

JK Lakshmipat University Jaipur

INSTITUTE OF ENGINEERING AND TECHNOLOGY

Theory Backlog Examination-III, December 2023
BCA, Semester I

Roll No.....

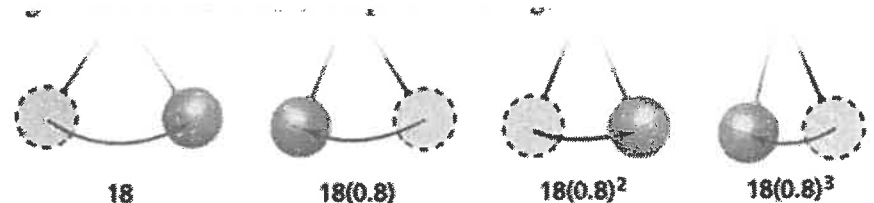
AS1104: Mathematics

Time: 2 hours

Max. Marks: 30

Instructions to students:

1. Do not write anything other than your roll number on the question paper.
2. Use of calculator is not allowed. Be Neat! Be Legible!!All the Best!!!

Q.1	Find the inverse function $f(x) = \frac{(3x+2)}{(x-1)}$	1.5 (CO1)
Q.2	If $f(x) = 4x^2 - 1$ and $g(x) = 1 + x$. Find $f \circ g(x)$ and $g \circ f(x)$. Also, check whether. $f \circ g(x) = g \circ f(x)$	1.5 (CO1)
Q.3	Express $5^3 = 125$ in logarithm form. Then, find x if $\log_5(x - 7) = 1$.	1.5 (CO2)
Q.4	Sketch the graph of exponential function $f(x) = 2^{x-1} + 3$.	1.5 (CO1)
Q.5	Determine whether the following relation is a function. State the domain and range of the relation. $\{(-4,2), (2,0), (3,5), (-3,1), (4,2)\}$	1.5 (CO1,2)
Q.6	Evaluate the following integral: $\int_0^{\frac{\pi}{2}} \cos^4 x \, dx$	1.5 (CO4,5)
Q.7	A balloon is connected to a meteorological station by a cable of length 200 m inclined at 60° angle with the ground. Find the height of the balloon from the ground. (Imagine that there is no slack in the cable).	2 (CO2,3)
Q.8A	What is the value of the function $f(x) = (x - 1)(x - 2)^2$ at its maxima?	2 (CO3,4)
Q.8B	Evaluate $\lim_{z \rightarrow \infty} \frac{2z^2 - 17z + 8}{8 - z}$, if it exists.	2 (CO3)
Q.9	In how many ways can the letters of the word THOUGHTS be arranged so that the vowels always come together?	2 (CO2)
Q.10	Find the area of the region bounded by the parabolas $y = x^2$ and $x = y^2$.	3 (CO4,5)
Q.11A	The total distance traveled by the pendulum is given by the infinite series. 	3 (CO2)

	$18 + 18(0.8) + 18(0.8)^2 + 18(0.8)^3 + \dots$ Find total distance traveled by the pendulum. Also, express the series in summation form.	
Q.11B	A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected if the team has (i) no girls (ii) at least one boy and one girl (iii) at least three girls	3 (CO2)
Q.12	What is the binomial expansion of $(x^2 + 1)^5$ using the binomial theorem?	4 (CO2)