COMPETITIVE ENT	2014						
	SESSION	J					
Department: Civil Engineering and Forestry Techniques, Electrical and							
Power Engineering	, Mechanical Engin	eering and Co	omputer Sci	ience			
Paper 2: Mathematic	s cycle Op	tion. ALL	Duration	3hours			
1 If $\left \frac{2x+5}{2x+5}\right < 1$ then t	<u>-</u> be set of values of <i>r</i>	that satisfies it	t is.				
$ x_{-1} < 1$, then t	$\frac{1}{2} = \frac{1}{2} = \frac{1}$		4				
A) $-3 < x < 4$	B) $-18 < x < -4$	4 C) $-6 <$	$x < \frac{-}{3}$ D	x < x < x			
$\frac{4}{3}$ and $x < -6$							
2. The value of x if 32	$2^{x} = 0.25$ is						
A) $\frac{2}{3}$	B) $\frac{5}{2}$	C) $\frac{2}{5}$		D)			
4							
3. $f(x) \equiv x^3 - 2x^2 - $	-11x + 52 is exactl	y divisible by:					
A) $x - 5$	B) $x + 4$	C) $5x -$	6	D)			
x - z	a 1 than a	ia					
4. $\prod_{x=4}^{3} \left(\frac{1}{(x-4)(x-1)} \right) = \frac{1}{3}$	$\frac{1}{(x-4)} - \frac{1}{3(x-1)}$ then a						
A) 1 r^3	B) - I 1 27	C) 4		D) -4			
5. If $\frac{x}{(x+1)(x-3)} = px + \frac{x}{(x+1)(x-3)} = px $	$+ p + \frac{1}{4(x+1)} + \frac{27}{4(x-3)}$	then p and q a	re respectiv	ely:			
A) 1, 2	B) 2, 1	C) -2, 1		D) 1, -2			
6. $x = 3 - tan\theta$, $y = 9$	$3\cos\theta$ in terms of x	and <i>y</i> only:	9				
A) $y^2 = \frac{y}{x^2 - 6x + 10}$	B) $y^2 = \frac{y}{x^2 + 6x + 1}$	$\frac{1}{0}$ C) y =	$\frac{y}{x^2-6x-10}$	D)			
$y = \frac{9}{r^2 - 6r + 10}$							
7. The point $(-1,2)$ on	the curve $x = t$, $y =$	$t^3 - 3t$ and i	s:				
A) Minimum point	B) maximum poi	int C) poin	t of inflexio	n D) none			
of these.	0 are answer using t	ha data on qua	stion 8				
8. A particle of mass r	nkg falls from rest u	nder gravity in	a medium v	which the			
resistance is of mag	nitude $\frac{mgv^4}{mgv^4}$ where v	is the speed of	the narticle	and c is a			
constant. The time	the particle takes to	is the speed of	$c^{c} m a^{-1} i$				
			$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	s. 71\]			
A) $t = \frac{c}{2g} \left[\ln 3 + 2t \right]$	$\tan^{-1}\left(\frac{1}{2}\right)$	B) $t = \frac{c}{2g} \left[\ln 2 \right]$	$2 + 3tan^{-1}$	$\left(\frac{1}{2}\right)$			
C) $t = \frac{c}{2\pi} \left[\ln 3 + 2t \right]$	$\tan^{-1}\left(\frac{1}{2}\right)$	D) $t = \frac{c}{4\pi} \left[\ln t \right]$	$3 + 2tan^{-2}$	$\left(\frac{1}{2}\right)$			
δyL	(27)	4 <i>9</i> L		\ 4 / J			

9. If g = 10 and c = 2, the time for the speed $\frac{c}{2}ms^{-1}$ to be obtained will now be: B) 8.08 C) 1.48 A) 5.48 D) 2.78 10. $\int_0^{-2} \frac{1}{1-x} dx$ is A) not possible B) $-\ln 3$ C) ln 3 D) $-\frac{1}{2}\ln 3$ 11. $\int_0^1 \frac{1}{1+a^2x^2} dx = \frac{\pi}{4}$ Then the value of a is: A) 1 B) -1 C) $\frac{\pi}{4}$ D) $-\frac{\pi}{4}$ 12. $\int sin^4 \theta d(sin\theta)$ is the same as integrating wrt θ is: C) $sin^3\theta cos\theta$ A) $sin^4\theta cos\theta d\theta$ B) sin⁵θcosθ D) none of the above 13. The eight term of a GP is 256 and the first term is 2, its common ratio is D) 128 A) 7 B)2 C) 128 14. A group of 2 boys and 3 girls is to be chosen from 5boys and 4girls. If one girl refuses to serve in the same committee as one particular boy, the number of possible groups are: B) 12 C) 10 A) 40 D) 28 15. Which of the following is not an equation of a circle? A) $x^2 + y^2 - x = 0$ B) $x^2 + 2y^2 + x - 2y = 0$ C) $3x^2 + 3y^2 = 1$ D) $x^2 + y^2 - 6x - 8y = 2$ 16. When two circles with centers C_1 and C_2 and radii r_1 and r_2 respectively When two encircles touch externally C_1C_2 is B) $r_1 + r_2$ A) $r_1^2 + r_2^2$ C) $|r_1 - r_2|$ D) $r_1 r_2$ 17. If z is any cube root of unity, the value of $z^2 + z$ is **B**) 0 A) 1 C) -1 D) 2 18. The sum to infinity of a GP is 5times its first term. The common ratio is: A) 1 B) 1/5 C)-4 D) 4/5 19. The Cartesian equation of the curve defined parametrically by x = $2sin\theta$, $y = cos^2\theta$ is: A) $4y + x^2 - 4 = 0$ B) $y + 4x^2 - 4 = 0$ C) $4y^2 + x^2 - 4 = 0$ D) $v^2 + x^2 = 0$ 20. The probability function of a discrete random variable X is given by: f(x) = K(3x + 1), x = 0, 1, 2, 3.The value of K is: A) 1/11 B) 1/22C) 1/44 D) 1/24

21. $E(X)$ is:	A) 24/11	B) 44/22	C) 43/22	D)
22. What is th A) 2 23. Expressin	e exact value of B) $\frac{1}{2}$ g 1 + log ₁₀ 3 a	f the logarithm of 8 t C) 6 as a single logarithm	to base 64? in gives:	D) 8
A) $\log_{10} 3$	$B = B \log_{10}$, 3 C) l	og ₁₀ 4	D)
$\log_{10}\left(\frac{1}{10}\right)$ 24. An AP ha	s 12terms. If its um of the AP is	5 th term is 7 and it'	s common differen	nce is 6,
A) 300	B) 39	6 C) 1	92	D) 196
25. The limits	s of $\frac{x^3 - 3x^2 + 3}{x - 1}$ at	1 is: A) 0 B) 12	C) -3	D) 3