CHRISTIAN SOCIAL SERVICES COMMISSION- (CSSC)

NORTHERN ZONE JOINT EXAMINATION SYNDICATE(NZJES)

FORM TWO PRE-NATIONAL EXAMINATION AUGUST 2024

BASIC MATHEMATICS

MARKING SCHEME

1. **a) Solution**

A red light flash on 18 sec

A green light flashes on 24 sec

2	18	24
2	9	12
2	9	6
3	9	3
3	3	1
	1	1

04 Marks

Lowest Common Multiple (LCM) = $2\times 2\times 2\times 3\times 3$ =72 sec

Therefore both lights will flash together at 72 Sec

Solution (b)

i. 0.00034578 $\approx$ 0.000346 (6 dps) ……………………..01 Marks

ii. 0.00034578 $\approx$ 0.0003458 (4 sgfs) ………………… 01 Marks

Solution (c)

Three towns

65000 $\approx$ 60000 ………………………………… 01 Marks

13000 $\approx$ 10000 ………………………………… 01 Marks

29700 $\approx$ 30000 ………………………………… 01 Marks

their total population = 70000 + 10000 + 30000 =11000

Therefore the total population = 10000 …………………………. 01 Marks

2. **Solution**
3. **(a)**

Test has 20 questions

Student got 13 questions

his percentage score $=\frac{13}{20}\times 100\%$, = 65% ……………………………02 Marks

Solution (b)

i. Total Students = 63

Boys = $\frac{4}{7}$

Girls = $1 - \frac{4}{7}$, = $\frac{3}{7}$ ………………………………………1.5 Marks

Therefore fraction for girls = $\frac{3}{7}$

ii. Girls = $\frac{3}{7} \times 63 = 27$

Therefore there are 27 girls …………………………………..1.5 Marks

Solution (c)

X= $0.33333 = 0.\dot{3}$

Y = $0.5454 = 0.\dot{5}\dot{4}$

Let

$x = 0.\dot{3}$

$x \times 10 = 0.\dot{3} \times 10$

$10x = 3.\dot{3}$

$10x - x = 3.\dot{3} - 0.\dot{3}$

$\frac{9x}{9} = \frac{3}{9}$ ………………………………………………………..02 Marks

$x = \frac{1}{3}$

Again

Let $y = 0.\dot{5}\dot{4}$

$y \times 100 = 0.\dot{5}\dot{4} \times 100$

$100y = 54.\dot{5}\dot{4}$

$100y - y = 54.\dot{5}\dot{4} - 0.\dot{5}\dot{4}$

$\frac{99y}{99} = \frac{54}{99}$ ……………………………………… 02 Marks

$y = \frac{6}{11}$

$xy = \frac{1}{3} \times \frac{6}{11} = \frac{2}{11}$

Therefore the value of $xy = \frac{2}{11}$ ……………………………… 01 Marks

4. a) Solution(i)

$A\hat{B}C + B\hat{A}C + A\hat{C}B = 180^0$ (Sum of angle of triangle)

$70^0 + 50^0 + q = 180^0$

$120^0 + q = 180^0$

$q = 180^0 - 120^0$

$q = 60^0$ ……………………………………………….02 Marks

$A\hat{B}C = E\hat{C}D = 70^0 = r$

$r = 70^0$ ………………………………… 01 Marks

$B\hat{A}C = A\hat{C}E = 50^0 = P$

$P = 50^0$ …………………………………… 01 Marks

Therefore $P = 50^0,\ q = 60^0\ and\ r = 70^0$ ………………………………… 1.5 Marks

Solution (ii)

Value of $p + q + r$

$P = 50^0$, $q = 60^0$ and $r = 70^0$

$p + q + r = 50^0 + 60^0 + 70^0 = 180^0$ …………………………………….. 01 Marks

Therefore the value of $p + q + r = 180^0$ …………………………………...0.5 Marks

Solution (b)

Given, $2x + 70^0$, $3x + 20^0$

$2x + 70^0 + 3x + 20^0 = 180^0$………………….(01 mark)

$2x + 3x + 70^0 + 20^0 = 180^0$

$5x + 90^0 = 180^0$

$5x = 180^0 - 90^0$

$\frac{5x}{5} = \frac{90}{5}$

$x = 18^0$ ………………… (01 mark)

Therefore the value of $x = 18^0$ ……………… (01 mark)

5. a) Solution

Given, $a * b = a^2 - b$

$4 * (2 * y) = 4$

Consider $2 * y$

$2^2 - y = 4 - y$ ……………………………………………1.5 Marks

$4 * (4 - y) = 4$

$4^2 - (4 - y) = 4$

$16 - 4 + y = 4$ …………………………………….. 2.5 Marks

$12 + y = 4$

$y = -8$

Therefore the value of $y = -8$ ………………………………01 Marks

b) Solution

$s = \frac{r-q}{1-r}$

$s(1 - r) = r - q$

$s - sr = r - q$ ……………………..02 Marks

$-sr - r = -q - s$

$\frac{-r(s+1)}{-(s+1)} = \frac{-(q+s)}{-(s+1)}$ ………………… 02 Marks

Therefore $r = \frac{q+s}{s+1}$……………….. 01 Marks

5. a) Solution

Given, $\begin{cases} 2x + y = 10 \\ 3x - 2y = 1 \end{cases}$

Consider $2x + y = 10$

$y = 10 - 2x$

$3x - 2(10 - 2x) = 1$……………..(01 mark)

$3x - 20 + 4x = 1$

$3x + 4x = 1 + 20$

$\frac{7x}{7} = \frac{21}{7}$

$x = 3$……………(01 mark)

Again Consider

$y = 10 - 2x$

$y = 10 - 2 \times 3$…………………..(01 mark)

$y = 10 - 6$

$y = 4$ …………………..(01 mark)

Therefore $x = 3$ *and* $y = 4$…………………01 Marks

Solution (b)

Perfect Square $b^2 = 4ac$……………(02 marks)

From $5x^2 + hx + 5$

$h^2 = 4 \times 5 \times 5 = 100$……………………….01 Mark

Therefore $h = \pm 10$ ……………..02 marks

6. a) Solution (i)

A (2,⁻k) and B (4,3)

Slope (m) = 2

From $\frac{change\ in\ y}{change\ in\ x} = Slope$ …………….01 mark

$\frac{3-(^-k)}{4-2} = 2$

$\frac{3+k}{2} = 2$ .... 01 Mark

$3 + k = 2 \times 2$

$3 + k = 4$

$k = 4 - 3$

$k = 1$

Therefore $k = 1$ ……………………………01 Mark

Solution (ii)

The equation of line $\overline{AB}$

Our point are A (2,⁻1) and B (4,3)

Slope = 2

$\frac{\Delta y}{\Delta x} = m$

Take (x, y) and B (4,3)

$\frac{y-3}{x-4} = 2$ ……………………………02 Marks

$y - 3 = 2(x - 4)$

$y - 3 = 2x - 8$

$y = 2x - 8 + 3$

$y = 2x - 5$ …………………………02 Marks

Therefore equation of line $\overline{AB}$ $is\ y = 2x - 5$

Solution (b)

From the given ratio scale

1cm represent 5000cm in land

but

1m = 100cm

? ← 5000cm

$= \frac{1m \times 5000cm}{100cm} = 50m$ …………………01 Mark

Then

1cm = 50m

3.5cm = ?

$= \frac{3.5cm \times 50m}{1cm} = 175m$ …………………….01 Mark

Therefore the actual length represented by 3.5cm is 175m ……………01 mark

7. a) Solution

Given $\frac{2+\sqrt{5}}{2\sqrt{7}+\sqrt{6}}$, R.F = $2\sqrt{7} - \sqrt{6}$ ……….01 mark

$= \frac{2+\sqrt{5}}{2\sqrt{7}+\sqrt{6}} \times \frac{2\sqrt{7}-\sqrt{6}}{2\sqrt{7}-\sqrt{6}}$ …………..01 mark

$= \frac{4\sqrt{7}-2\sqrt{6}+2\sqrt{35}-\sqrt{30}}{4\sqrt{49}-\sqrt{36}}$ …………01 mark

$= \frac{4\sqrt{7}-2\sqrt{6}+2\sqrt{35}-\sqrt{30}}{4\times7-6}$ …………01 mark

$= \frac{4\sqrt{7}-2\sqrt{6}+2\sqrt{35}-\sqrt{30}}{22}$ …………01 mark

(b) Solution

Given, $\log_5 25 + \log_4 x = 6$

$\log_5 5^2 + \log_4 x = 6$

$2\log_5 5 + \log_4 x = 6$ …………………………..02 Marks

$2 + \log_4 x = 6$

$\log_4 x = 6 - 2$

$\log_4 x = 4$ …………………………..02 Marks

From $\log_a b = c \rightarrow a^c = b$

Then, $x = 4^4$

$x = 256$ ……………………..01 Mark

8. (a) Solution

$\overline{AB} = \overline{BC}$ (given) …………01 mark

$DAB = DCB = 90^0[given]$ ………..01 mark

$\overline{DB}$ is common …………….. 01 mark

$\therefore\ \Delta ABD = \Delta CBD\ (SAS)$………………………………………… 01 Mark

Solution (b) (i)

$BKL = BMN$ [$Corresponding\ angles$] ………01 mark

$BLK = BNM = 90^o$ [$given$] ………… 01 mark

$KBL = MBN$ [$Common\ angle$] ……………………………..01 Mark

$\because \Delta BLK \sim \Delta\ BNM$ [$AA - Similarity\ theorem$] …………. 01 mark

Solution (ii)

$\frac{\overline{KL}}{\overline{MN}} = \frac{\overline{BK}}{\overline{BM}} = \frac{12}{30} = \frac{15}{15+Y}$ ………………01 mark

$12(15 + Y) = 30 \times 15$

$\frac{12(15+Y)}{12} = \frac{450}{12}$

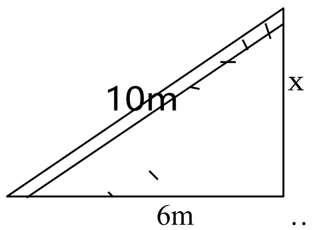
$15 + Y = 37.5$

$Y = 37.5 - 15$

$Y = 22.5$ ………….. 01 mark

9. a) Solution

Let the ladder reach x m up



……………01 mark

By using Pythagoras theorem

$a^2 + b^2 = c^2$ …………………01 mark

$6^2 + x^2 = 10^2$

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$36 + x^2 = 100$ ……………01 mark

$x^2 = 100 - 36$

$x^2 = 64$

$x = 8m$ ....01 mark

$\therefore$ *It reaches* $8m$ *up* … … … … 01 Mark

b) Solution

From $Cos\ a = \frac{Adj}{Hyp}$ .... 01 mark

$= \frac{4}{5} = 0.8$

$a = \cos^{-1}(0.8)$ .... 01 mark

$a = 36.87°$ .... 01 mark

By using Pythagoras Theorem

$a^2 + b^2 = c^2$, ... 01 mark

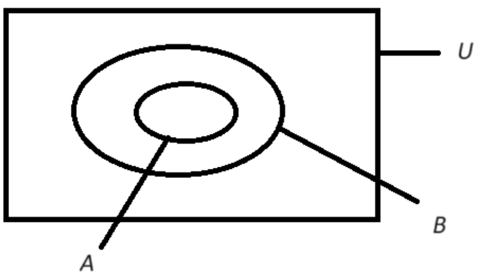
$4^2 + x^2 = 5^2$

$x^2 = 25 - 16$

$x^2 = 9$

$x = 3cm$ .... 01 mark

10. **Solution (a)(i)**



02 marks

(ii)

Number of subsets $= 2^n,\ where\ n = 5$ ……01 mark

$= 2^5$

$= 32$

Therefore, there are 32 subsets ………01 mark

Solution (b)

Math $\frac{25}{200} \times 360^0 = 45^0$

English $\frac{40}{200} \times 360^0 = 72^0$

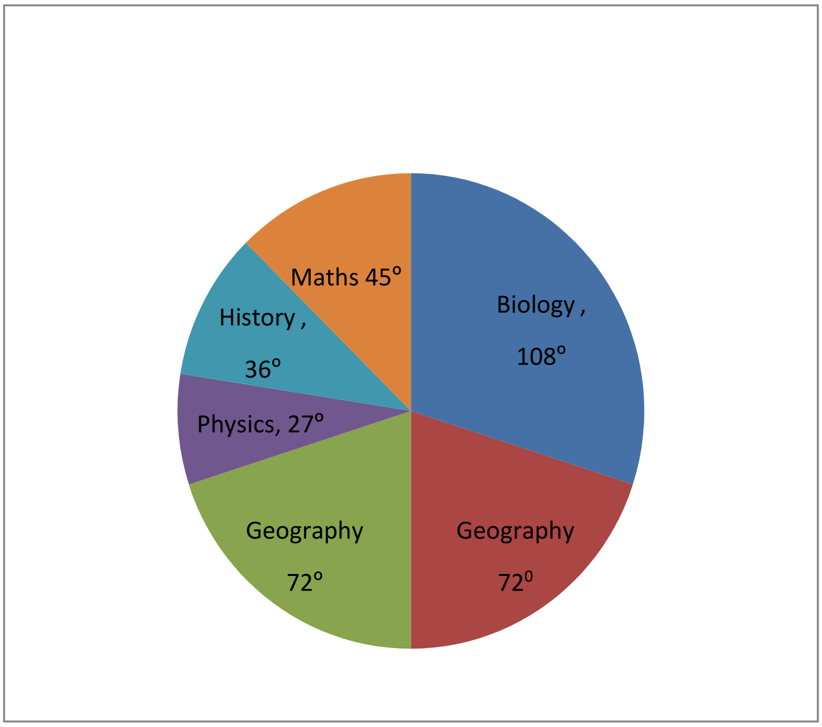
Biology $\frac{60}{200} \times 360^0 = 108^0$

History $\frac{20}{200} \times 360^0 = 36^0$

Geography $\frac{40}{200} \times 360^0 = 72^0$

Physics $\frac{15}{200} \times 360^0 = 27^0$ ……………………0.5 mark @ = 03 Marks

A pie chart to represent data from a survey.



03 Marks