22. What is the exact value of the log	garithm of 8 to base 64	?
A) 2 B) ½	C) 6	D) 8
23. Expressing $1 + \log_{10} 3$ as a sing	gle logarithm gives:	
A)log ₁₀ 30 B) log ₁₀ 3	C) log ₁₀ 4	D)
$\log_{10}\left(\frac{3}{10}\right)$		
24. An AP has 12terms. If its 5 th terr	n is 7 and it's commor	n difference is 6,
then the sum of the AP is:		
A) 300 B) 396	C) 192	D) 196
25. The limits of $\frac{x^3 - 3x^2 + 3}{x - 1}$ at 1 is: A	A) 0 B) 12 C) -3	D) 3
λ-1		
COMPETITIVE ENTRANCE	2	013 SESSION
Department: Civil Engineering and Forestry Techniques, Electrical and Power Engineering,		
Mechanical Engineerin	ng and Computer Science	
Paper 2: <u>Mathematics</u>	Du	aration 3hours
1. The value of x given that $32^x = 0$	0.25 is	
A: 2/5 B: 5/2	C: -2/5 D:	4
2. The eight term of the geometric se	equence is 256. If the f	irst member of the
sequence is 2 then common ratio i	s:	
A:2 B:7	C: 128 D: 4	
3. Given the function $f: x \to \frac{2x}{4-3x}; x$	$\epsilon \mathbb{R} - \left\{\frac{4}{3}\right\}$. The range is	A: R-{4/3}. B:R-
{2/3}. C: R-{-3/21}. D: $x \in \mathbb{R}$		
4. The set of values for x for which ((x-3)(x-4) < (x-4)	- 3) is
A: x < 4 B: x > 4	C: $5 < x < 3$ D: $3 < 3$	< x < 5
5. The complex number $Z = \frac{2-i}{1-i}$ can be reduced to the form $x + iy$, where x		
and y are real numbers. Then the values of x and y are;		
A: 3/2 and 1/2 B: 1/2 and	d -3/C: -1/2 and -3/2	D: 3/2 and ¹ / ₂
6. $\int_0^2 \frac{x}{1+x^2} dx$ is		
A: $\ln(1/5)$ B: $\ln(5/2)$ C: $\ln(\sqrt{5})$	b) D: $\ln(5^2)$	
7. The sequence whose nth term is g	iven by $S_n = n(2n + 1)$	1) is A: a GP B:
an AP C: an infinite sequence	D: a finite sequenc	e
8. The coordinates of the point on in	flexion of the curve $f($	$(x) = x^4 - 4x^3$ are;
A: (3, -27) B: (0,0) C: D: (3,2)	27)	
9. i^{1003} is A: 1 B: i C: -i	D: -1	
10. If $\log_5 3 = x$, then the value of 62	25^x is A: 12	B: 81 C:
64 D: 60		
11. $\lim_{x \to 1} \left(\frac{x^3 - 1}{x - 1} \right)$, where $x \neq 1$ gives		

A: 0 B: 3 C:
$$\infty$$
 D: -3
12. Given the Cartesian equation of the line as $\frac{x-5}{7} = \frac{y+4}{7} = \frac{z-6}{2}$ then the line passes through the point; A: (5, -4, 6) B: (3, 7, 2) C: (-5, 4, -6)
D: (5/3, -4/3, 3)
13. The equation $x^2 - 12x + k + 3 = 0$, has real roots, the range of values of k are;
A: $-2 \le x \le 6$ B: $k \le 2 \cup k \ge 6$ C: $k < -2 Uk < 6$ D: $k < -2 \cap k > 6$
14. If $\frac{dy}{dx} + 5 = 6x$ at A(2,1), then the expression of y in terms of x will be
A: $y = 3x^2 - 5x - 1$ B: $y = 6x - 5$
C: $y = 12/5$ D: $y = 6x^2 - 5$
15. Given that the parametric equations of a curve are $x = \frac{1}{t-1}$ and $y = \frac{1}{t+1}$ then the gradient of the curve at the point where $t = 2$ is;
A: -1 B; 1/9 C: 1 D: 1/3
16. The number of ways in which we can arrange the letters of the word "
NDOMBOLO" is;
A: 40320 B: 33 C: 6720 D: 8
17. The term independent of x in the expansion of $(2x - \frac{1}{x^2})^6$ is A:2 B: 15
C:16 D:240
18. How many 4digits numbers can be formed from the numbers 1, 2, 3, 4 and 5
if repetition is not allowed?
A: 625 B: 256 C: 120 D: 24
19. The oblique (skew) asymptote of the curve $y = \frac{2x^2 + x^2}{2(x^2 - 1)}$ is A: $y = x+2$ B: $y = x$
 x C: $y = x+1/2$ D: $y = 2x+1$
20. The value of $\sum_{r=1}^{\infty} 4(1/3)^r$ is:
A: 2 B: 4 C: 3 D: 4/3
21. If $y = \ln x^7$, then $\frac{d^2y}{dx^2}$ is
A: 7/x B: $-7/x^2$ C: $-7/x$ D: $7/x^2$
22. Given the geometric series $\frac{x}{x-3} + 1 + \frac{x-3}{x} + \cdots$ The range of values of x for the series is convergent is
A: $x > 3$ B: $x < C$: $x > 3/2$ D: $x < 3$
23. If $cost = -\frac{1}{2}$ then the general solution is A: $2n\pi \pm \frac{2\pi}{3}$ B: $2n\pi \pm \frac{2n\pi}{3}$
C: $2n\pi - \frac{2n\pi}{3}$ D: $2n\pi \pm \frac{\pi}{3}$

24. The direction of the vector $\vec{a} = -3\vec{\iota} + 5\vec{\jmath}$ is A: 59^o B: -59⁰ $C:120^{0}$ **D:** 31⁰ 25. If $x^3 + y^3 = 10$, then $\frac{dy}{dx}$ at the point (1,1) is C: ½ **D:** 2 A: 1 **B:-1** 26. A committee of 4boys and 5girls is to be selected from a group of 8boys and 9girls. In how many ways can this Committee be formed? A: 8820 ways B: 196ways C: 24310 ways D: 2ways 27.An even function is symmetrical about : 28.A: the line y = x B: the origin C: the y -axis C: the x -axis 29. If f(x) = 0 has a solution at x = T, then A: f(T) > B: f(T) < 0 C: f(T) = 0 D: f(T) < 030. The length of the vector $2\vec{i} - 4\vec{j} - 4\vec{k}$ is C: +6 **D: 6** A: 36 **B:** +36 31. The arg. of z if $z = -\sqrt{3} - i$ is A: $\frac{\pi}{6}$ B: $\frac{7\pi}{6}$ C: - $\frac{5\pi}{6}$ 32. Given that P(A) = 1/4 and $P(A \cup B) = 1/3$, if the evens A and B are independent, then P(B) B: 1/9 C: ³/₄ Is A: 1/22 D: 2/3 33. The upper quartile of a distribution is A: The value below which 25% of the distribution lies B: The value above which 25% of the distribution lies C: The value above which 50% of the distribution lies **D**: The value below which 50% of the distribution lies 34. The discrete random variables X and Y has a probability mass function defined by P(X - x) = c(3 - x);x = 0, 1, 2, 3. The value of the constant c is; A: 5/6 B: 1/2 C: 2/3 D: 1/6 35.12 numbers are such that is 72. Another set of 8 numbers is such that their sum is 80. The mean of the combined set of 20 numbers is B:7 C: A: 75 38/5 **D: 8** 36.A bag contains 4red balls and 5yellow balls. Two balls are randomly drawn from the bag without replacement, one after the other . what is the probability that both balls are of the same color? **B: 5/18** C: 1/20 D:4/9 A: 5/9 36. Two random variables X and Y are such that $\overline{X} \sim N(30,3)$ and $\overline{Y} \sim N(30,3)$ N(40, 5). The distribution of $4\overline{X} - 2\overline{Y}$ is A: N(40, 28) B: N(40, 68) C: N(200,4) D: N(40, 22)

37. A random variable has a probability density function $f(x) = 3x^k$ if $0 \le x \le 1$ and f(x) = 0 otherwise. The value of the constant k is A: 1/2 B: 4 C:2 D: 1/3

38.A panel of two judges conducted and interview for 7 children and their respective ranking orders revealed that $\sum d^2 = 48$. Spearman's coefficient of rank correlation is

A: 6/7 B: 42/7 C: 1/7 D: 3/7

39.Linear regression is defined as

A: The straight line regression

B: The measure of the degree of relationship between two variables C: The process of estimating one variable corresponding to a given value of another

variable.

D: A function that relate two variables.

40. The power of a statistical test is

A: The probability of rejecting a false hypothesis

B: The probability of not rejecting a false hypothesis

C: the probability of committing a type 1 error

D: The probability of committing a type 2 error