TEST DE VERIFICARE A CUNOȘTINȚELOR

DISCIPLINA MATEMATICĂ

A

1. Să se calculeze $x_1^2 + x_2^2$, unde x_1 , x_2 sunt soluțiile ecuației $x^2 - 6x + 7 = 0$.

a) 1 ; **b)** 22 ; **c)** 2 ; **d)** 5 .

2. Fie expresia $\mathrm{E}(x) = \mathrm{tg}x + \cos 2x + \sin\frac{x}{2}$. Atunci valoarea $\mathrm{E}\left(\frac{\pi}{3}\right)$ este egală cu:

a) 0 ; **b)** $\sqrt{2}$; **c)** $\sqrt{3}$; **d)** -1 .

3. Fie punctele în planul de coordonate xOy : $\mathrm{A}(2,0), \mathrm{B}(0,5)$ și $\mathrm{C}(3,7)$. Să se scrie ecuația înălțimii din B a triunghiului ABC :

a) $x + 2y - 10 = 0$; **b)** $2x + y - 5 = 0$; **c)** $x - 7y - 34 = 0$; **d)** $x + 7y - 35 = 0$.

4. Să se rezolve ecuația $1 + 5 + 9 + ... + x = 231$.

a) $x = 61$; **b)** $x = 53$ **; c)** $x = 37$ **; d)** $x = 41$.

5. Să se calculeze numărul complex $\mathrm{z} = (1+\mathrm{i})^{2023} + (1-\mathrm{i})^{2023}$, unde $\mathrm{i}^2 = -1$.

a) $z = 2^{1012}$; **b)** $z = -2^{1012}$; **c)** $z = 2^{2023}$; **d)** $z = -2^{2023}$.

6. Fie matricea $\mathrm{A}(x) = \begin{pmatrix} 1+x & -x \\ 2x & 1-2x \end{pmatrix}$. Valorile reale ale lui x , $x \neq 1$, pentru care matricea $\mathrm{A}(x)$ coincide cu inversa sa, sunt:

a) $x \in \{2,5\}$; **b)** $x \in \{0,5\}$; **c)** $x \in \{0,2\}$; **d)** $x \in \{0,3\}$.

7. Să se calculeze ecuația asimptotei oblice la graficul funcției $\mathrm{f} : (0,\infty) \to \mathrm{R}$, $\mathrm{f}(x) = (x+2) \cdot e^{\frac{1}{x}}$.

a) $y = x - 3$; **b)** $y = x + 3$; **c)** $y = x - 1$; **d)** $y = x + 1$.

8. Fie $x, y \in (0,\infty)$ astfel încât $4(\lg x)^2 + (\lg y)^2 = 1$. Atunci cea mai mare valoare posibilă a lui x este:

a) $\sqrt{10}$; **b)** 1; **c)** $\frac{1}{10}$; **d)** 10.

9. Să se calculeze $\int_0^2 \left|x^2 - 5x + 4\right| \mathrm{d}x$.

a) 2 ; **b)** 3 ; **c)** 10 ; **d)** 11.

DISCIPLINA INFORMATICĂ **A**

1. Variabilele **x**, **y**, **z**, **w** și **v** sunt de tip întreg, iar **v** memorează inițial valoarea **0**. Indicați o secvența echivalentă cu secvența de mai jos.

```
if (x==y && z==w) v=4; else if(x==y && z!=w) v=6; else v=8;
```

a.
```
if (x!=y || z==w) v=8; else if(x==y || z!=w) v=6; else v=4;
```

b.
```
if (x==y || z==w) v=4; else if(x==y || z!=w) v=6; else if(x!=y || z!=w) v=8;
```

c.
```
if (x==y && z==w) v=4; else if(x==y && z!=w) v=6; else if(x!=y && z!=w) v=8;
```

d.
```
if(x!=y) v=8; else if(z==w) v=4; else v=6;
```

2. Variabilele **k** și **i** sunt de tip întreg. Indicați câte valori distincte se vor afla pe coloana a **3**-a a tabloului bidimensional pătratic **A** cu componente de tip întreg, având cel mult **10** linii și **10** coloane, dacă se citește valoarea **5**. (indexarea este de la 1)

```
cin>>n;
for(k=(n+1)/2;k>=1;--k)
for(i=1;i<=n;++i)
   A[i][k] =A[i][n-k+1]=k, A[k][i] =A[n-k+1][i]=k;
```

a. 4
b. 2
c. 5
d. 3

3. Utilizând metoda backtracking, se generează în ordine crescătoare toate numerele naturale de **4** cifre alese din mulțimea **{3,7,2,0,5,8}** astfel încât cifrele de pe poziții alăturate să aibă parități diferite. Știind că primele **4** numere generate sunt, în această ordine, **2305**, **2307**, **2385**, **2387**, indicați care dintre următoarele secvențe reprezintă o secvență de numere generate unul după altul.

a. 5087,5237,5238
b. 7850,7852,8305
c. 5237,5238,5270
d. 7830,7832,7835

4. Subprogramul **f** este definit alăturat. Indicați ce se afișează în urma apelului de mai jos.

```
f(4);
```

```
void f(int x)
{ int i;
  for(i=x;i>1;--i)
  { f(x-1);
    cout<<i;
  }
}
```

a. 433222
b. 232432
c. 232242322323222
d. 432223322223222

5. Variabila **i** este de tip întreg, iar variabila **s** poate memora un șir de cel mult **20** de caractere. Indicați ce se afișează în urma executării secvenței alăturate.

```
strcpy(s,"planor"+3);
cout<<strchr(s,'o')-s<<' ';
strncat(s,"platou",4);
s[4]=0;
for(int i=0;i<4;i++)
if(i%2) s[i]=s[0]+4*(2*i/3-1);
    else s[i]=s[0]+i-1;
cout<<s;
```

a. 1 minq
b. 1 jjjllat
c. 4 okps0rplat
d. 1 minq0at

6. Se consideră graful orientat **G=(X,U)** unde **X={1,2,3,4,5,6,7,8}** și **U={(2,3),(6,7),(2,4),(3,2),(7,6),(3,7),(5,6),(4,3),(4,6) }**. Indicați câte componente tare conexe are graful dat.

a. 6
b. 4
c. 3
d. 5

7. Subprogramul **f** este definit alăturat. Indicați ce se afișează după secvența de mai jos.

```
int z = 23; f(z,z); cout<<z;
```

```
void f(int x, int &y)
{
    y = y*x ;
    x = x + y ;
    cout<<x<< ' '<<y<< ' ';
}
```

a. 23 529 23
b. 552 529 529
c. 23 529 529
d. 1058 1058 1058

8. Indicați care este conținutul tabloului unidimesional **z** după executarea următoarei secvențe de program.

```
int n=5,m=6,i,j,k;
float z[16],x[]={0,1,2,3,5.5,7}, y[]={0,1,2,3,4,8,9};
i=j=1;k=0;
while(i<=n && j<=m)
   if(x[i]<y[j])z[++k]=x[i++];
         else {if(x[i]!=y[j]) z[++k]=y[j]; j++;}
while(i<=n) z[++k]=x[i++];
while(j<=m) z[++k]=y[j++];
```

a. z=(1,2,3,4,5.5,7,8,9)
b. z=(0,0,1,1,2,2,3,3,4,5.5,7,8,9)
c. z=(1,1,2,2,3,3)
d. z=(1,1,2,2,3,3,4,5.5,7)

9. Pentru declararea de mai jos indicaţi care dintre instrucţiunile de atribuire nu este corectă:

```
struct candidat
{
    char nume[26];
    struct
    {
        int nota1,nota2,nota3;
    }punctaj;
}s1,s2;
```

a. s1.punctaj.nota1=s2.punctaj.nota2+1;
b. s1=s2+1;
c. s1=s2;
d. s1.nume[2]='s';

DISCIPLINA LIMBA ENGLEZĂ A

Read the texts below and choose the best answer a, b, c, or d. Only ONE variant is possible.

Dear Mrs. Baxter,

This is to inform you that we have been forced to make some changes with regards to our policy for the payment and delivery of drinking water to your establishment. These changes have been made due to late payment by a number of our clients. From 19th October onwards, there will be a surcharge of 15% for all accounts falling 30 days behind. We will also refuse to deliver any further orders to customers whose accounts are still outstanding. We thank you for your continued custom, and apologize for any inconvenience that these changes may cause.

Yours sincerely,
Daniel Applegate

1. The letter informs Mrs. Baxter that …

a	there will be special conditions for customers drinking water at their workplace.
b	there will be changes in delivery for customers paying at late hours.
c	there will be different conditions for water payment and delivery due to debtors.
d	there will be established new rules for water consumption in 30 days.

2. Mrs. Baxter learns from the body of the letter that …

a	payments made before the date of October, 19 will be refused.
b	payments made upon delivery of drinking water will benefit of 15% discount.
c	any payment exceeding a 30-day delay will be charged 15% extra.
d	any payment made after October, 19 will be left behind for 30 days.

3. Finally, Mrs. Baxter is informed that …

a	customers with outstanding accounts will benefit from special orders.
b	customers may refuse delivery unless their accounts are outstanding.
c	deliveries to customers' establishments will soon be refused.
d	deliveries to customers owing money will come to an end.

4. The word *onwards*, in line 3, has the connotation of …

a	after October, 19.
b	until October, 19.
c	afore October, 19.
d	prior to October, 19.

5. The meaning of *further*, in line 4, is …

a	farther.
b	future.
c	past.
d	distant.

6. The word *outstanding*, in relation with accounts, in line 5, refers to …

a	remarkable payments.
b	delayed payments.
c	prompt payments.
d	significant payments.

A charity supporting military veterans opened a café in Cheshire. The Shout Out Loud Foundation said the aim was to support people who had left the armed forces or who were nearing the end of their careers.

The charity was set up in 2012 to support veterans affected by homelessness and mental health issues. Since then, it had helped almost 100 veterans find accommodation: "The aim is to engage veterans and share experiences since leaving the services," said Andrew Dolman-Bayley, from the foundation. "We also want serving personnel to attend where possible, especially those that are getting to the end of their service and they can start learning from our struggles from when we've left."

A report from the Ministry of Defence found last year that one in eight armed forces personnel received professional mental healthcare support in 2022. Combat Stress, a nationwide charity supporting veterans' mental health, receives about 15,000 calls to its helpline each year.

"We want to create a wholesome living," Mr Dolman-Bayley said. He added that their work would not just be limited to mental health but also adjusting to civilian life.

7. We learn from the passage that the charity established in 2012 ...

a	focuses on veterans' psychological assistance and housing.
b	intends to open several entertainment places for veterans.
c	aims to support 15,000 veterans with their mental health.
d	desires to teach veterans how to combat civilian life stress.

8. The café was opened by ...

a	Combat Stress charity.
b	the Shout Out Loud Foundation.
c	the Ministry of Defence.
d	Mr. Dolman-Bayley.

9. Combat Stress...

a	provides homes for people.
b	teaches people how to build shelters.
c	provides psychological counselling.
d	teaches a healthy lifestyle.

10. *Engage*, in line 5, is closest in meaning to ...

a	attack.
b	obstruct.
c	intercept.
d	involve.

11. *Serving personnel*, in line 7, refers to ...

a	people working in the military.
b	people waiting in the café in Cheshire.
c	people working for the healthcare.
d	people providing help for the veterans.

12. *Wholesome*, in line 12, is best replaced by ...

a	thoroughly.
b	healthy.
c	accurate.
d	charitably.

In the Romanian Armed Forces, uniformed women began to emerge in 1973, when compulsory military service for all citizens, regardless of gender, was introduced. The female military personnel were tasked to train the female students coming from higher education institutions. The number of military specialties for females increased after 1980, when female officers began training as helicopter pilots, doctors, pharmacists and logistics officers.

But with the new Romanian Constitution in 1990, stipulating that military service was to be compulsory for male citizens only, the mandatory military training of female students was abandoned. Consequently, during the 1990s, many women left the Armed Forces before reaching legal retirement age because they were exclusively assigned to administrative positions which carried limited responsibility and restricted women's access to senior decision-making levels. Since 2001, however, the Romanian Ministry of National Defence resumed a female recruitment and selection programme aimed at training and promoting women according to their professional skills and potential. The revised Constitution and "The Status of Military Personnel" currently represent the legal framework which guarantees equal opportunities for both men and women upon assignment to public, civilian or military positions, including senior-level appointments.

13. In 1973, military women started training …

a	students in educational institutions.
b	Air Force personnel.
c	administrative personnel.
d	military personnel.

14. In 1990, the new Romanian Constitution …

a	maintained administrative roles for women in the military.
b	encouraged women to pursue a military career.
c	prevented women from reaching higher military positions.
d	maintained obligatory military service for men.

15. At present, military training provides …

a	less responsibility for women in the military.
b	equal opportunities of professional development.
c	recruitment potential to women in the military.
d	less responsibility for men in the military.

16. *Consequently,* in line 8, is best replaced by ...

a	as a result.
b	constantly.
c	after all.
d	in addition.

17. … *'they were exclusively assigned to administrative positions which carried limited responsibility'*, in line 9 can be best rephrased as ...

a	they were prevented from carrying administrative positions with little responsibility.
b	they issued assignments of administrative positions with little responsibility.
c	they only received administrative positions with little responsibility.
d	they were only received to administer positions with little responsibility.

18. *Revised*, in line 12, is best replaced by ...

a	visioned.
b	summarised.
c	audited.
d	altered.