CO24997- PROGRAMMING PRATICES

ASSIGNMENT #01

```
#include <stdio.h>
int main() {
  int r, c, a[10][10], b[10][10], sum[10][10], sub[10][10] ,  i, j;
  printf("Enter the number of rows (between 1 and 10): ");
  scanf("%d", &r);
  printf("Enter the number of columns (between 1 and 10): ");
  scanf("%d", &c);

  printf("\nEnter elements of 1st matrix:\n");
  for (i = 0; i < r; ++i)
    for (j = 0; j < c; ++j) {
      scanf("%d", &a[i][j]);
    }

  printf("Enter elements of 2nd matrix:\n");
  for (i = 0; i < r; ++i)
    for (j = 0; j < c; ++j) {
      scanf("%d", &b[i][j]);
    }

  // adding two matrices
  for (i = 0; i < r; ++i)
    for (j = 0; j < c; ++j) {
      sum[i][j] = a[i][j] + b[i][j];
```

```
  }


  // subtracting two matrices
for (i = 0; i < r; ++i)
  for (j = 0; j < c; ++j) {
    sub[i][j] = a[i][j] - b[i][j];
  }
// printing the result
printf("\nSum of two matrices: \n");
for (i = 0; i < r; ++i){
  for (j = 0; j < c; ++j) {
    printf("%d   ", sum[i][j]);
    }
    printf("\n");
  }
  // printing the result
printf("\nDifference of two matrices: \n");
for (i = 0; i < r; ++i){
  for (j = 0; j < c; ++j) {
    printf("%d   ", sub[i][j]);
    }
    printf("\n");
  }
  // TRACE
  int trace_a=0;
  int trace_b=0;
  for (i = 0; i < r; ++i){
  for (j = 0; j < c; ++j) {
    if(i==j){
```

```
        trace_a+=a[i][j];
        trace_b+=b[i][j];
      }
      }
    }
    printf("TRACE of Matrix a is : %d\n",trace_a);
    printf("TRACE of Matrix b is : %d",trace_b);

  return 0;
}
```

CO24997- PROGRAMMING PRATICES

ASSIGNMENT #03

```
\documentclass{article}
\usepackage[utf8]{inputenc}
\usepackage{graphicx}
\usepackage{amsmath}
\usepackage{geometry}
\graphicspath{ {This PC/Documents/image1/} }
\begin{document}
\begin{center}
   {\Huge\textbf{Mathematics}}
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{\textmd (JEE Advanced 2022)} \\
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{\textmd Paper 1}\\
{\textmd Name: ISHA SINGHAI} \\
{\textmd Enrollment: 0801CS211045}
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\begin{center} \textbf{SECTION 1 (Maximum Marks:24)}
\end{center}

\begin{itemize}
```

\item This section contains \textbf{EIGHT(08)} questions.\

\item The answer to each question is a \textbf{NUMERICAL VALUE.} \

\item For each question, enter the correct numerical value of the answer using the mouse and the onscreen virtual numeric keypad in the place designed to enter the answer. If the numerical value has more than two decimal places, \textbf{truncate/round-off} the value to \textbf{TWO} decimal places. \

\item Answer to each question will be evaluated \underline{according to the following marking scheme}:\\

\textit{Full Marks} : +3 \textbf{ONLY} if the correct numerical is entered; \\

\textsl{Zero Marks} : 0 in all other cases.

\end{itemize}

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\begin{center}

\textbf{QUESTIONS}

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Q1.A debate club consists of 6 girls and 4 boys. A team of 4 members is to be selected from this club including the selection of a captain (from among these 4 members) for the team. If the team has to include at most one boy, then the number of ways of selecting the team is \\

\hspace{2cm}(A) 380 \hspace{1cm} (B) 320 \hspace{1cm} (C) 260 \hspace{1cm} (D)95

\\

Q2. A solution curve of the differential equation

${(x^{2}+xy+4x+2y+4){dy\over dx} -{y^2}=0,x>0,}$passes through the point (1,3). Then the solution curve \\

\hspace{1cm} (A)\hspace{1cm} intersects $y=x+2$ exactly at one point \\

\hspace{1cm} (B)\hspace{1cm} intersects $y=x+2$ exactly at two points \\

\hspace{1cm} (C)\hspace{1cm} intersects $y={(x+2)^2}$ \\

\hspace{1cm} (D)\hspace{1cm} does \textbf{NOT} intersect $y={(x+3)^2}$\\

Q3. Let RS be the diameter of the circle ${x^2+y^2=1}$, where \textsl{S} is the point(1,0). Let \textsl{P} be a

variable point (other than \textsl{R} and \textsl{S}) on the circle at \textsl{S} and \textsl{P} meet at the point \textsl{Q}.

The normal to the circle at \textsl{P} intersects a line drawn through \textsl{Q} parallel to\textsl{RS} at point \textsl{E}.

Then the locus of \textsl{E} passes through the points(s)\\

\\

\hspace{1cm} (A) ${1\over 3,1\over\sqrt{3} }$

\hspace{1cm}(B)${{1\over 4, 1\over 2} } $

\hspace{1cm}(C)${1\over 3, -1\over\sqrt{3}}$

\hspace{1cm}(D)${1\over 4, -1\over 2}$ \\

Q4.The least value of$\alpha \in \Re for which 4\alpha$ {x^{2}} + {1\over x}\geq 1$, for all ${x>0}$, is \\

\hspace{3cm}(A)\hspace{1cm} ${1\over 64}$

(B)\hspace{1cm} ${1\over 32}$\hspace{1cm}

(C)\hspace{1cm} ${1\over 27}$\hspace{1cm}

(D)\hspace{1cm} ${1\over 25}$ $

\\\\

\\Q5. \hspace{1cm} \textmd{Consider the equation} \\

\hspace{2cm}$\int{\log_e \def\log{\mathop{\rm log}\nolimits}dx\ over x(a-\log_e x\def\logx{\mathop{\rm log}\nolimits})} =1$, $a\in(-\infty,0)\bigcup(1,\infty)$. \\\

\hspace{1cm}\hspace{3cm}Which of the following statements is/are \textbf{TRUE} ? \\

(A) \textbf{No} \textsl{a} satisfies the above equation\\

(B) An integer \textsl{a} satisfies the above equation\\

(C) An irrational number \textsl{a} satisfies the above equation \\

(D) More than one \textsl{a} satisfy the above equation \\

\\Q6. Which of the following is (are) NOT the square of a 3\times3 matrix with real entries? \\

\hspace{2cm} (A) \hspace{1cm}

{\begin{pmatrix}

1 \hspace{1cm} 0 \hspace{1cm} 0 \\

0 \hspace{1cm} 1\hspace{1cm} 0 \\

0\hspace{1cm} 0\hspace{1cm} 1

\end{pmatrix} }

\hspace{3cm} (B) \hspace{1cm}

{\begin{pmatrix}

1 \hspace{1cm} 0 \hspace{1cm} 0 \\

0 \hspace{1cm} 1\hspace{1cm} 0 \\

0\hspace{1cm} 0\hspace{1cm} -1

\end{pmatrix} } \\\

\hspace{2cm} (C) \hspace{1cm}

{\begin{pmatrix}

1 \hspace{1cm} 0 \hspace{1cm} 0 \\

0 \hspace{1cm} -1\hspace{1cm} 0 \\

0\hspace{1cm} 0\hspace{1cm} -1

\end{pmatrix} }

\hspace{3cm} (D) \hspace{1cm}

{\begin{pmatrix}

-1 \hspace{1cm} 0 \hspace{1cm} 0 \\

0 \hspace{1cm} -1\hspace{1cm} 0 \\

0\hspace{1cm} 0\hspace{1cm} -1

\end{pmatrix} } \\

\\\\ Q7. \textmd{Let [x] be the greatest integer less than or equal to x. Then, at which of the following point(s) the function} \\ \textit{${f(x) =x \cos{\pi(x+[x])}}$} \textmd{is discontinuous?} \\

\hspace{3cm}

(A) x = -1 \hspace{1cm}

(B)\hspace{1cm} x =0 \hspace{1cm}

(C)\hspace{1cm} x =1 \hspace{1cm}

(D)\hspace{1cm}x =2 \\\\\

Q8. If $2x-y+1=0$ is a tangent to the hyperbola ${{{x^2}\over a{^2}}}$ - ${{{y^2}\over 16}}=1$, then which of the following CANNOT be sides of a right angle triangle? \\$

\hspace{2cm}

(A) \textit{a},4,1 \hspace{1cm}

(B) \textit{a},4,2 \hspace{1cm}

(C) 2\textit{a},8,1 \hspace{1cm}

(D) 2\textit{a},4,1 \\$

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{\Huge\textbf{Physics}}

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{\textmd (JEE Advanced 2022)} \\

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{\textmd Paper 1}\\

{\textmd Name: ISHA SINGHAI} \\

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\textbf{QUESTIONS}

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Q1.A particle of mass m is initially at rest at the origin. It is subjected to a force and starts

moving along the x-axis. Its kinetic energy K changes with time as dK/dt = ${\gamma}$t,where ${\gamma}$

is a positive constant of appropriate dimensions. Which of the following statements is (are)

true?\\

(A) The force applied on the particle is constant\\

(B) The speed of the particle is proportional to time\\

(C) The distance of the particle from the origin increases linearly with time\\

(D) The force is conservative\\

\vspace{10pt}\\

Q2. \textbf{STATEMENT-1}

The stream of water flowing at high speed from a garden hose pipe tends to spread like a fountain when held vertically up, but tends to narrow down when held vertically down.\\

and\\

\textbf{STATEMENT-2}\\

In any steady flow of an incompressible fluid, the volume flow rate of the fluid remains constant.\\

(A) \textbf{STATEMENT-1} is True, \textbf{STATEMENT-2} is True; STATEMENT-2 is a correct explanation for \textbf{STATEMENT-1}\\

(B) \textbf{STATEMENT-1} is True, \textbf{STATEMENT-2} is True; \textbf{STATEMENT-2} is NOT a correct explanation for \textbf{STATEMENT-1}\\

(C) \textbf{STATEMENT-1} is True, \textbf{STATEMENT-2} is False\\

(D) \textbf{STATEMENT-1} is False, \textbf{STATEMENT-2} is True\\\

\vspace{10pt}\\

Q3. Six charges are placed around a regular hexagon of side length \textit{a}as shown in the figure. Five

of them have charge\textit{q} and the remaining one has charge \textit{x} The perpendicular from each

charge to the nearest hexagon side passes through the center O of the hexagon and is bisected

by the side.\\

\includegraphics{image 1}

Which of the following statement(s) is(are) correct in SI units?\\

(A)\hspace{1cm} When \textit{x}= \textit{q} the magnitude of the electric field at O is zero.\\

(B) \hspace{1cm}When \textit{x}= −\textit{q} the magnitude of the electric field at O is 2.\\

(C) \hspace{1cm}When \textit{x}= 2\textit{q} the potential at O is 3\\

(D)\hspace{1cm} When \textit{x}= −3\textit{q} the potential at O is −1\\\\

Q4.\textbf{STATEMENT-1}\\

If the accelerating potential in an X-ray tube is increased, the wavelengths of the characteristic X-rays do not change.\\

because\\

\textbf{STATEMENT-2}\\

When an electron beam strikes the target in an X-ray tube, part of the kinetic energy is converted into X-ray energy.\\

(A) \textbf{STATEMENT-1} is True, \textbf{STATEMENT-2} is True;\textbf{STATEMENT-2} is a correct explanation for \textbf{STATEMENT-1}.\\

(B) \textbf{STATEMENT-1} True, \textbf{STATEMENT-2} is True; \textbf{STATEMENT-2} is NOT a correct explanation for Statement-1.\\

(C) \textbf{STATEMENT-1} is True,\textbf{STATEMENT-2} is False.\\

(D)\textbf{STATEMENT-1} is False, \textbf{STATEMENT-2} is True.\\

\vspace{10pt}\\\\

Q5.In an experiment to measure the speed of sound by a resonating air column, a tuning fork of

frequency 500 Hz is used. The length of the air column is varied by changing the level of

water in the resonance tube. Two successive resonances are heard at air columns of length

50.7cm and 83.9cm.Which of the following statements is (are) true?\\

(A) The speed of sound determined from this experiment is 332 $m{s}^-1$\\

(B) The end correction in this experiment is 0.9cm\\

(C) The wavelength of the sound wave is 66.4cm\\

(D)The resonance at 50.7cm corresponds to the fundamental harmonic\\

\vspace{10pt}\\

\vspace{10pt}\\

Q6. A particle of mass m is initially at rest at the origin. It is subjected to a force and starts

moving along the x-axis. Its kinetic energy K changes with time as dK/dt = ${\gamma}$t,where ${\gamma}$

is a positive constant of appropriate dimensions. Which of the following statements is (are)

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(A) The force applied on the particle is constant\\

(B) The speed of the particle is proportional to time\\

(C) The distance of the particle from the origin increases linearly with time\\

(D) The force is conservative\\

\vspace{10pt}\\

Q7. A ball is projected from the ground at an angle of 45° with the horizontal surface. It reaches a maximum height of 120m and returns to the ground. Upon hitting the ground for the first

time, it loses half of its kinetic energy. Immediately after the bounce, the velocity of the ball makes an angle of 30° with the horizontal surface. The maximum height it reaches after the bounce, in meters is:\\

\textbf{Ans}.

\vspace{10pt}\\

Q8.A particle, of mass ${10^{-3}}$ kg and charge 1.0 C, is initially at rest. At time t=0, the particle comes under the influence of an electric field $\Vec{E}$(t)=Eo ${\sin{\omega}}$t $\hat{i}$ where Eo = 1 N${C^{-1}}$ and ${\omega}$ = ${10{^3}}$ rad ${s^{-1}}$.Consider the

effect of only the electrical force on the particle. Then the maximum speed, in m ${s^{-1}}$, attained by the particle at subsequent times is:\\

\textbf{Ans}\\\\

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{\LARGE\textbf{END OF THE QUESTION PAPER}

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