INSTRUCTIONS

COWBELL

COWBELLPEDIA
SECONDARY SCHOOL MATHEMATICS TV QUIZ SHOW

JUNIOR CATEGORY

March 11, 2017   1 HOUR 15 MINUTES   10:00am

1. THIS PAPER IS IN TWO PARTS (I & II).

2. ANSWER ALL QUESTIONS IN BOTH PARTS.

3. USE HB PENCIL THROUGHOUT FOR THE MULTIPLE CHOICE QUESTION.

4. THE USE OF CALCULATOR IS NOT ALLOWED.

5. SHADE THE CORRECT OPTION IN THE SPACE PROVIDED IN THE ANSWER BOOKLET.

6. PLEASE WRITE YOUR NAMES IN CAPITAL LETTERS.

7. CANDIDATES WHO DO NOT SHADE THEIR CORRECT CATEGORIES WILL BE DISQUALIFIED.

8. YOU ARE ADVISED NOT TO SPEND MORE THAN 1 HOUR IN PART I AND 15 MINUTES IN PART II.

9. EACH MULTIPLE CHOICE QUESTION ATTRACTS 2 MARKS.

10. PART II ATTRACTS 20 MARKS.

1. Express 234 as a product of its prime factors.
   A. $2 \times 3 \times 13$
   B. $2 \times 3^2 \times 13$
   C. $2^2 \times 3 \times 13$
   D. $2^2 \times 3^2 \times 13$

2. The positive difference between two numbers is 164. If the larger number is 102, find the value of the smaller number.
   A. -62
   B. -40
   C. 22
   D. 40

3. Two similar cups are 3cm and 5cm deep. If the larger cup holds $625cm^3$ of water, what is the volume of the smaller one?
   A. $27cm^3$
   B. $125cm^3$
   C. $135cm^3$
   D. $375cm^3$

4. Find the product of HCF and LCM of 10 and 15.
   A. 5
   B. 30
   C. 120
   D. 150

5. Find the HCF of $27a^3b^2$, $12ab^2$ and $3ab^3$.
   A. ab
   B. ab^2
   C. $3ab$
   D. $3ab^2$

6. Simplify $\dfrac{xy + x^2}{3x}$
   A. $\dfrac{y + x^2}{3}$ B. y C. $\dfrac{y+x}{3x}$ D $\dfrac{y+x}{3}$

7. Factorise $50a^2 - 2b^2$.
   A. $2(5a + b)(5a + b)$
   B. $2(5a + b)(5a - b)$
   C. $2(5a - b)(5a - b)$
   D. $25a^2 + b^2$

8. A typist types 37 words per minute. Estimate how long it will take him to type a letter of 370 words.
   A. 10 minutes
   B. 9½ minutes
   C. 9 minutes
   D. 8½ minutes

9. Divide 10101_{two} by 11_{two}.
   A. 111_{two}
   B. 110_{two}
   C. 101_{two}
   D. 100_{two}

10. Convert 111_{two} to a number in base 10.
    A. 7
    B. 8
    C. 9
    D. 10

11. Simplify $\dfrac{2(a+1)}{a} - \dfrac{1}{3}$.
    A. $\dfrac{7a+6}{3a}$ B. $\dfrac{5a+6}{3a}$ C. $\dfrac{11a}{3}$ D. $\dfrac{11}{3}$

12. Simplify the expression
    $6p - 2q - 9r + 2q - p + r$.
    A. $7p - 4q + 10r$ B. $5p - 4q - 10r$
    C. $7p + 4q$ D. $5p - 8r$

13. Solve simultaneously $4p + 3q = 7$
    $p - 3q = -2$
    A. $p = 1$ and $q = 1$
    B. $p = -1$ and $q = -1$
    C. $p = ½$ and $q = 1⅔$
    D. $p = ½$ and $q = 3$

14. If equations $3x - 2y = 12$ and $2x + y = 1$ are solved simultaneously, find the value of y.
    A. -3 B. -2 C. 2 D. 3

15. Simplify $\dfrac{5x + 2}{6} - \dfrac{3x - 1}{9}$
    A. $\dfrac{x - 4}{2}$ B. $\dfrac{x + 4}{2}$ C. $\dfrac{4 - x}{2}$ D. $\dfrac{x - 2}{2}$

16. Simplify $\frac{4}{5}x + 2 + \frac{3}{5}(x - 1)$.
    A. $\dfrac{7x + 5}{5}$ B. $\dfrac{7x - 5}{5}$ C. $\dfrac{x + 5}{5}$ D. $\dfrac{x - 5}{5}$

17. Given that $\dfrac{p}{3} - \dfrac{p+y}{2} = -2$, find y when $p = 6$.
    A. -2 B. -1 C. 1 D. 2

18. Solve the equation $2x - \dfrac{x - 1}{2} = -7$
    A. -13 B. -8 C. -5 D. -3

19. Solve $\dfrac{1}{3t} - \dfrac{1}{5} = \dfrac{1}{2t}$.
   A. $\dfrac{-5}{6}$ B. $\dfrac{-1}{6}$ C. $1\frac{1}{5}$ D. 2

20. Solve $2(4a - 1) - 3(a + 4) = 0$.
    A. $\dfrac{-1}{5}$ B. $1\dfrac{4}{5}$ C. $2\dfrac{4}{5}$ D. $4\dfrac{1}{2}$

21. What is the value of x in $2\dfrac{1}{2} + \dfrac{5}{x} = 0$?
    A. –10   B. –2   C. 4   D. 6

22. If 8 is added to a number and the sum is divided by 3, the result is 12. What is the number?
    A. 10   B. 20   C. 28   D. 38

23. Find the one – fifth of the sum of 30, 12 and 18.
    A. 5   B. 7   C. 9   D. 12

24. Factorize $2qr - 2rx + 2qy - 2xy$.
    A. $2(r-y)(q-x)$ B. $(2ry-x)(q+x)$
    C. $2(r+y)(q+x)$ D. $2(r+y)(q-x)$

25. Which of the following inequalities is represented in the figure below?
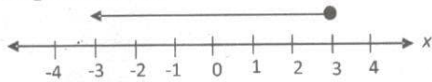
    A. $x \geq -3$ B. $x \leq -3$ C. $x \geq 3$ D. $x \leq 3$

26. The perpendicular bisector of a straight line cuts the line at angle
    A. 25^0.   B. 30^0.   C. 60^0.   D. 90^0.

27. Two similar cuboids have their volumes in the ratio 27 : 125. Find the ratio of their sides.
    A. 2:3   B. 3:5   C. 5:3   D. 9:25

28.
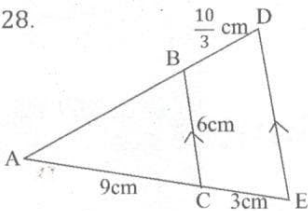
    (Diagram not drawn to scale) Calculate AB in the diagram above.
    A. 8cm   B. 10cm   C. 12cm   D. 13cm

29. Calculate the size of each interior angle of a regular hexagon.
   A. 120^0 B. 360^0 C. 540^0 D. 720^0

30. Find the value of x in the diagram below.
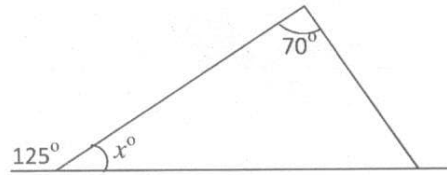
    A. 50^0 B. 55^0 C. 70^0 D. 110^0

31. Find the area of a rhombus whose diagonals are 10cm and 8cm.
    A. $160cm^2$ B. $80cm^2$ C. $40cm^2$ D. $20cm^2$

32. Which of the following is a Pythagorean triple?
    A. 5, 12, 14   B. 8, 12, 15
    C. 8, 15, 17   D. 8, 12, 17

33. Moses has 4 Honda, 8 Toyota, 7 Mercedes and 5 Peugeot cars. If one of the cars is been sold, what is the probability of selling a Toyota car?
    A. $\dfrac{1}{12}$ B. $\dfrac{5}{24}$ C. $\dfrac{1}{3}$ D. $\dfrac{1}{6}$

34. What is the median of the following scores: 6, 3, 4, 2, 7, 5, 6?
   A. 6   B. 5   C. 4   D. 3

The scores obtained by 5 schools in a competition are represented below.
Use the information to answer questions 35 to 37.
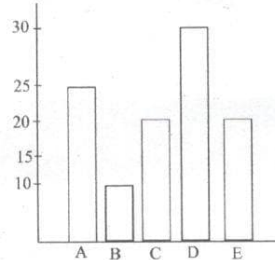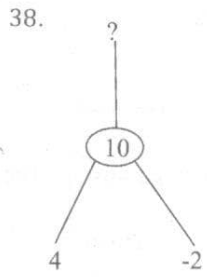

35. What is the total score for all the schools?
    A. 25   B. 50   C. 75   D. 105

36. If pass mark is 15, how many school(s) failed?
    A. 1   B. 2   C. 3   D. 4

37. Which is the best school?
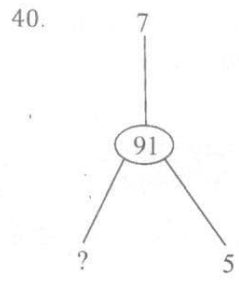   A. E   B. D   C. C   D. B

Study and use the sample below to answer questions 38 to 40

SAMPLE

39.

A. $3/8$ B. $5/8$ C. $7/8$ D. 1

38.

A. 2
B. 4
C. 5
D. 6

40.
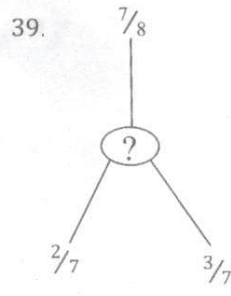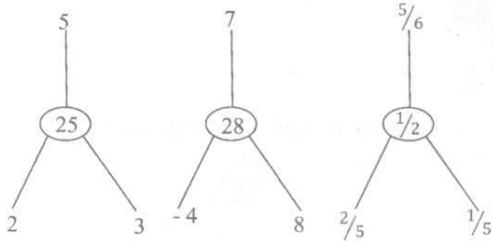
A. 3   B. 8   C. 9   D. 12

PART TWO   THEORY (15 Minutes)

1. Simplify $685_{nine} \times 205_{seven} - 345_{eight}$.
   Leave your answer in base five.

2(a) Three angles of a nonagon are equal and the sum of six other angles is 960°.
   Calculate the size of the equal angles.

(b) What is the amount to be paid if compound interest is calculated on N500.00 for 2 years at 10%.

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1. B		21. B	
2. A		22. C	
3. C		23. D	
4. D		24. D	
5. D		25. D	
6. D		26. D	
7. B		27. B	
8. A		28. B	
9. A		29. A	
10. A		30. B	
11. B		31. C	
12. D		32. C	
13. A		33. C	
14. A		34. B	
15. BONUS		35. D	
16. BONUS		36. A	
17. D		37. B	
18. C		38. C	
19. A		39. B	
20. C		40. B	

S/N	SOLUTIONS	DISTRIBUTION OF MARKS	TOTAL
1	$685_{nine} = 6 \times 9^2 + 8 \times 9^1 + 5 \times 9^0$ $\qquad = 6 \times 81 + 8 \times 9 + 5 \times 1$ $\qquad = 486 + 72 + 5$ $\qquad = 563_{ten}$	M_1 converting to base ten A_1 for 563_{ten}	2 marks
	$205_{seven} = 2 \times 7^2 + 0 \times 7^1 + 5 \times 7^0$ $\qquad = 2 \times 49 + 0 \times 7 + 5 \times 1$ $\qquad = 98 + 0 + 5$ $\qquad = 103_{ten}$	M_1 for converting to base ten A_1 for 103_{ten}	2 marks
	$345_{eight} = 3 \times 8^2 + 4 \times 8^1 + 5 \times 8^0$ $\qquad = 3 \times 64 + 4 \times 8 + 5 \times 1$ $\qquad = 192 + 32 + 5$ $\qquad = 229_{ten}$	M_1 for converting to base ten A_1 for 229_{ten}	2 marks
| | ``` 
    5 6 3
 x  1 0 3
 ─────────
  1 6 8 9
  0 0 0
+5 6 3
 ─────────
 5 7 9 8 9
 -   2 2 0
 ─────────
 5 7 7 6 0
``` | $M_1$ for multiplying <br><br><br> $A_1$ for $57760_{ten}$ | 2 marks |
| | ``` 
 5 | 57760 | R
 5 | 11552 | 0
 5 |  2310 | 2
 5 |   462 | 0
 5 |    92 | 2
 5 |    18 | 2
 5 |     3 | 3
 5 |     0 | 3
``` | $M_1$ for converting to base five | |
| | $57760_{ten} = 3322020_{five}$
 $685_{nine} \times 205_{seven} - 345_{eight} = 3322020_{five}$ | A_1 for 3322020_{five} | 2 marks |

2 a.	$S_n = (n-2) \times 180°$ $\quad = (9-2) \times 180°$ $\quad = 7 \times 180$ $\quad = 1260°$ But 6 angles $= 960°$ $\therefore$ 3 angles $= 1260° - 960°$ $\quad\quad\quad\quad = 300°$ Each of the angles $= 300°/3$ $\quad\quad\quad\quad\quad = 100°$	M_1 for finding angle sum A_1 for $1260°$ M_1 for subtraction A_1 for $300°$ M_1 for dividing A_1 for $100°$	6 marks
b.	$A = P[1 + R/100]^n$ $\quad = 500[1 + 10/100]^2$ $\quad = 500[110/100]^2$ $\quad = 500[11/10]^2$ $\quad = 500 \times 1.21$ $\quad = ₦605.00$	M_1 for applying formula M_1 for simplifying M_1 for multiplying A_1 for ₦605.00	4 marks
			20 marks