

(1)(i) Simplify without using logarithmic tables.

$$\lg 2.4 + \lg 1250 - \lg 3 + 2 \quad (3 \text{ marks})$$

(ii) If $\lg 3 = 0.4771$ and $\lg 5 = 0.6990$ find the value of $\lg 150$

(2 marks)

(iii) If $3^{x+1} = 9^{x-2}$ find the value of x (2 marks)

(iv) simplify and keep the answer in a positive index form

$$(x^{-4})^{\frac{1}{2}} \times \frac{1}{\sqrt{x^{-3}}}$$

(3 marks)

(2)(a) A conical shape metal solid with base radius r and height $2a$ is melted to form 16 equal solid spheres with radius a , without any wastage of metal. Show that $r = 4\sqrt{2}a$. (4 marks)

(b) If $a = 0.73\text{m}$, find the value of " r " to the first decimal place. (6 marks)

(3) (i) Express $\sqrt{48}$ as a surd. (1 marks)

(ii) Express $7\sqrt{3}$ as an entire surd. (1 marks)

(iii) Simplify. $7\sqrt{3} + \sqrt{108} - \frac{6}{\sqrt{3}}$ (4 marks)

(iv) If $\sqrt{2} = 1.41$ and $\sqrt{5} = 2.24$ Find the value $\frac{2}{\sqrt{2}} + \frac{5}{\sqrt{5}}$ (4 marks)

(4) (i) write the expansion of $\left(x - \frac{1}{x}\right)^3$ (2 marks)

(ii) If $x - \frac{1}{x} = 7$,Find the value of $x^3 - \frac{1}{x^3}$ (3 marks)

(iii) Using the expansion of $(a+b)^3$, Find the value of 104^3 (3 marks)

(iv) Fill in the blanks using suitable values.

$$x^2 + 8x + \dots = (x + \dots)^2$$

(2 marks)

(5) (i) Find the L . C . M of the following expressions.

$$x^2 - 9, x^2 - x - 6, 4x + 8$$

(3 marks)

(ii) Simplify $\frac{1}{x^2-9} + \frac{1}{x^2-x-6} - \frac{2}{4x+8}$

(3 marks)

(iii) Simplify $\frac{x^2-16}{x^2+9x+20} \div \frac{x-4}{x^2-x-30}$ (4 marks)