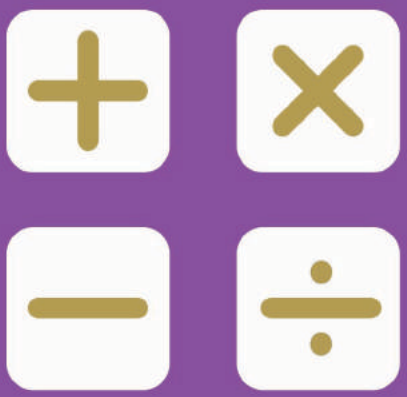
TCIMO | TERRY CHEW INSTITUTE OF MATHEMATICAL OLYMPIADS

PAPER C



SEAMO

Southeast Asian Mathematical Olympiad

2022

DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED.

STUDENT'S NAME:

Read the instructions on the **ANSWER SHEET** and fill in your **NAME, SCHOOL** and **OTHER INFORMATION**.
Use a 2B or B pencil.
Do **NOT** use a pen
Rub out any mistakes completely.

You **MUST** record your answers on the **ANSWER SHEET**.

UPPER PRIMARY

Mark only **ONE** answer for each question.
Marks are **NOT** deducted for incorrect answers.

QUESTIONS 1 TO 20
Use the information provided to choose the **BEST** answer from the five possible options.
On your **ANSWER SHEET** shade the option that matches your answer.

QUESTIONS 21 TO 25
On your **ANSWER SHEET** write your answer within the box provided. Units are not required.

You are **NOT** allowed to use a calculator.

QUESTIONS 1 TO 10 ARE WORTH 3 MARKS EACH

1. It is given that

$$A : B = 6 : 5$$

$$B : C = 4 : 3$$

$$C : D = 5 : 6$$

Find the value of D if $A = 120$.

(A) 75

(B) 80

(C) 90

(D) 100

(E) 120

2. 5 is subtracted from $7n$, where n is an integer. The result is then divided by 5. Finally, the quotient is added to 9. The final result is 22. Find the value of n.

(A) 7

(B) 8

(C) 9

(D) 10

(E) 11

3. Let P and Q represent 2 different integers, such that $P * Q = \frac{PQ}{2}$.

Find $3 * (6 * 8)$.

(A) 34

(B) 36

(C) 38

(D) 40

(E) 42

4. Which of the following numbers has/have the largest value?

$$2^{415},\ 3^{249},\ 5^{166}$$

(A) 5^{166}

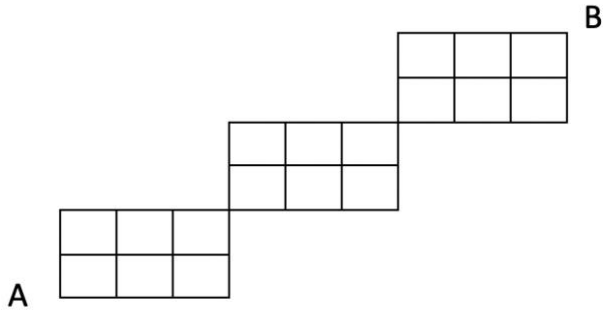
(B) 2^{415}

(C) 3^{249}

(D) 5^{166} and 2^{415}

(E) All have the same value

5. Find the number of shortest paths from Point A to Point B. Only → and ↑ movements are allowed.



(A) 720

(B) 880

(C) 920

(D) 950

(E) 1000

6. There are 12 points on a circle. How many different triangles can be formed by selecting any 3 points as its vertices?

(A) 150

(B) 180

(C) 210

(D) 220

(E) 240

7. Dr Soe was driving from Yangon to Mandalay. If he drove at a speed of 90 km/h, he would arrive at 2.00 pm. If he drove at a speed of 105 km/h, he would arrive at 1.00 pm. Find the distance between the 2 cities in km.

(A) 620

(B) 625

(C) 630

(D) 635

(E) 640

8. There are 81 marbles in a box. Dean and Pong are to take turns removing 1, 2 or 3 marbles each time. Whoever draws the last marble will be the winner. If Dean starts the game, what should his first move be in order to win?

(A) Take 1

(B) Take 2

(C) Take 3

(D) The person who starts will always win.

(E) There is no strategy to win.

9. There are 10 matchsticks on the table. Tevbot takes 1, 2 or 3 matchsticks each time. How many ways are there for him to take all the matchsticks?

(A) 274

(B) 275

(C) 276

(D) 280

(E) 295

10. There are fifty \$1, \$2, and \$5 notes. There are two more \$1 notes than \$2 notes. Given that the total value of the notes is \$116, find the number of \$5 notes.

(A) 9

(B) 10

(C) 11

(D) 12

(E) 13

QUESTIONS 11 TO 20 ARE WORTH 4 MARKS EACH

11. Find the ones digit in

$$3^{2020} + 4^{2021} + 5^{2022}$$

(A) 0

(B) 1

(C) 3

(D) 5

(E) 7

12. Find the remainder when $34 \times 37 \times 41 \times 43$ is divided by 13.

(A) 1

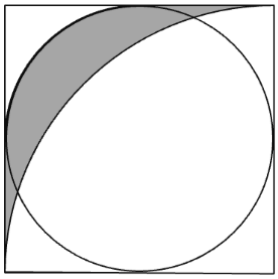
(B) 2

(C) 3

(D) 4

(E) 5

13. The figure below is made up of a square, a quadrant and a circle. The length of the square is 14 cm. Find the area of the shaded region. Take $\pi = \frac{22}{7}$.



(A) 28.5

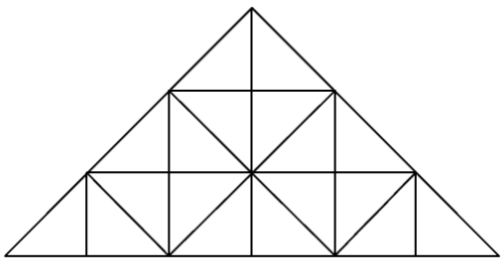
(B) 31.5

(C) 37.5

(D) 40.5

(E) 42.5

14. How many triangles are there in the figure below?



(A) 43

(B) 44

(C) 45

(D) 46

(E) 47

15. The passcode to a locker is a 3-digit number. The following statements are made by three different people?

A: The number is 954.

B: The number is 358.

C: The number is 214.

Each person has exactly one correct digit. Which of the following could be the passcode?

(A) 954

(B) 254

(C) 258

(D) 918

(E) 914

16. Evaluate

$$12359 \times 12486 - 12489 \times 12356$$

(A) 360

(B) 390

(C) 420

(D) 450

(E) 480

17. A fast-food vendor sells nuggets in packets of 5 or 8 only. What is the largest number of nuggets that cannot be sold?

(A) 13

(B) 17

(C) 19

(D) 27

(A) 29

18. Evaluate

$$\left(46-\frac{1}{8}\right)\times\frac{1}{8}+\left(43-\frac{1}{8}\right)\times\frac{1}{8}+\cdots+\left(1-\frac{1}{8}\right)\times\frac{1}{8}$$

(A) $44\frac{25}{64}$

(B) $45\frac{27}{64}$

(C) $46\frac{3}{32}$

(D) $46\frac{9}{16}$

(E) $46\frac{3}{4}$

19. Michelle and Lenny took 24 days to finish a science project together. If Michelle worked alone for 6 days, and then Lenny continued for another 4 days, only $\frac{1}{5}$ of the project would be finished. How many days in total will it take Michelle to finish the project by herself?

(A) 12

(B) 24

(C) 30

(D) 50

(E) 60

20. Each Grade A durian costs \$12 and each Grade B durian costs \$22. Mr Tan paid \$126 for some Grade A and Grade B durians. How many Grade A durians did he buy?

(A) 1

(B) 2

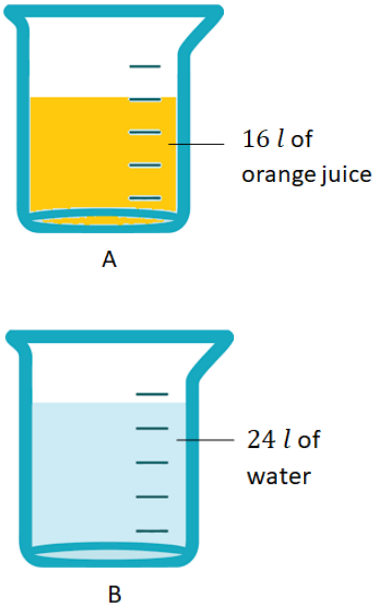
(C) 3

(D) 4

(E) 5

QUESTIONS 21 TO 25 ARE WORTH 6 MARKS EACH

21. There is 16 l of orange juice in container A and 24 l of water in container B. Some water is poured from B to A such that 60% of the mixture in A is orange juice. Some mixture from A is then poured back to B such that the content of orange juice in B is 20%. How many litres of mixture are there in A now?



22. Find the integer part of the expression

$$S = \frac{1}{\frac{1}{2017} + \frac{1}{2018} + \frac{1}{2019} + \cdots + \frac{1}{2028}}$$

23. The ratio of the number of boys to the number of girls in the first round of a Math Olympiad Competition was 4 : 3. In the second round, the ratio was 8 : 5. The number of boys and girls who did not qualify for the second round is in the ratio 3 : 4. Given that 91 students qualified for the second round, how many students took part in the first round of the competition?

24. There are 10 questions in a Math Olympiad competition. 4 marks are awarded for a correct answer. 1 mark is deducted for a wrong answer. 0 marks are awarded for questions that are not attempted. What is the minimum number of participants so that at least 4 participants get the same score?

25. It is given that n is a positive integer and $n^2 + 5n + 13$ is a perfect square. Find the value of n. Hint: $(a+b)^2 = a^2 + 2ab + b^2$.

End of Paper

SEAMO 2022

Paper C – Answers

Multiple-Choice Questions

Questions 1 to 10 carry 3 marks each.

Q1	Q2	Q3	Q4	Q5
(C)	(D)	(B)	(B)	(E)

Q6	Q7	Q8	Q9	Q10
(D)	(C)	(A)	(A)	(D)

Questions 11 to 20 carry 4 marks each.

Q11	Q12	Q13	Q14	Q15
(A)	(B)	(B)	(E)	(D)

Q16	Q17	Q18	Q19	Q20
(B)	(D)	(E)	(E)	(C)

Free-Response Questions

Questions 21 to 25 carry 6 marks each.

21	22	23	24	25
20	168	119	136	4