

- Which of the following is a factor of $5 - 7x - 6x^2$?
A. $2x + 1$ B. $3x - 5$ C. $2x - 1$
D. $2 - x$ E. $3x + 1$
- Find the value of $(8a^3)^{2/3}$
A. $4a^2$ B. $2a^6$ C. $8a^3$ D. $2a^2$ E. $8a^2$
- In a right angled triangle, two of the angles are in the ratio 6:13. Find the third angle.
A. 30° B. 45° C. 60° D. 75° E. 90°
- The sum of the interior angles of a convex polygon is seven times the sum of the exterior angles. Find the number of sides of the polygon.
A. 10 B. 12 C. 14 D. 16 E. 18
- Given that x varies inversely as the cube of y and that $x = 240$ when $y = 3$ find x when $y = 2$.
A. 240 B. 360 C. 480 D. 730 E. 810
- The energy E possessed by a moving object of mass m and velocity v varies as its mass and the square of its velocity. What would be the percentage change in energy when v is increased by 20% and m is decreased by 15%?
A. 12.5% B. 16.2% C. 21.7%
D. 22.4% E. 24.6%
- Calculate the area of a triangle whose lengths are 6cm, 8cm and 10cm respectively.
A. 24cm^2 B. 32cm^2 C. 36cm^2
D. 22cm^2 E. 20cm^2
- A closed rectangular box $7\frac{1}{2}\text{cm}$ long 7cm wide and $2\frac{3}{4}\text{cm}$ deep has the same volume as a closed circular cylinder of height 15cm . Calculate the radius of the cylinder.
A. $1\frac{3}{4}\text{cm}$ B. $1\frac{1}{2}\text{cm}$ C. $2\frac{3}{4}\text{cm}$
D. $2\frac{1}{3}\text{cm}$ E. $3\frac{1}{4}\text{cm}$
- Two towns A and B are located on $(11.9^\circ\text{N}, 13.3^\circ\text{E})$ and $(11.9^\circ\text{N}, 15.7^\circ\text{W})$ respectively. Calculate the shortest distance measured along the parallel of latitude on which A and B lie.
A. 2466km B. 2864km C. 3136km
D. 3170km E. 6263km
- The area of a rhombus is 16cm^2 and one diagonal is double the other in length. Find the sum of the two diagonals.
A. 4cm B. 8cm C. 12cm
D. 14cm E. 16cm
- The ratio of the areas of two spheres is 1:4. If the smaller sphere has a radius of 5cm, find the radius of the larger sphere.
A. 20cm B. 18cm C. 12cm
D. 10cm E. 8cm
- The distances and bearings of ports A and B from point P are $(3\text{km}, 025^\circ)$ and $(20\text{km}, 295^\circ)$ respectively. Calculate the distance /A B/ between the two ports to the nearest km.
A. 17km B. 20km C. 23km
D. 26km E. 30km
- In a game involving the throwing of two dice, the winning scores are 11 and 12. Find the probability of obtaining the winning score.
A. $\frac{1}{36}$ B. $\frac{1}{18}$ C. $\frac{1}{12}$ D. $\frac{1}{6}$ E. $\frac{1}{3}$
- In an AP, the difference between the 8th and the 4th terms is 20 and the 8th term is $1\frac{1}{2}$ times the fourth term. What is the common difference?
A. 2 B. 3 C. 4 D. 5 E. 6
- Using the information in 14 above, find the first term.
A. 10 B. 12 C. 15 D. 20 E. 25

16. Express 111111_2 in octal.
A. 11_2 B. 22_3 C. 55_4 D. 66_5 E. 77_8
17. Which of the following numbers is not a prime?
A. 23_{four} B. 23_{five} C. 23_{six}
D. 23_{seven} E. 23_{eight}

The following Simultaneous equations are written in base two.

$$11x + 10y = 10001$$

$$10x - y = 10$$

Solve the equations leaving your answers in base two.

Use the information above to answer questions 18 and 19.

18. The value of x is
A. 10 B. 11 C. 110 D. 101 E. 100
19. The value of y is
A. 10 B. 11 C. 101 D. 110 E. 100
20. Given that $3 \times 9^{1+x} = 27^{-x}$. Find the value of x .
A. $-\frac{3}{5}$ B. $\frac{3}{5}$ C. $\frac{2}{5}$ D. $-\frac{2}{5}$ E. $\frac{1}{5}$
21. Find the value of x if
 $\log_{10} 7 + \log_{10} (3x + 2) - \log_{10} (2x - 1) = 1$
A. 16 B. -18 C. 18 D. -20 E. -24
22. If $A = \{x: 3 < x < 15\}$.
What is the cardinality of the above set?
A. 0 B. 1 C. 3 D. 12 E. 15
23. Malam Bako received N4920 as total salary for x months. After his monthly salaries were doubled he received N6150 as total salary for $(x-3)$ months. Find x .
A. 5 B. 6 C. 7 D. 8 E. 9
24. The lengths of the sides of a right angle triangle are x cm, $(3x - 1)$ cm and $(3x + 1)$ cm. Find the value of x .
A. 8 B. 10 C. 12 D. 14 E. 16
25. An arc of a circle of radius 14cm is 11cm long. Find the angle which the arc subtends at the centre of the circle.
A. 30° B. 45° C. 56° D. 60° E. 65°
26. If the circumference of a parallel of latitude is 25,000km, what is its latitude? ($R = 6400$ km)
A. 45.4° B. 50.2° C. 51.6° D. 54.1° E. 55.2°
27. By sailing 800km due East, a ship alters its longitude by 10° . Find its latitude. ($R = 6400$ km)
A. 38.1° B. 42.6° C. 44.3° D. 48.7° E. 50.2°
28. The area of a parallelogram is 513cm^2 and the height is 19cm. Calculate the base.
A. 25cm B. 27cm C. 29cm D. 34cm E. 37cm
29. The area and a diagonal of a rhombus are 60cm^2 and 12cm respectively. Calculate the length of the other diagonal.
A. 6cm B. 7cm C. 8cm D. 9cm E. 10cm
30. A Cylinder of base radius 4cm is open at one end. If the ratio of the area of its base to that of its curved surface is 1:4, calculate the height of the cylinder.
A. 5cm B. 9cm C. 7cm D. 6cm E. 8cm
31. A cone is 14cm deep and the base radius is $4\frac{1}{2}$ cm. Calculate the volume of water that is exactly half the volume of the cone.
A. 126.5cm^3 B. 134.3cm^3 C. 148.5cm^3
D. 153.2cm^3 E. 160.5cm^3
32. In a given regular polygon, the ratio of the exterior angle to the interior angle is 1:3. How many sides has the polygon?
A. 7 B. 8 C. 9 D. 10 E. 12
33. ABCD is a cyclic quadrilateral and the diagonals AC and BD intersect at H. If angle $\text{DAC} = 41^\circ$ and angle $\text{AHB} = 70^\circ$, calculate angle ACB.
A. 21° B. 25° C. 27° D. 29° E. 34°
34. If the shadow of a pole 7m high is $\frac{1}{2}$ its length, what is the angle of elevation of the sun, correct to the nearest degree?
A. 45° B. 59° C. 62° D. 63° E. 71°
35. Musa cycled for x km and then walked for $\frac{1}{2}$ hour at a rate of 6km/h. At the end of that time he had gone 10km altogether. Find value of x .
A. 5 B. 6 C. 7 D. 8 E. 9

36. Mrs Okon drives 5km north from her home and then 10km on a bearing of 060° to the market. How far is the market to her home to the nearest km?
 A.8km B.10km C.13km
 D.15km E.16km
37. The ages in years of the four children of Mr.Obi are 8,10,10 and 12. Find the standard deviation of their ages.
 A.1.4 B.3.8 C.4.5 D.5.6 E.6.2
38. What is the standard deviation correct to 2 decimal places of a distribution whose variance is 6.27 ?
 A.2.50 B.2.64 C.2.87
 D.3.02 E.3.65
39. If the roots of $(x-1)(x-2) = k$ are equal, find the value of k.
 A. 0 B. 1 C. $\frac{1}{2}$ D. $-\frac{1}{2}$ E. $-\frac{1}{4}$
40. Find the minimum value of the function, $2x^3 - 6x^2$
 A.- 4 B.- 6 C.- 8 D.- 9 E.-10

PART 2

1. Three Cowbell depots P, Q and R are such that P to Q is 50km, P to R is 90km. The bearing of Q from P is 075° and the bearing of R from P is 310° .
- (a) Find the distance between Q and R.
 (b) Find the bearing of R from Q.
- 2(a) Draw the graph of $y = x^2 - 2x - 3$, $y = -2$ and $y = x$.
- (b) Use the graph to find approximate solutions to the following equations.
- (i) $x^2 - 2x - 3 = -2$
 (ii) $x^2 - 2x - 3 = x$
 (iii) $x^2 - 2x - 3 = 0$