PAPER III

Answer **all** questions.

Each question is followed by **five** options lettered **A** to **E**. Choose the correct option for each question and shade in **pencil** on your answer sheet the answer space that bears the same letter as the option you have chosen. Give only **one** answer to each question and erase completely any answer you wish to change. Do **all** rough work on this question paper.

An example is given below:

The product of three numbers is 3876. Two of the numbers are 17 and 19. What is the third number?

A 57
B 12
C 6
D 3
E 2

The correct option is "12" which is lettered **B**. Therefore, answer space **B** would be shaded as shown below:

[A] [B] [C] [D] [E]

1. Find the midpoint of a line joining the points A(2, 2) and B(6, 4).

A. (2, 3)
B. (4, 5)
C. (4, 3)
D. (5, 3)
E. (3, 2)

2. Evaluate $\frac{\log 8}{\log \frac{1}{4}}$.

A. $\frac{2}{3}$

B. $\frac{2}{5}$

C. $\frac{3}{2}$

D. $\frac{-3}{2}$

E. $\frac{-2}{3}$

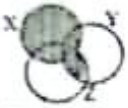
3

4. Which of the following describes $X \cap (Y \cup Z)'$

A. 

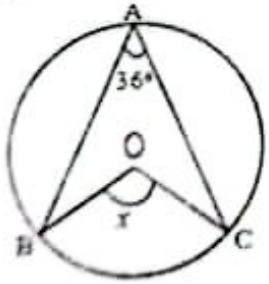
B 

C 

D. 

E. 

5. Find the value of x in the figure below, where O is the centre of the circle.



A. 38°
B. 48°
C. 72°
D. 44°
E. 18°

6. Find the 12th term of the sequence 20, 16, 12, 8, ...

A. −24
B. 20
C. 10
D. −12

6. If $J \propto \left(3 + \frac{Q}{z}\right)$, which of the following statement is true? J

A. varies directly as Q
B. is partly constant and partly varies as Q
C. varies directly as 3 and inversely as Q
D. varies jointly as 3 and directly as Q
E. varies inversely as Q

7. Given that log3 = 0.4771, evaluate log243 without using tables.

A. 1.3855
B. 2.3255
C. 0.4755
D. 2.3855
E. 2.0855

8. Consider the truth table below:

P	Q	Y
T	T	T
T	F	F
F	T	F
F	F	T

Which of the following represents Y?

A. $P \Leftrightarrow Q$
B. $\sim(P \wedge Q)$
C. $P \vee Q$
D. $\sim(P \vee Q)$
E. $P \wedge Q$

9. Solve the simultaneous equations:
$2x + y = 4$
$3x - y = 1$

A. $x = -1, y = 2$
B. $x = 1, y = 1$
C. $x = 1, y = -2$
D. $x = 1, y = 2$
E. $x = -1, y = -2$

10. Points X and Y are 30 km due north and 11 km due east of point O respectively.
What is the bearing of Y from X, correct to the nearest degree?

A. 020°
B. 160°
C. 135°
D. 180°
E. 060°

11. Evaluate $1100l_{two} + 1111_{two} - 1011_{two}$

A. 11001_{two}
B. 101000_{two}
C. 101001_{two}
D. 1011_{two}
E. 1101_{two}

12. A bag contains 3 green and 2 brown identical balls. If 2 balls are picked at random from the bag one after the other without replacement, find the probability that they are of the same colour.

A. $\frac{2}{5}$
B. $\frac{1}{4}$
C. $\frac{1}{2}$
D. $\frac{3}{10}$
E. $\frac{7}{10}$

13. An aircraft flies from Q (25°N, 38°E) to R (72°S, 38°E). Calculate the distance QR along the line of longitude, correct to the nearest kilometre.
(Take $R = 6,400$ km, $\pi = \frac{22}{7}$)

A. 10,839
B. 29,839
C. 9,810
D. 3,930
E. 1,039

14. Find the radius of a hemisphere whose volume is $\frac{99}{14}$ cm^3.
(Take $\pi = \frac{22}{7}$)

A. $2\frac{1}{4}$ cm
B. $1\frac{1}{2}$ cm
C. $3\frac{1}{6}$ cm
D. $1\frac{1}{3}$ cm
E. $\frac{2}{3}$ cm

15. The table below shows the scores obtained by 20 students in a Mathematics test.

Scores	8	10	12	15	18	20
No. of Students	3	5	6	3	2	1

Find the modal score.

A. 12
B. 20
C. 18
D. 15
E. 10

16. Simplify $(32x^5)^{-\frac{1}{5}}$

A. $\frac{1}{2x}$

B. $\frac{1}{2x^5}$

C. $\frac{1}{32x^5}$

D. $\frac{1}{32x^2}$

E. $\frac{1}{18x^2}$

17. The probability that T and K pass an examination are $\frac{3}{4}$ and $\frac{2}{3}$ respectively. Find the probability that both of them fail the examination.

A. $\frac{1}{7}$

B. $\frac{1}{3}$

C. $\frac{1}{13}$

D. $\frac{1}{12}$

E. $\frac{1}{4}$

18. A flagpole of length 26.54 m was measured by a student as 26.45 m. Calculate the percentage error, correct to 2 decimal places.

A. 0.09
B. 1.37
C. 0.33
D. 1.40
E. 0.34

19. Find the value of y in the figure below.

A. 54°
B. 124°
C. 110°
D. 70°
E. 56°

20. Express the product of 0.016 and 3.54 in standard form.

A. 5.664×10^{1}
B. 5.664×10^{-3}
C. 5.664×10^{-5}
D. 5.664×10^{2}
E. 5.664×10^{-1}

21. If p varies inversely as the square root of $(m + 2)$ and $p = 12$ when $m = 7$, find m when $p = 6$.

A. 34
B. 9
C. 36
D. 18
E. 6

22. If the surface area of a sphere is 210 cm^2, find the radius correct to one decimal place.
(Take $\pi = \frac{22}{7}$)

A. 4.1 cm
B. 2.0 cm
C. 5.0 cm
D. 3.5 cm
E. 4.5 cm

29. If $\begin{vmatrix} 4 & x \\ 5 & 3 \end{vmatrix} = 42$, find the value of x.

A. 6
B. 4
C. -6
D. 8
E. 11

30. Two fair dice are tossed together once. Find the probability that the sum of the outcome is at least 10.

A. $\frac{1}{8}$
B. $\frac{1}{9}$
C. $\frac{1}{6}$
D. $\frac{1}{5}$
E. $\frac{1}{4}$

31. If y varies inversely as x^2 and $y = 20$ when $x = 4$, find y when $x = 8$.

A. 80
B. 5
C. 10
D. 40
E. 20

32. A right circular cone of base radius 6 cm is 8 cm high. Find the volume of the cone, correct to two significant figures.
(Take $\pi = 3.142$)

A. $300\ cm^3$
B. $220\ cm^3$
C. $200\ cm^3$
D. $210\ cm^3$
E. $320\ cm^3$

33. The quadratic equation whose roots are $\frac{7}{4}$ and $\frac{-1}{2}$ is

A. $8y^2 - 10y - 7 = 0$
B. $y^2 - 10y - 7 = 0$
C. $8y^2 - 10y + 7 = 0$.
D. $8y^2 + 10y - 7 = 0$.
E. $4y^2 - 5y + 7 = 0$.

34. Find the area bounded by the curve $y = x^2 + \frac{1}{x^2}$, x-axis and the ordinates $x = 2$ and $x = 3$.

A. $9\frac{1}{3}$ square units
B. $6\frac{1}{2}$ square units
C. $2\frac{5}{6}$ square units
D. $12\frac{1}{6}$ square units
E. $15\frac{5}{6}$ square units

35. Given that $P = \begin{pmatrix} -2 & 1 \\ 3 & 4 \end{pmatrix}$ and $Q = \begin{pmatrix} 5 & -3 \\ 2 & -1 \end{pmatrix}$, find the value of $2P + Q$.

A. $\begin{pmatrix} 8 & 6 \\ 2 & -4 \end{pmatrix}$
B. $\begin{pmatrix} 4 & 7 \\ -1 & 1 \end{pmatrix}$
C. $\begin{pmatrix} -4 & 2 \\ 6 & 8 \end{pmatrix}$
D. $\begin{pmatrix} -1 & 1 \\ 7 & 4 \end{pmatrix}$
E. $\begin{pmatrix} 1 & -1 \\ 8 & 7 \end{pmatrix}$

36. Find the range of values of x for which $4 + x \leq 7$ and $13 + x \geq 8$ are both satisfied.

A. $-3 \leq x \leq 5$
B. $-3 \leq x \geq 5$
C. $-5 \leq x \leq 3$
D. $5 \leq x < 3$
E. $-5 \leq x \geq 3$

37. Find the minimum value of the curve $y = 3x^2 - 3x$.

A. $\frac{-1}{2}$
B. $2\frac{1}{4}$
C. $\frac{1}{2}$
D. $\frac{-3}{4}$
E. $\frac{3}{4}$

38. If a number is chosen at random from the set $\{x: 7 \leq x \leq 19\}$, find the probability that it is a multiple of 3 or 4.

A. $\frac{9}{13}$
B. $\frac{6}{13}$
C. $\frac{11}{13}$
D. $\frac{7}{13}$
E. $\frac{5}{13}$

39. Simplify $\frac{3}{\sqrt{3}}\left(\frac{2}{\sqrt{3}} - \frac{\sqrt{12}}{6}\right)$.

A. 1
B. 5
C. 3
D. $\frac{6-\sqrt{3}}{3}$
E. $\frac{6+\sqrt{3}}{3}$

40. Find the equation of a straight line passing through the points M(3, 3) and N(2, 1).

A. $y = 4x - 11$
B. $y = 4x - 9$
C. $y = 4x + 9$
D. $y = -4x - 9$
E. $y = 4x + 11$

41. Find the value of k^2 if $2x^2 + kx + 3 = 0$ has equal roots.

A. 24
B. 25
C. 29
D. 6
E. 14

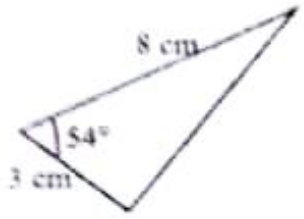
42. A chord of a circle subtends an angle 120° at the centre with radius 6 cm. Find the area of the minor segment, correct to three significant figures. $\left(Take\ \pi = \frac{22}{7}\right)$.

A. 22.1 cm²
B. 53.3 cm²
C. 37.7 cm²
D. 113.0 cm²
E. 15.6 cm²

43. Solve the equation $2x^2 - 32 = 0$.

A. $x = 0$ or -4
B. $x = 4$ or -4
C. $x = 2$ or -4
D. $x = 0$ or 2
E. $x = -2$ or 4

44. Find the area of the figure below, correct to one decimal place.



A. 14.1 cm²
B. 19.4 cm²
C. 7.1 cm²
D. 16.5 cm²
E. 9.7 cm²

45. Determine the equation of the line.

A. $y = -8x$
B. $y = -6x$
C. $y = 3x$
D. $y = 6x$
E. $y = -3x$

46. The radius of a sphere is $5\frac{1}{4}$ cm. Calculate its volume, correct to one decimal place. (Take $\pi = \frac{22}{7}$)

A. 303.2 cm³
B. 606.4 cm³
C. 115.5 cm³
D. 1212.8 cm³
E. 2425.5 cm³

47. A man deposited a sum of ₦45,000.00 in a bank at 3% simple interest. Calculate the amount at the end of 7 years.

A. ₦54,450.00
B. ₦64,450.00
C. ₦44,450.00
D. ₦63,900.00
E. ₦35,550.00

48. A laptop costs ₦180,000.00. If its value depreciates by 27% in the first year and 24% the second year, find its value after 2 years.

A. ₦99,864.00
B. ₦48,600.00
C. ₦31,536.00
D. ₦131,400.00
E. ₦80,136.00

49. Find the differential coefficient of $\frac{2x}{x+1}$ with respect to x.

A. $\frac{2x}{(x+1)^2}$
B. $\frac{3}{x+1}$
C. $\frac{1}{(x+1)^2}$
D. $\frac{2}{(x+1)^2}$
E. $\frac{2}{x+1}$

50. Solve for x in the equation $\frac{1}{x} + \frac{2}{3x} = \frac{1}{6}$.

A. 5
B. −5
C. 10
D. −10
E. −3

58. The perpendicular height of a triangle is 12 cm and its area is at most 120 cm^2. Determine the possible values of the base.

A. $b = 20$ cm
B. $b > 20$ cm
C. $b \leq 20$ cm
D. $b < 20$ cm
E. $b \geq 20$ cm

59. if $x = -2$, $y = 6$ and $z = 3$, evaluate $\frac{x^2(y+z)}{2y-2z}$.

A. 6
B. 3
C. 7
D. 11
E. 9

60. The figure shows how a man spends his annual income. Use the information to answer question that follow.

Calculate the total sectorial angle representing transport and savings, to the nearest degree.

A. 83
B. 100
C. 101
D. 108
E. 115