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FOR EXAMINERS USE ONLY
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CANDIDATE'S EXAMINATION NUMBER _____

AN ROINN OIDEACHAIS

BRAINSE NA SCRÚDUITHE

DAY VOCATIONAL CERTIFICATE EXAMINATION 1980

MATHEMATICS—PAPER II

FRIDAY 13 JUNE—2-4 p.m.

INSTRUCTIONS

(*a*) Before attempting to answer any question you should write your examination number in the space provided on top of this page.

(*b*) This booklet is to be returned to the Supervisor at the end of this examination period.

(*c*) The total time allowed for this paper is 2 hours. You are allowed five minutes to read these instructions and to write your examination number on top of this page. You will then get 10 minutes to look through the questions but may not write down any answers during this time. You will then have 100 minutes in which to answer the questions and the remaining five minutes is for final checking.

(*d*) You will be given one mark for each question answered correctly in Section One and two marks for each question answered correctly in Section Two.

(*e*) Four suggested answers, A, B, C, and D, are given for each question and only one of these is correct. You are required to select the correct response and to record it by encircling the letter opposite the right answer as shown in the following item:

A. −1
B. 1
Ⓒ 7
D. 12

You will not get credit for any answer unless it is marked in this way. No credit will be given if more than one response is thus marked. However if you make a mistake you may cancel the wrong answer by putting an X across it thus Ⓧ

(*f*) Answer as many questions as you can. If you find a question too difficult go on to the next, but go back and attempt it later if you have sufficient time and then choose the response which you judge most likely to be correct.

(*g*) If you wish to do any calculations or other work you may do it in this booklet but do not do it on the left hand side where the letters A, B C and D appear.

You may also carry out calculations on paper available from the Supervisor.

(*h*) The official Mathematical Table book may be used in answering this paper. Ask the Supervisor for the tables when you need them.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD DO SO.

OVER

SECTION ONE

1. The number of metres in $2 \cdot 4$ km is

   A. $0 \cdot 24$
   B. 24
   C. 240
   D. 2400

2. How many numbers between 9 and 41 are divisible by 4?

   A. 5
   B. 7
   C. 8
   D. 9

3. The only prime number among the numbers 18, 19, 20, 21 is

   A. 18
   B. 19
   C. 20
   D. 21

4. What is the value of $(0 \cdot 7)^2$?

   A. $0 \cdot 14$
   B. $0 \cdot 49$
   C. $1 \cdot 4$
   D. $4 \cdot 9$

5. Let $\pi = 3 \cdot 14$. The diameter of a tenpenny (10p) coin is 29 mm. Its length (circumference) is

   A. 87 mm
   B. 91 mm
   C. 116 mm
   D. 290 mm

6. $\frac{4}{7} \times \frac{21}{8}$ is

   A. $\frac{32}{147}$ B. $\frac{3}{2}$ C. $\frac{5}{3}$ D. 6.

7. An article cost £45 in a shop. At a $33\frac{1}{3}\%$ discount the article would cost

   A. £15
   B. £30
   C. £33·50
   D. £60

8. The value of $9x^{12} \times 5x^2$ is

   A. $14x^{14}$
   B. $14x^{24}$
   C. $45x^{14}$
   D. $45x^{24}$

9. The value of $6 + (3 \times 2) - (8 \div 4)$ is

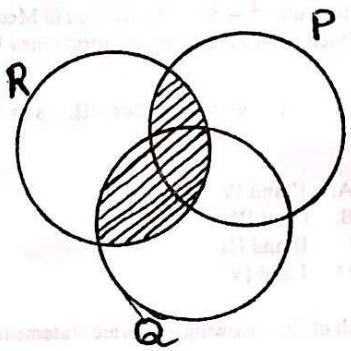
   A. $2\frac{1}{2}$
   B. 6
   C. 10
   D. 16.

10. The n^{th} term of a sequence is $n^2 - 3$. The fourth term of this sequence (T_4) is

    A. 1
    B. 5
    C. 13
    D. 19

11. The shaded area in the Venn Diagram represents.

A. $(P \cup Q) \cup R$
B. $(P \cup Q) \cap R$
C. $(P \cap Q) \cup (Q \cap R)$
D. $(P \cap R) \cap (Q \cap R)$



12. U is the set of all dogs, L is the set of labradors and G is the set of golden coloured dogs. Then $L' \cup G'$ is

A. All golden labradors
B. All golden dogs except labradors
C. All dogs except golden labradors
D. All dogs neither golden nor labrador.

13. The domain of the function $f: x \to 3x^2 - 5x - 1$ is $\{1,2,3\}$. The range is

A. $\{-3, -1, -11\}$
B. $\{-3, -1, 11\}$
C. $\{3, -1, 11\}$
D. $\{-3, 1, 11\}$

14. If $S = \{x \mid -1 < x < 3, x \in Z\}$ then one of the following statements is true.

A. $-1 \in S$
B. $0 \in S$
C. $2\frac{1}{2} \in S$
D. $3 \in S$

15. One of the factors of $ax - ay + bx - by$ is $a + b$; the other is

A. $a - x$
B. $x - y$
C. $x + y$
D. $b + y$

16. The sum of $2m - n, 4n - 3m, m + 3n, 4m - 5n$, is

A. $4m + n$
B. $4m + 3n$
C. $10m - 7n$
D. $10m + 13n$

17. Given $x \neq 2$ then $\frac{x^2 - 4}{x^2 - 4x + 4}$ is

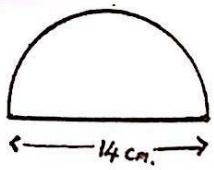
A. $-\frac{1}{4x}$ B. $\frac{x-2}{x+2}$ C. $\frac{x+2}{x-2}$ D. $\frac{1}{x+4}$

18. The solution set of $4x - 9 = 0$ is

A. $\frac{4}{9}$
B. $2\frac{1}{4}$
C. 5
D. 36

19. Let $\pi = \frac{22}{7}$. The area in cm^2 enclosed by the semicircle in the diagram is

A. 308 B. 154 C. $153\frac{1}{2}$ D. 77



20. A rectangle is $(3x - 1)$ metres long and $(x + 5)$ metres wide. Its area in m^2 is

A. $4x + 4$
B. $3x^2 - 5$
C. $3x^2 + 14x - 5$
D. $3x^2 + 16x + 5$

21. If $32 \cdot 48 = 10^{1 \cdot 5116}$ then $\sqrt{32 \cdot 48}$ is

A. $10^{0 \cdot 7558}$
B. $10^{1 \cdot 2558}$
C. $10^{1 \cdot 7558}$
D. $10^{3 \cdot 0232}$

22. A wall which measures 7m × 3m has a door measuring 1m × $2\frac{1}{2}$m set into it. The cost of papering the wall, excluding the door, at 50p per m^2 is

A. £9.25
B. £$9 \cdot 00\frac{1}{2}$
C. £$1 \cdot 85$
D. £$1 \cdot 25$

23. The sum of $1011_{two} + 1101_{two}$ is

A. 10000_{two}
B. 10100_{two}
C. 10110_{two}
D. 11000_{two}

24. The average of four numbers is 15. If three of the numbers are 18, 24, 12, the fourth is

A. 6
B. 8
C. 10
D. 12

25. In 1980 the population of a city is 40,000. It is increasing at the rate of 500 persons per year. In how many years will the population have increased by 50% of the 1980 level.

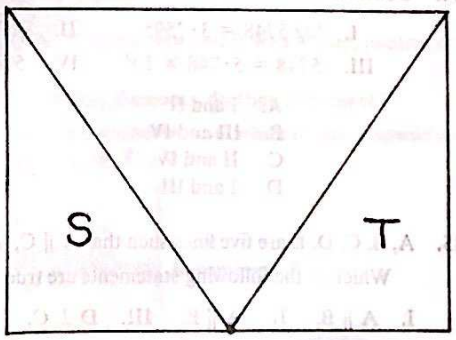
A. $0 \cdot 1$
B. 20
C. 40
D. 990

26. A pie chart is divided into four sections of angles 117°, 108°, 90° and 45° respectively. If the smallest section represents £120, then the largest one represents

A. £180
B. £240
C. £308
D. £312

27. The triangle S is the image of the triangle T by

A. Rotation
B. Central Symmetry
C. Axial Symmetry
D. Parallel projection



28. In a certain area 60% of families own a dog and 40% own a cat. Which of the following statements **MUST** be **FALSE.**

A. All families own a cat or a dog
B. All cat owners also own a dog
C. More than half the dog owners also own a cat
D. All dog owners also own a cat

29. Five oranges cost the same as three apples. If ten oranges are bought for 30p, an apple costs

A. 5p
B. $7\frac{1}{2}$
C. 10p
D. 15p

30. The diagram represents

A. A closed curve
B. An open line segment
C. A closed line segment
D. A half line.

SECTION TWO

31. Three of the following sets are functions.

I $\{(x,y), (m,x), (n,x), (y,x), (z,p)\}$.
II $\{(m,p), (t,s), (t,p), (y,z), (n,m)\}$.
III $\{(4,7), (3,8), (1,9), (2,6), (5,3)\}$.
IV $\{(1,2), (2,3), (3,4), (4,5), (5,6)\}$.

A. I, II, III,
B. I, III, IV,
C. II, III, IV,
D. I, II, IV.

32. Which of the following had the greatest average speed.

A. a hurling ball (sliotar) travelled 20 m in 0·36s.
B. a man ran 100 m. in 9·9 s.
C. a train travelled 400 km in $2\frac{1}{2}$ hrs.
D. a bird flew 2 km in $1\frac{1}{2}$ minutes.

33. Which of the following statements are correct.

I. 6% of £60 = £10
II. £30 wages per week = £1560 per annum.
III. The Simple Interest on £400 for 3 years at 7% p.a. is £28.
IV. A taxable income of £1000 will yield £250 tax if the rate is 25p. in the £1.

A. I & III.
B. II & IV.
C. I & IV.
D. II & III.

34. Consider the number 5748. Which of the following statements are true.

I. $\log 5748 = 3{\cdot}7595$ II. $\sqrt{5748} = 23{\cdot}98$
III. $5748 = 5{\cdot}748 \times 10^3$ IV. 5748 correct to 2 significant figures = ·5800.

A. I and II
B. III and IV
C. II and IV
D. I and III.

35. A, B, C, D, E are five lines such that A ∥ C, A ⊥ D, B ⊥ D, B ⊥ E.
Which of the following statements are true.

I. A ∥ B, II. A ∥ E, III. D ⊥ C, IV. D ∥ E.

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

36. The formula $v^2 = u^2 + 2as$ is used in Mechanics.
Which two of the following forms may be properly deduced from this formula.

I. $u^2 = v^2 + 2as$, II. $s = \frac{v^2 - u^2}{2a}$ III. $2as = u^2 - v^2$ IV. $\frac{v^2 - u^2}{as} = 2$.

A. II and IV
B. I and III
C. II and III
D. I and IV

37. Which of the following algebraic statements are true.

I. $5xy \div 2y = \frac{5x}{2}$ II. $\sqrt{y^2} = \pm y$ III. $(3a^2)^3 = 9a^6$ IV. $4m^2n \times 3mn = 12m^3n^2$.

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

38. Which of the following statements are true.

I. 41, 51, 61 are all prime numbers.
II. 5, 10, 15, 30 are all multiples of 30.
III. The highest common divisor of 24 and 36 is 12.
IV. The difference of any two odd numbers is an even number.

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

39. {2} is the solution set of which of the following.

I. $8x - 5 = 4x + 3$ II. $\frac{1}{3-x} = \frac{2}{x-4}$. III. $\frac{x+4}{3} + 6 = \frac{7x+2}{2}$ IV. $x(2x+5) = (2x-1)(5x-4)$.

A. I, II, IV,
B. II, III, IV,
C. I, III, IV,
D. I, II, III.

40. Which of the following are axes of symmetry of the rectangle $PQRS$.

I. PR, II. XV. III. QS. IV. UW.

A. I and II
B. II and III
C. III and IV
D. II and IV.