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HARRISON COLLEGE



END OF YEAR EXAMINATION 2017

SECOND YEAR MATHEMATICS

DURATION: 1 Hour and Thirty-Five Minutes

GENERAL INSTRUCTIONS TO CANDIDATES

- 1) This Examination Paper consists of **FOUR** printed pages.
- 2) Write your name clearly on **EACH** sheet of foolscap used.
- 3) All **FOURTEEN** questions are to be attempted.
- 4) Number your responses carefully and identically (including any associated parts) as they appear on the question paper.
Do **NOT** write ANY of your responses beside each other.
- 5) Calculators **ARE** allowed.
- 6) If a numerical answer cannot be given exactly, and the accuracy required is not specified in the question, then in the case of an angle it must be given correct to **one (1) decimal place**, in other cases it must be given correct to **three (3) significant figures**.
- 7) The maximum mark for this Examination is **75**.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO

Write on your foolscap the LETTER that matches your response for Questions 1 to 5

1. The size of each interior angle of a regular polygon with 7 sides, in degrees, is

- (A) $128\frac{4}{7}$ (B) 360 (C) 540 (D) 900

2. The simple interest on \$ 400 for 2 years at 5% per annum is

- (A) \$ 20 (B) \$ 40 (C) \$ 80 (D) \$ 200

3. A rectangular gate is 3 metres wide and 2 metres high. The length of the diagonal brace is

- (A) 5 metres (B) 2.5 metres (C) $\sqrt{5}$ metres (D) $\sqrt{13}$ metres

4. The next two terms in the sequence 7, 3, -2, -6, -11 are

- (A) -15, -19 (B) -15, -20 (C) -16, -20 (D) -16, -21

5. The expression $7(x - 2y) - 5(x - 3y)$ simplifies to

- (A) $-2x + y$ (B) $-2x - y$ (C) $2x - y$ (D) $2x + y$ [5 marks]

Show ALL working for Questions 6 to 14

6. Write the following numbers in standard form

- (a) 0.009362 (b) 224.09 (c) 650 thousand [6 marks]

7. If $U = \{f, a, c, t, o, r, i, s, e\}$, $P = \{r, a, t, i, o\}$ and $Q = \{s, e, t\}$

(a) Draw a Venn diagram to represent the above information. [4 marks]

(b) Using the information for U , P and Q find the following

(i) $(P \cup Q)'$

(ii) $P \cap Q$

(iii) $(P \cup Q)' \cap (P \cap Q)$

(iv) $n(P \cup Q)$

[5 marks]

8. Solve EACH of the following for x

(a) $x - 1 > -6$

(b) $4 - 5x < 10$

(c) $3x - 4 = 6x + 2$

(d) $4(3x + 1) = 6 - 2(x + 5)$

[21 marks]

9. Make x the subject of

(a) $\frac{x}{2} + a = c$

(b) $v = u + ax$

[4 marks]

10. Calculate the Principal that will earn \$ 200 as simple interest after 8 years at

$5\frac{1}{2}\%$ per annum.

[5 marks]

11. Mary's pay slip showed that she worked $5\frac{1}{2}$ hours overtime in addition to her basic 37-hour week. If her basic pay is \$ 3.00 per hour and overtime is paid at time-and-a-half, calculate her gross pay for the week.

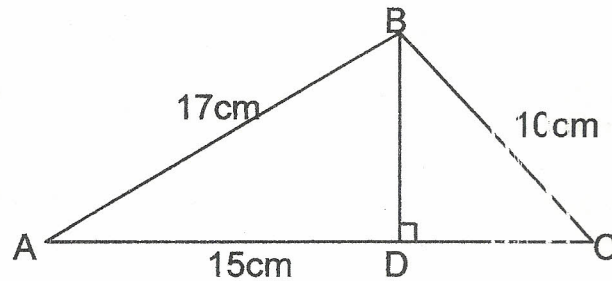
[3 marks]

12. A cuboid is of length 3.2 cm, width 7 cm and height 4 cm. Calculate its

(i) volume

[6 marks]

13. In $\triangle ABC$ below (not drawn to scale), $AB = 17$ cm, $AD = 15$ cm, $BC = 10$ cm and BD is perpendicular to AC .



Calculate the

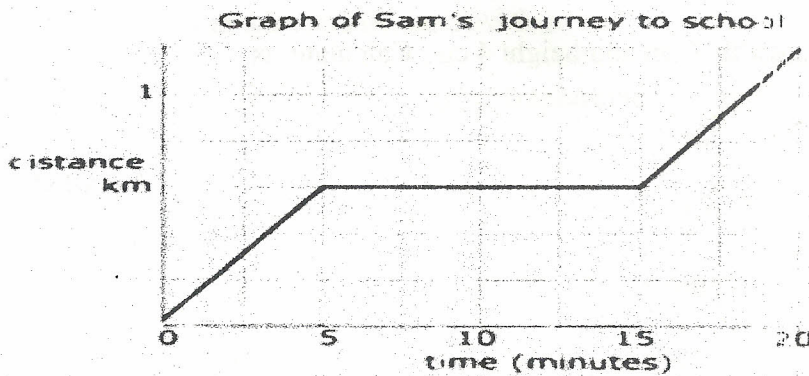
- (i) length BD
- (ii) length AC
- (iii) area of triangle ABC

[9 marks]

14. (ε) At constant speed a car used five litres of petrol to travel 80 km. At the same speed, how much petrol is needed to travel 120 km.

[2 marks]

- (b) The graph below shows Sam's journey from home to school.



- (i) What is the distance between Sam's home and school?
- (ii) How much time did it take to complete the journey to school?
- (iii) What was his average speed, in km per minute, for the last five minutes of the journey?
- (iv) Sam visited a relative on his way to school. How long did the visit last? [5 marks]

End of Examination