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$2021 - 2022$

S5 First Term Uniform Test

MATHEMATICS Compulsory Part

PAPER 2

8th November, 2021

9:15 am – 9:45 am (30 minutes)

INSTRUCTIONS

1. Read carefully the instructions on the Answer Sheet. After the announcement of the start of the examination, you should insert the information required in the spaces provided.

2. When told to open this book, you should check that all the questions are there.   Look for the words '**END OF PAPER**' after the last question.

3. All questions carry equal marks.

4. **ANSWER ALL QUESTIONS**. You should use an HB pencil to mark all your answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly; otherwise you will lose marks if the answers cannot be captured.

5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.

6. No marks will be deducted for wrong answers.

There are 11 questions in Section A and 7 questions in Section B.

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

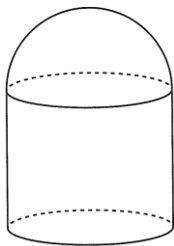Choose the best answer for each question.

Section A

1. $\dfrac{4x^2}{(2x^{-3})^4} =$

   A. $\dfrac{x^{14}}{4}$.

   B. $2x^{14}$.

   C. $\dfrac{2}{x^{10}}$.

   D. $\dfrac{x^{10}}{4}$.

2. In the figure, a solid consists of a right cylinder and a hemisphere with a common base. The radius of the hemisphere is 6 cm and volume of the solid is 432π cm^3. Find the total surface area of the solid.

   A. 96π cm^2
   B. 168π cm^2
   C. 204π cm^2
   D. 240π cm^2

3. If $p < q < 0$, which of the following must be true?

   A. $p + q > 0$
   B. $p^2 < q^2$
   C. $\dfrac{1}{p} < \dfrac{1}{q}$
   D. $\dfrac{p}{q} > 1$

4. Solve $-4x - 3 > 5$ or $3x + 1 \le x + 3$.

   A. $x < -2$
   B. $x \le 1$
   C. $-2 < x \le 1$
   D. All real numbers

5. It is given that y varies directly as x^2. When $x = 3$, $y = 54$. Find the value(s) of x when $y = 150$.

   A. 5
   B. 6
   C. 25
   D. 5 or –5

6. If p varies directly as the square root of q and inversely as r, which of the following must be a constant?

   A. $\dfrac{p^2 r^2}{q}$

   B. $\dfrac{pr}{q^2}$

   C. $p\sqrt{qr}$

   D. $\dfrac{p\sqrt{q}}{r}$

7. It is given that $f(x)$ is partly constant and partly varies inversely as the square of x. If $f(1) = 11$ and $f(4) = -4$, then $f(-2) =$

   A. -9.
   B. -1.
   C. 3.
   D. 16.

8. It is given that y varies as x and z. If x is increased by 20% and z is decreased by 30%, then

   A. y is increased by 4%.
   B. y is decreased by 6%.
   C. y is decreased by 10%.
   D. y is decreased by 16%.

9. Given a straight line $4x - 3y - 24 = 0$. Which of the following must be true?

I. The slope of the straight line is $\dfrac{4}{3}$.

II. y-intercept is positive.

III. x-intercept is 6.

    A. I only
    B. I and III only
    C. II and III only
    D. I, II and III

10. Find the median and the range of the set of data {41, 37, 33, 30, 44, 43, 55, 59}.

	Median	Range
A.	42	18
B.	42	29
C.	42.75	18
D.	42.75	29

11. The stem-and-leaf diagram below shows the distribution of the heights (in cm) of the students of class 5B. Find the mode, median and range of the distribution.

Stem (tens)	Leaf (units)
15	0 5 9 9
16	0 0 0 1 2 3 3 4 6 6 7 7 7 8 9
17	1 1 2 2 2 5 5 7 7 7 7 9 9
18	0 0 4

	Mode	Median	Range
A.	7 cm	168 cm	30 cm
B.	7 cm	169 cm	34 cm
C.	177 cm	168 cm	34 cm
D.	177 cm	169 cm	30 cm

Section B

12. The solutions of $x^2 - 10x + 21 > 0$ are
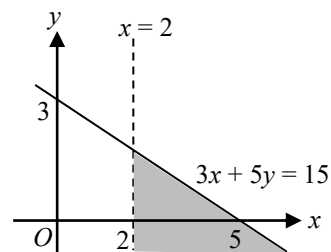
    A. $x < 3$.
    B. $x < 7$.
    C. $3 < x < 7$.
    D. $x < 3$ or $x > 7$.

13. Which of the following points lies in the feasible region of $\begin{cases} y \le 2x - 1 \\ x + y - 4 > 0 \\ 5x - 2y < 7 \end{cases}$?
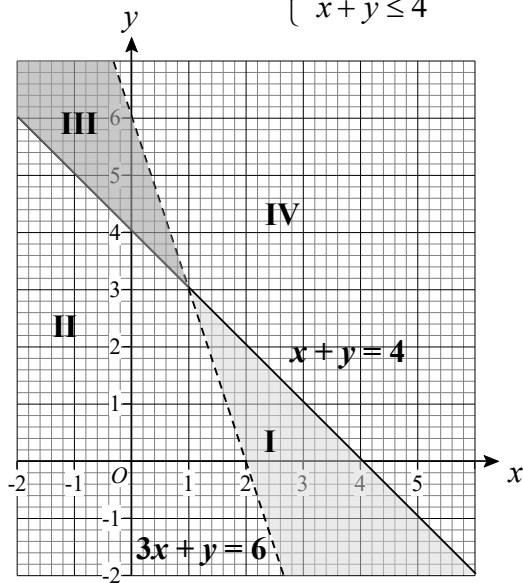
    A. (0, 3)
    B. (2, 0)
    C. (2, 3)
    D. (4, 6)

14. Which of the following systems of inequalities has its solutions represented by the shaded region in the figure?

A. $\begin{cases} 3x + 5y \le 15 \\ x < 2 \end{cases}$

B. $\begin{cases} 3x + 5y \le 15 \\ x > 2 \end{cases}$

C. $\begin{cases} 3x + 5y \ge 15 \\ x < 2 \end{cases}$

D. $\begin{cases} 3x + 5y \ge 15 \\ x > 2 \end{cases}$

15. Which of the region in the figure may represent the solution of $\begin{cases} 3x+y>6 \\ x+y\leq 4 \end{cases}$?

- A. Region I
- B. Region II
- C. Region III
- D. Region IV

16. A chef has 10 kg meat, 9 kg seafood and 15 kg vegetables. He has to make two kinds of dishes A and B. The following table shows the ingredients required to make these two dishes.

Dish	Meat(g)	Seafood(g)	Vegetables(g)
A	200	90	50
B	100	180	250

The profits of each dish A and dish B are $30 and $40 respectively. Suppose that the chef makes x dishes A and y dishes B. Which of the following is a constraint about x and y?

- A. $30x+40y\leq 0$
- B. $200x+100y\leq 10$
- C. $10x+50y\leq 3$
- D. $x+2y\leq 100$

17. The graph in the figure shows the linear relation between x and $\log_5 y$. If $y=ab^x$, then $b=$
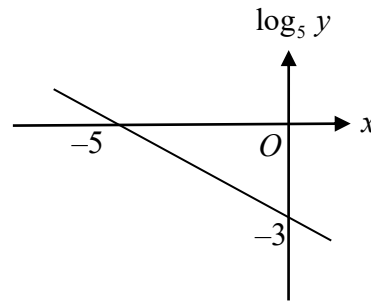
- A. $\dfrac{1}{125}$.
- B. $\dfrac{1}{1000}$.
- C. $\dfrac{1}{\sqrt[5]{125}}$.
- D. $\dfrac{1}{\sqrt[5]{1000}}$.

18. It is given that $x>0$ and $x\neq 1$. Find the value of $\dfrac{5\log\sqrt{x}-\log\sqrt[3]{x}}{\log x^2+3\log\dfrac{1}{x}}$.

- A. $-\dfrac{13}{6}$
- B. -1
- C. $\dfrac{1}{5}$
- D. $\dfrac{13}{30}$

END OF PAPER