Code No: 2005

FACULTY OF ENGINEERING

BE I-Year (Backlog) Examination, December 2019

Subject: Programming in C & C++

Time: 3 Hours **Max. Marks: 75**

Note: Answer All Questions From Part-A & Any Five Questions From Part-B.

PART-A (25 Marks)

1	What is a variable? Write rules for declaring a variable.	2
2	List and explain relational operators.	3
3	What are two dimensional arrays?	3
4	What is #define directive?	2
5	Write about enumeration data types.	2
6	Write about new and delete operators.	3
7	What is the use of try block?	3
8	What are reference parameters?	2
9	What are static member functions?	3
10	What is scope resolution operator?	2

PART-B (50 Marks)

11. a)	Draw and explain block diagram of a computer.	6
b)	Write an algorithm to find sin x value.	4
12.	Explain repetition control structure with examples.	10
13. a)	Write a program to implement linear search.	5
b)	Explain call by reference technique with example.	5
14. a)	How can we pass an array as argument to a function? Explain with example.	5
b)	Write a program using structure for reading and printing different house addresses containing name, house number, area and city.	5
15. a)	Write a program for displaying contents of a file in reverse order.	5
b)	Write a program to overload unary operator.	5
16.	Write a program illustrating multilevel inheritance, with constructor and destructor.	10
17.	Write short notes on:	
a)	Dynamic binding	4
b)	Function templates	3
c)	Inline function	3

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Code No: 2505/CBCS

FACULTY OF ENGINEERING

B.E. I – Semester (CBCS) Examination, December 2019

Subject: Engineering Mathematics – I

Time: 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part A and any Five questions from Part B.

PART – A (10 x 2 = 20 Marks)

1) Define rank of a matrix. Find the value of k such that rank of A = $\begin{bmatrix} -1 & 3 \\ 4 & k \end{bmatrix}$ is 2. (2)

2) If 1, -1, 2 are the eigenvalues of a matrix A of order 3. Find the determinant of the matrix B = $3A^3-A^2+I$. (2)

3) Discuss the convergence of the series $1+r+r^2+r^3+\ldots\ldots\ldots\ldots+r^n+\ldots\ldots$,r is a real number, when r 1. (2)

4) Define absolute convergence and conditionally convergence of a series. (2

5) Expand $f(x)=e^x \sin x$ in powers of x. (2)

6) Find oblique asymptotes of the curve $y=x+\frac{1}{x}$. (2)

7) Determine $\lim\limits_{(x,y)\to(0,0)} \frac{x}{\sqrt{x^2+y^2}}$, if it exists (2)

8) If $u=f(2x-3y, 3y-4z, 4z-2x)$, prove that $6\frac{\partial u}{\partial x}+4\frac{\partial u}{\partial y}+3\frac{\partial u}{\partial z}=0.$ (2)

9) If $\vec{F}=x^2y\hat{i}+xy^2z\hat{j}-yz^2\hat{k}$, find $grad(div\vec{F})$. (2)

10) State Stoke's theorem. (2)

PART – B (50 Marks)

11. a) Determine the values a and b for which the system of equations

$$\begin{pmatrix} 3 & -2 & 1 \\ 5 & -8 & 9 \\ 2 & 1 & a \end{pmatrix}\begin{pmatrix} x \\ y \\ z \end{pmatrix}=\begin{pmatrix} 6 \\ 3 \\ -1 \end{pmatrix}$$ has

i) no solution ii) a unique solution and iii) an infinite number of solutions. (5)

b) If the eigenvectors of a 3x3 matrix A corresponding to the eigenvalues 0, 1, -1 and $(1,1,1)^{T,}$ $(1, 0, -1)^T$ $(-1, 1, 0)^T$ respectively. Find the matrix A. (5)

12. a) Test the convergence of the series $\sum_{n=1}^{\infty} \frac{1.4.7\ldots\ldots\ldots\ldots(3n-2)}{2.5.8\ldots\ldots\ldots\ldots(3n-1)}$. (5)

b) Discuss the convergence of the series $1-\frac{1}{2\sqrt{2}}+\frac{1}{3\sqrt{3}}-\frac{1}{4\sqrt{4}}+\ldots\ldots\ldots\ldots\bullet$ (5)

13. a) State Langrage's value theorem and hence show that $|\sin b-\sin a|\le|b-a|$ (4)

b) Find the evolute of the curve $xy=1$. (6)

contd…2

14. a) If $f(x,y) = \begin{cases} \dfrac{x^2 y(x-y)}{x^2+y^2}, & (x,y) \neq (0,0), \\ 0, & (x,y) = (0,0) \end{cases}$

find $\dfrac{\partial^2 f}{\partial x^2}$ and $\dfrac{\partial^2 f}{\partial y^2}$ at (0,0) (5)

b) Find the maximum and minimum values of the function
$f(x,y) = x^4 + y^4 - x^2 - y^2 + 1.$ (5)

15. Verify Green's theorem for $\oint_C (xy^2 - 2xy)\,dx + (x^2 y + 3)\,dy$ where C is the boundary of the region defined by $y^2 = 8x$ and $x = 2.$ (10)

16. a) If A = $\begin{pmatrix} 6 & 2 & -1 \\ -6 & -1 & 2 \\ 7 & 2 & -2 \end{pmatrix}$, find the matrix
$B = A^8 - 3A^7 - 4A^6 + 12A^5 + 3A^4 - 9A^3 + 2A + 3I$ using Cayley-Hamilton theorem. (5)

b) Find the curvature and radius of curvature of the curve $y = x^2 - 6x + 10$ at (1, 5). (5)

17. a) If z = $f(x,y), x = r\cos\theta, y = r\sin\theta,$ show that $\left(\dfrac{\partial f}{\partial x}\right)^2 + \left(\dfrac{\partial f}{\partial y}\right)^2 = \left(\dfrac{\partial f}{\partial r}\right)^2 + \dfrac{1}{r^2}\left(\dfrac{\partial f}{\partial \theta}\right)^2.$ (5)

b) Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$, $z + 3 = x^2 + y^2$ at (-2, 1, 2) (5)

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Code No: 2406

FACULTY OF ENGINEERING & TECHNOLOGY

BE / B. Tech (Bridge Course) II- Semester (Backlog) Examination, December 2019

Subject: Engineering Mechanics

Time: 3 Hours **Max. Marks: 75**

Note: Answer All Questions From Part-A, & Any Five Questions From Part –B.

PART – A (25 Marks)

1. State the principle of transmissibility. 2m
2. Define FBD and give two examples. 3m
3. How the term centroid differs from centre of gravity? Explain in detail. 2m
4. Define the terms angle of friction and cone of friction. 3m
5. State and prove parallel axis theorem for area moment of inertia. 3m
6. Calculate MMI for a sphere having radius 1 m and mass of 100kg. 2m
7. Differentiate between kinematics and kinetics. 2m
8. State and explain D Alembert's principle in detail. 3m
9. A body wt 1000N moves on a level horizontal road for a distance of 400 m. The resistance of the road is 10 m per 1000N wt of the body. Find the work done on the body by its resistance. 3m
10. A body vibrates in SHM with a period of oscillation 6 sec and an amplitude of 2 cm. Find the velocity and acceleration of the body at the mean position. 2m

PART – B (50 Marks)

11. Three bars hinged at A and D, and pinned at B and C form a four link mechanism as shown in fig.1. Determine the value of P which will prevent motion. 10m

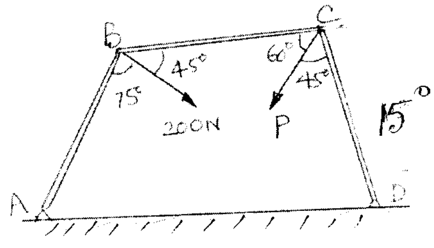

Fig.1

12. A uniform ladder 7.2m long weighs 180N. It is placed against a vertical wall at an angle of 60° with the ground. How for along the ladder can a 700 N man climb before ladder is on the verge of slipping. The angle of friction at all contact surfaces is 15°. 10m
13. Derive the equations for M.I about X and Y axis for a right angled triangle. 10m
14. A shot is fired with a velocity of 30 m /s from a point 15m in front of the vertical wall and 6m high. Find the angle of projection to the horizontal to enable the shot to clear the top of the wall. Find the time lapsed when the shot left the wall. 10m
15. The system fig.2 is connected by flexible inextensible cords. If the system starts from rest, find the distance d between A and the ground so that the system comes to rest with body B just touching A. 10m

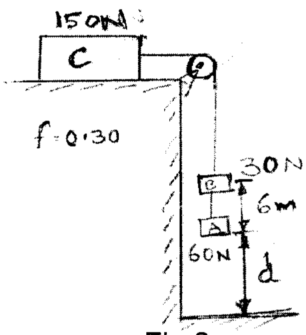

Fig.2

16. Determine the force P to be applied to the weightless wedges to start them under a 500 N block as shown in fig.3. The coefficient of friction at all contact surfaces is 0.3C 10m

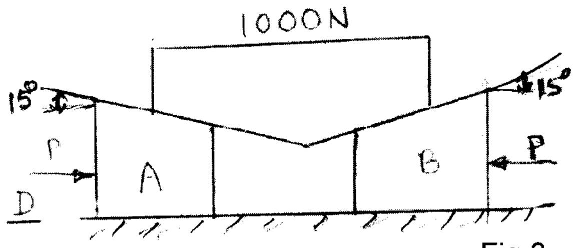

Fig.3

17. Find the CG of the section shown in fig.4 about X and Y axis. 10m

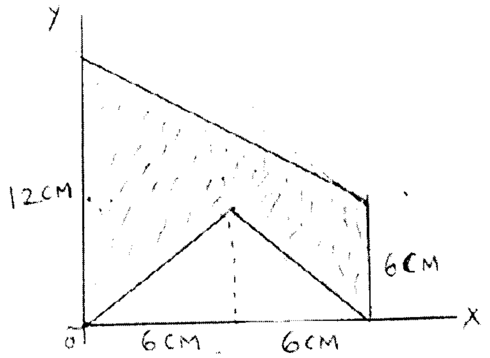

Fig.4

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