CENTRAL COLLEGE MITYANA

Star campus-The Home Glory
End of Term One Examinations
S.6 Sub-Mathematics

Time: 2 ½ hours

Instructions

- *Answer all questions in section A and four questions in section B*
- *Non-programmable scientific calculators and mathematical tables can be used.*

SECTION A (40 marks)

1. The position of an object is given by the expression $x=bt^2+2ct^3-6dt^4$ where b, c, d are constants with appropriare units and t is the time in seconds. Find the velocity of the particle at t=1 and the acceleration. (05 marks)
2. Solve the equation $3\sin 2\theta + cos\theta + 1 = 0 \; for \; values \; \theta from \; 0^o \; 180^o$ inclusive (05 marks)
3. The table below shows the oral interviews rank (x) and written interview rank (Y for 12 candidates)

Candidate	A	B	C	D	E	F	G	H	I	J	K	L
Oral interview Rank (x)	8	10	9	4	12	5	11	7	3	6	1	2
Written interview Rank (Y)	11	12	9	7	10	6	8	5	2	4	1	3

4. The sum to infinity of a geometric progression is 25/4 and the first term is 5. Find the
   (a). Common ratio of the G. P. (03 marks)
   (b). Sum of the first ten terms of the G.P. (02 marks)
5. Given the matrix A= $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$, find
   (a). A^2 and A^3 (03 marks)
   (b). Verify that $A(A^2) = A^2(A)$ (02 marks)
6. Two independent events A and B are such that P(A)= ¼ and P(B)= 3/5. Find P (AUB). (05 marks)
7. The table below shows the number of crates of soda sold by a certain shop in 2010

Month	JAN	FEB	MAR	APRI	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
Number of crates	175	783	351	228	378	297	823	338	230	391	410	742

   Calculate the four-month moving averages for the data (05 marks)
8. Given that (x+1) and (x-2) are factors of the polynomial ax^3-3x^2-bx+2, find the values of a and b

SECTION B (60 marks)

9. The table below shows a frequency distribution of marks scored by 55 students in attest.

Marks	10-	20-	30-	40-	50-	60-	70-	80-≤ 90
Number of students	2	6	12	15	10	6	3	1

(a). Draw a histogram for the data and use it to estimate the modal mark

(ii). Mean mark

(iii). Standard deviation. (10 marks)

10. Sketch the curve $y=2x^2-x^4$ (12 marks)

11. A continuous random variable X has a probability density function given by

F(x)= $\int_0^{kx} k(x-1)$ $0\leq x\leq 1$

$1\leq x\leq 2$ elese where

Where k is a constant

Determine

(a). value of k

(b). P(X<1)

(c). Expectation, E(X)

(d). Variance, Var(x)

12. The table below shows the prices in US dollars and weights of the five components of an engine in 1998 and 2005.

Component	A	B	C	D	E
Price ($)1998	35	70	43	180	480
Price ($)2005	60	135	105	290	800
Weight	6	5	3	2	1

Taking 1998 as the base year

Calculate for 2005 the base year

(i). Simple aggregate price index (03 marks)

(ii). Price relative of each component. (03 marks)

(iii). Weighted aggregate prince index (06 marks)

(b). Estimate the cost of an engine in 1998 given that its cost in 2005 was 1600

us dollars. (03 marks)

13. Chemical A is converted into another chemical by a chemical reaction. The rate at which chemical A is being converted is directly proportional to the amount present at any time. Initially 100g of chemical A was present after 5 minutes , 90g of A is present.

(a). Form a differential equation for the chemical reaction (03 marks)

(b). By solving the deferential equation formed in (a), determine the

(i). amount of chemical A present after 20 minutes

(ii). time taken for the amount of chemical A to be reduced to 20g. (12 marks)

14. A car initially at rest accelerated uniformly to a speed of 20m/s-2 for 8 seconds. If finally decelated uniformly at 2.5m/s^2 to rest.

(a). Find the

(i). Greatest speed attained by the car.

(ii). Total time taken by the car to rest. (06 marks)

(b). Sketch the velocity time graph for the motion of the car. (04 marks)

(c). Use your graph to find the total distance travelled by the car. (05 marks)

END

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