions to candidates:**

1. Answer **ALL** questions.
2. Write all your detailed solutions (including rough work) in the blank space provided after each question.
3. Use **ONLY pencil** for drawing graph.
4. Programmable calculators and electronic dictionaries are **not** allowed to be used.
5. Unless otherwise stated, all decimal answers should be correct to **two** decimal places and angle measurement correct to **one** decimal place.
6. This paper consists of **9** pages.

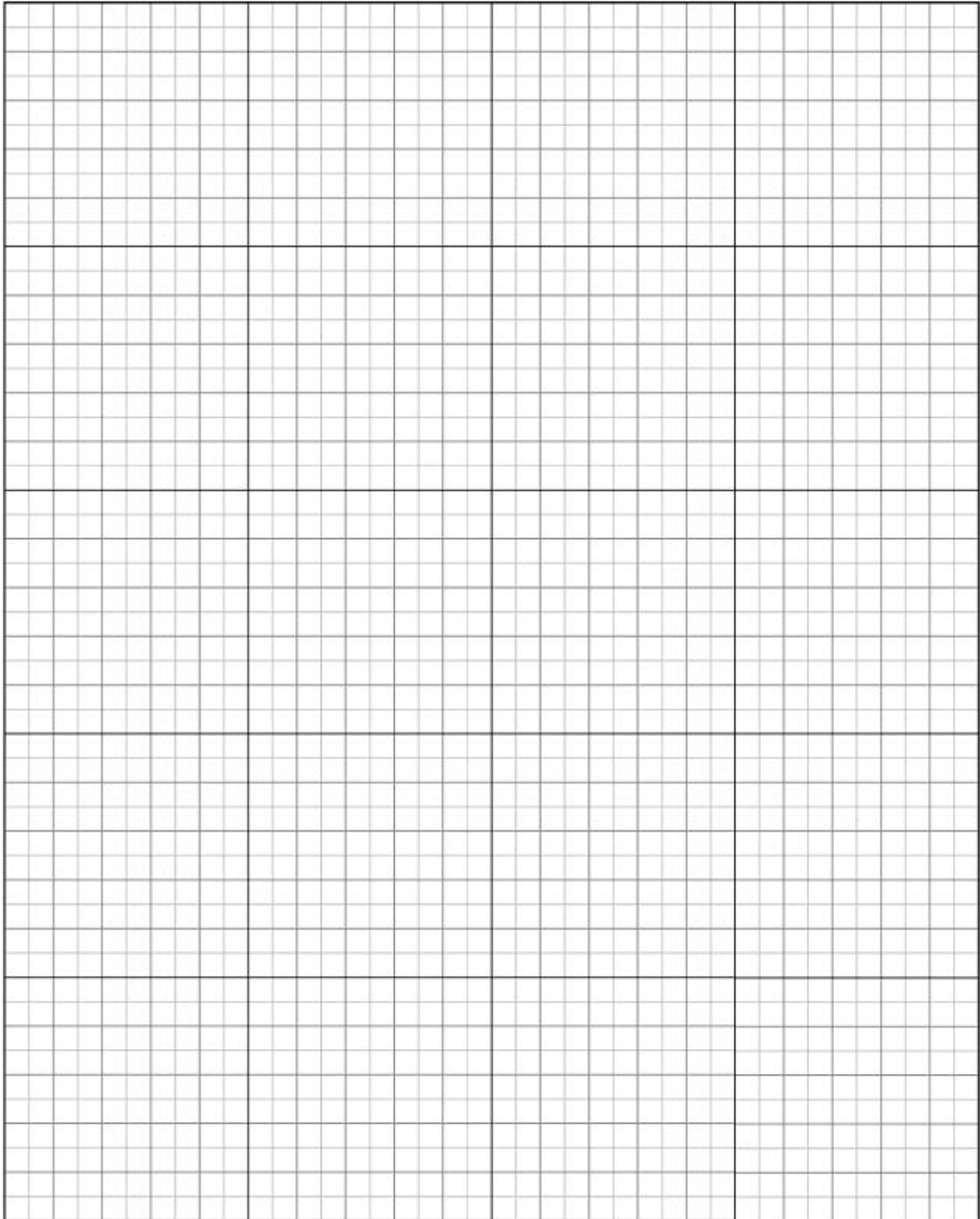
FOR OFFICIAL USE ONLY

QUESTION ANSWERED	MARKS	QUESTION ANSWERED	MARKS
1		5	
2		6	
3		7	
4		TOTAL	

1. The following table shows the horse power P of an engine for different speeds S .

S (rev/min)	1200	1350	1500	1650	1800
P (hp)	270	310	350	390	430

If the law relating P and S is of the form $P = aS + b$, plot a best fit line on the following graph paper to estimate the values of the constants a and b . [10 marks]



2. (a) Solve the equation $\frac{1}{x-1} - \frac{1}{x+2} = \frac{1}{16}$

(b) Find the values of x and y which satisfy the simultaneous equations:

$$\begin{cases} 2x + 1 = 3(y - 1) \\ 6(2y - 1) = 5x \end{cases}$$

[13 marks]

3. (a) (i) Simplify the expression $\frac{5^0 \left(x^{\frac{1}{3}} y^3\right)^3}{\left(x^{\frac{1}{2}} y^2\right)^2}$

(ii) Reduce $\frac{2}{n-2} - \frac{3n+1}{n^2+n-6}$ to a single fraction.

(b) Given $T = 2\pi\sqrt{\frac{W}{GL}}$, express L in terms of T , W , G and π .

[13 marks]

- 4 (a) If a discount of 20% reduced the price of an item to \$100, find the original price of the item.
- (b) 220 boys and 180 girls sat for an examination. If 65% of the boys and 75% of the girls passed, what percentage of the total number of candidates passed?
- (c) The external and internal radii of a copper hemispherical bowl are 10 cm and 9 cm respectively. If the density of copper is 8.9 gm/cm^3 , find its weight in gm correct to 1 decimal place.

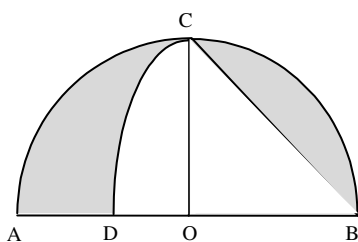
[16 marks]

5. (a) Convert the angle 142° to radians.

(b) In the figure, ABC is a semi-circle centre O with radius $OC = 3$ cm, perpendicular to the diameter AB . An arc of a circle is drawn with centre B and radius BC intersecting AB at D .

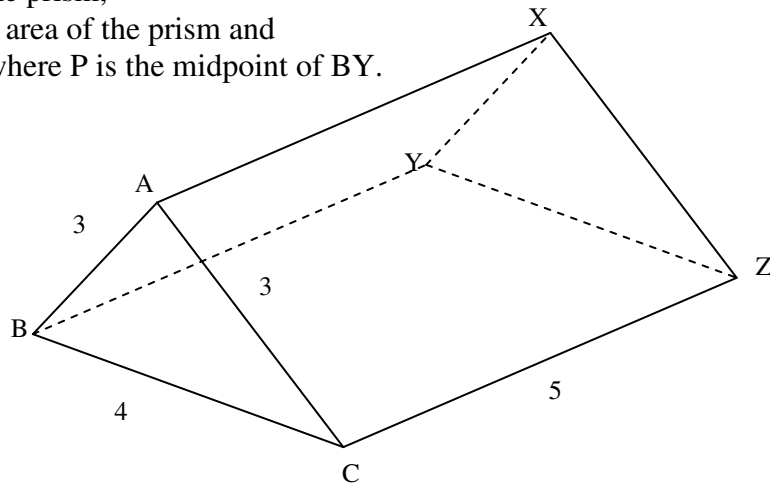
Find:

- (i) the angle CBD .
- (ii) the length of BC .
- (iii) the area of the sector BCD .
- (iv) the shaded area.



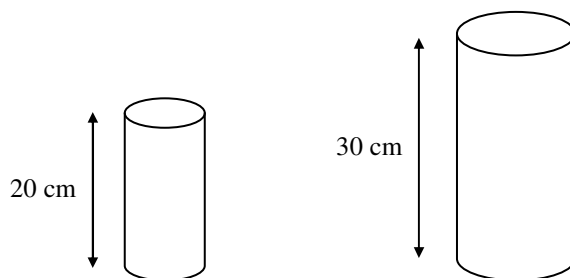
[18 marks]

6. The figure below is a solid triangular prism. Its base $BCZY$ is a rectangle. The triangles ABC and XYZ are vertical and the faces $ABYX$ and $ACZX$ are rectangles. Calculate
- the height of A above the base,
 - the volume of the prism,
 - the total surface area of the prism and
 - the angle CPZ where P is the midpoint of BY .



[17 marks]

7. The two cylinders shown below are geometrically similar. Their heights are 20 cm and 30 cm, respectively.



- (a) If the surface area of the large cylinder is 1350 cm^2 , what is the surface area of the small cylinder?
- (b) If the volume of the small cylinder is 1005 cm^3 , what is the volume of the large cylinder?
- (c) If the diameter of the base of the large cylinder is 12 cm, what is the diameter of the base of the small cylinder?
- [13 marks]

SINGAPORE POLYTECHNIC MATHEMATICS ENTRANCE TEST

Name : _____ In chinese (if applicable): _____

Passport / ID No: _____ Seat No: _____

Test Venue: _____ Date: _____