

# TEST DE VERIFICARE A CUNOȘTIȚELOR

## DISCIPLINA MATEMATICĂ



- Să se calculeze expresia  $E = \log_2 3 - \log_2 15 + \log_2 25 - \frac{1}{\log_5 2}$ .  
a) 1; b) 0; c) 2; d) 5.
- Dacă  $\operatorname{tg} x + \operatorname{ctg} x = 2$ , atunci  $\sin 2x$  este egal cu:  
a) 0; b)  $\sqrt{2}$ ; c) 1; d) -1.
- Să se calculeze  $\int_1^2 \frac{1}{x(x^6 + 1)} dx$ .  
a)  $\ln \frac{128}{65}$ ; b)  $\frac{1}{6} \ln \frac{128}{65}$ ; c)  $\frac{1}{3} \ln \frac{128}{65}$ ; d) 1.
- Să se calculeze  $\lim_{x \rightarrow +\infty} (\sqrt{x^2 + 5x} - 2\sqrt{x^2 + 2x} + \sqrt{x^2 + x})$ .  
a) 1; b) 0; c) 2; d) 4.
- Câte numere întregi verifică inecuația  $x^2 - 8x + 12 < 0$ ?  
a) 4; b) 5; c) 2; d) 3.
- Fie punctele în planul de coordonate  $xOy$ :  $A(0,5)$ ,  $B(1,1)$ ,  $C(3,0)$  și  $D(7,6)$ . Să se calculeze aria patrulaterului  $ABCD$ .  
a)  $\frac{43}{2}$ ; b)  $\frac{41}{2}$ ; c)  $\frac{45}{2}$ ; d)  $\frac{47}{2}$ .
- Fie funcția  $f: (0, \infty) \rightarrow \mathbb{R}$ ,  $f(x) = e^{\ln^2 x}$ . Să se calculeze panta tangentei la graficul funcției în punctul de abscisă  $x = e$ .  
a) 2; b) 0; c) 1; d)  $e$ .
- Dacă  $X \in M_3(\mathbb{R})$  și  $\det(X) = 2$ , atunci valoarea expresiei  $E = \det(X^3) - \det(4X)$  este:  
a) 10; b) 8; c) 0; d) -120.
- Să se calculeze modulul numărului complex:

$$z = 1 - \left(\frac{1+i}{1-i}\right)^{-1} + \left(\frac{1+i}{1-i}\right)^{-2} - \dots - \left(\frac{1+i}{1-i}\right)^{-2021} + \left(\frac{1+i}{1-i}\right)^{-2022},$$

unde  $i^2 = -1$ .

- a) 2; b) 1; c) 2022; d) 1011.

1. Indicați care dintre expresiile logice următoare, scrise în pseudocod, are valoarea TRUE, știind că variabilele întregi x și y au valorile  $x = 11$  și  $y = 20$ .

- a)  $y \bmod 10 > x \div 7$
- b)  $(x \neq y) \text{ and } (x > y)$
- c) not FALSE and  $(x \div 10 < y)$
- d) not TRUE OR  $(x + y < 10)$

2. Secvența de program de mai jos determină în variabila x numărul tuturor elementelor ce memorează o valoare pozitivă de cel puțin trei cifre dintre cele 15 elemente întregi ale tabloului unidimensional v (v[1] este primul element al tabloului unidimensional). Indicați cu ce pot fi înlocuite punctele de suspensie.

```
x=15;
for(int i=1;i<=15;i++)
if(99>=...)
    x=... +x;
    a) x și -1
    b) v[i] și -i
    c) v[i] și 1
    d) v[i] și -1
```

3. Se consideră secvența de program de mai jos în care h, i, j și k sunt variabile de tip întreg, iar x este un tablou bidimensional pătratic cu n linii și n coloane ( $n=7$  și  $x[1][1]$  este primul element al tabloului bidimensional) și conține elementele:

```
1 4 3 2 1 0 1
2 5 0 1 2 3 2
3 6 1 8 7 4 3
4 7 2 9 6 5 4
5 8 3 4 5 6 5
6 9 0 9 8 7 6
7 8 9 0 9 8 7
i=2;
j=n-1;
for(h=1;h<=n/2;h++)
{
    for(k=i;k<=j;k++)
        cout<<x[h][k]<<' ';
    i++;
    j--;
}
```

Indicați ce valori se vor afișa după executarea secvenței date.

- a) 4 3 2 1 0 0 1 2 8
- b) 4 0 9 8 8 9 0 9 8
- c) 2 3 6 4 7 2 5 8 6
- d) 2 4 3 6 5 4 6 5 6

4. Se consideră următorul subprogram:

```
void f(int k,long &n)
{
    long m,x=1,y=1;
    int z=0;
    m=n;
    while(m!=0)
    {
        m=m/10;
        z++;
        y=y*10;
        if(z<=k)x=x*10;
    }
    y=y/x;
    n=n%y*x+n/y;
```

```
}
```

Știind că inițial x este 1234567, indicați care este valoarea lui x după apelul f(4,x);

- a) 1357246
- b) 4567123
- c) 5671234
- d) 7531246

5. Se consideră următoarea secvență de program:

```
char s[30],x[21];
```

```
strncpy(s,"pilotimilitari",strlen("academia"));
s[strlen("militara")]=0;
cout<<strcat(strstr(s,"il")+ strlen("avion")-1,"nent");
s[1]=s[6]+2;
strcpy(x,s+7);
strcpy(strchr(s,'l')+1,x);
s[strlen(s)-5]=0;
cout<<s;
```

Indicați ce se va afișa după executarea secvenței de program anterioară.

- a) iminentkil
- b) iminentpol
- c) arinentpol
- d) arinentkil

6. Se consideră următoarele declarații:

```
struct avion
{
    char model[20];
    float pret;
    struct data
    {
        unsigned zi, an;
        char luna[13];
    }dataf;
}x,y[30];
```

Indicați care dintre următoarele atribuiri este corectă sintactic:

- a) x[3].dataf.luna[4]=y.dataf.luna[2];
- b) x.avion.pret[1]=y[20].avion.pret[1];
- c) x.data.zi=y[1].data.zi;
- d) x.dataf.an=y[3].dataf.an;

7. Se consideră următorul subprogram:

```
void f(int x,int y)
{
    if(x>0)
        if(y>0)
        {
            cout<<'+';
            f(x,y-1);
        }
    else
    {
        cout<<"\n";
        f(x-1,x-1);
    }
}
```

Indicați ce apel trebuie utilizat pentru ca pe ecran să se afișeze:

```
++++++
++++
+++
++
+
```

- a)  $f(5,5)$ ;
- b)  $f(4,6)$ ;
- c)  $f(5,6)$ ;
- d)  $f(6,5)$ ;

8. Utilizând metoda backtracking se generează toate grupele de accesorii pentru ținuta unui ofițer din mulțimea {epoleți, costum, ochelari, insignă, nasturi, pantofi, cravată, butoni}. Accesoriile au prețurile următoare: epoleți - 40, costum - 500, ochelari - 30, insignă - 30, nasturi - 10, pantofi - 500, cravată - 70, butoni - 60. Într-o grupă accesoriiile sunt distincte, nu contează ordinea lor și costă, în total, exact 600. Primele trei soluții generate sunt, în această ordine:

(epoleți, costum, ochelari, insignă),  
 (epoleți, costum, butoni),  
 (epoleți, ochelari, insignă, pantofi).

Indicați a cincea soluție generată.

- a) (costum, ochelari, nasturi, butoni)
- b) (costum, insignă, nasturi, butoni)
- c) (epoleți, nasturi, pantofi, butoni)
- d) (epoleți, pantofi, butoni)

9. Se consideră graful neorientat conex și aciclic  $G=(V,E)$ , unde  $\text{card}(V)=7$  și  $E=\{[1,2], [2,3],[3,4],[3,5],[5,6],[6,7]\}$ . Indicați un nod ca rădăcină pentru ca arborele astfel obținut să aibă înălțime minimă.

- a) 2
- b) 5
- c) 4
- d) 7

## DISCIPLINA LIMBA ENGLEZĂ

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



### Hot-air Balloons

The use of hot-air balloons can be traced back to the Three Kingdoms era of Chinese history (220-280 AD). Zhuge Liang used these early incarnations, known as Kongming lanterns, as military signals. The first manned flight on record took place in France on October 15th, 1783. In a balloon constructed by Jacques-Etienne Montgolfier, a Frenchman named Pilatre de Rozier was elevated eighty feet off the ground. Modern hot-air balloons, with their capacity to ascend or descend and occasionally 'steer' at the pilot's will, were first developed by Ed Yost in the 1950s. The Bristol Belle is generally regarded as the first modern hot-air balloon and had its inaugural flight in 1967. Since then, balloon technology has become extremely sophisticated. Some hot-air balloons have climbed to altitudes of 21,000 meters, travelled over 7,500 kilometers, and reached speeds of up to 400 kilometers per hour.

1. According to the passage, the use of hot-air balloons has started ....

a	since 220.
b	around 1783.
c	as of 1967.
d	after 1950.

2. Who used the early hot-air balloons in the army?

a	Ed Yost
b	Bristol Belle
c	Zhuge Liang
d	Pilatre de Rozier

3. Where did the first manned hot-air balloon come into use?

a	France
b	Bristol
c	United Kingdom



d	Kongming
---	----------

4. Besides climbing and descending modern day hot-air balloons could also ....

a	trace military signals.
b	turn left and right.
c	record other flights.
d	travel in outer space.

5. The word “incarnations”, used in line 2 of the text, refers to ....

a	French inventors.
b	Chinese dynasties.
c	hot-air balloons.
d	inaugural flights.

6. The verb “reached” in the line before the last refers to ....

a	an action that took place before another past action.
b	an action that happened at a definite time in the past.
c	an action that takes place on regular hour-basis.
d	an action that has taken place until now.

### Notice to all guests of the Glenvale Inn

The management of the Glenvale Inn would like to apologize to all its guests for any inconvenience caused by our remodeling efforts. We assure you that the greatest efforts are being made to ensure all public spaces are kept immaculately clean, that all guests are provided with courteous professionalism, and that noise is kept to a minimum.

During the remodeling, we are also offering all guests \$10 % off their bill and \$10 % off their next stay as well, when the remodeling is complete.

Our new and improved facilities: - A 24-hour coffee bar in the lobby with a menu that will feature all your favorite specialty beverages as well as home-made baked goods.

- An expanded exercise room with spa and sauna will be available to melt away any chill you get on the slopes, plus personal trainers on hand for workouts or lessons in skiing or snowboarding.

- A massage salon will relieve any aches from your exercise in our gym or on the mountain.

- 20 log cabins, each complete with antique furnishings and windows overlooking the scenic valley and the main hotel building, will provide a little extra privacy but with all the amenities of our suites.

Once again, the management thanks you for your patronage and patience.

7. Why is the management apologizing?

a	The exercise room is too small.
b	Some construction is underway.
c	There has been a lack of professionalism.
d	Guests are being overbilled.

8. What is being offered to current guests because of the problem?

a	A discount on their stay.
b	Personal training.
c	Free coffee.
d	A massage.

9. What is stated about the log cabins?

a	They have a good view of the area.
b	They have been installed in the main hotel.
c	They are destined to people who enjoy skiing.
d	They have been built out of 20 logs.

10. The extract - “... guests are provided with courteous professionalism...”, in paragraph 1, line 3, stands for ....

a	“guests will spare efforts to clean their rooms”.
b	“guests will be given professional help if affected by noise”.
c	“guests will be treated with utmost respect”.
d	“guests will be given professional help if needed remodeling”.

11. The word "feature" in paragraph 3 is closest in meaning to ....

a	introduce
b	make
c	highlight
d	include

12. The meaning of the extract – "but with all the amenities of our suites", in the line before the last, is ....

a	but with all the furniture removed from old apartments.
b	holding, nevertheless, the complete equipment of our apartments.
c	yet, at a little higher price, as in case of hotel apartments.
d	containing, of course, some small adjustments to our apartments.

### NATO ratings

NATO is generally seen in a positive light across publics within the alliance, despite lingering tensions between the leaders of individual member countries. A median of 53% across 16 member countries surveyed have a favorable view of the organization, with only 27% expressing a negative view.

Positive ratings of NATO among members range from a high of 82% in Poland to 21% in Turkey, with the United States and Germany in the middle at 52% and 57%, respectively. And in the three nonmember states surveyed, Sweden and Ukraine see the alliance positively (63% and 53%, respectively), but only 16% of Russians say the same.

Favorable views of the organization have fluctuated over time among both NATO member and nonmember countries. Since the late 2000s, favorable opinions of NATO are up 10 percentage points or more in Ukraine, Lithuania and Poland. However, positive opinions of NATO are down significantly in Bulgaria, Russia, Germany and France over the past decade, with double-digit percentage point declines in each of these countries. Favorable views of the organization are also down significantly in Spain and the Czech Republic.

13. The surveys referred to in the text have been conducted among...

a	leaders of individual member countries.
b	members of the public within NATO countries.
c	NATO member and non-member countries.
d	sixteen member countries.

14. The lowest rating among NATO members is....

a	16%.
b	21%.
c	52%.
d	10%.

15. The non-member country with the highest rating is....

a	Lithuania.
b	Ukraine.
c	Russia.
d	Sweden.

16. The text informs us that positive views of NATO ...

a	have been found with member states.
b	have decreased tremendously.
c	have met ups and downs.
d	have been imposed by membership.

17. The word "lingering" in paragraph 1, line 2 refers to ...

a	persisting
b	ceasing
c	subsiding
d	increasing

18. The term "double-digit percentage point" in paragraph 2, lines 4-5, represents an amount of ... decline.

a	more than 2%
b	more than 10%
c	less than 10%
d	less than 2%