MASARYK INSTITUTE OF ADVANCED STUDIES

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ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

SPECIMEN OF ADMISSION TEST

Bachelor´s degree programme – Academic Year 2021/22 – English language

Read the sentences and write the correct answers (A, B, C or D) on your answer sheet.

1. This prestigious hotel group _____ to recruit dedicated professionals for management positions.
   a) looks for
   b) seeks
   c) finds
   d) searches
2. I am writing _____ reply to your advertisement in the International Gazette.
   a) for
   b) as
   c) in
   d) with
3. Please find _____ my CV with full details of my experience to date.
   a) connected
   b) inserted
   c) enclosed
   d) included
4. If you send the CV in time, you _____ for a job interview.
   a) will invite
   b) invited
   c) could be invited
   d) will be invited
5. I would enjoy the challenge _____ to maintain high standards in a top-class hotel.
   a) of working
   b) to work
   c) of work
   d) with working
6. **Read the text below and mark the correct answer (A, B, C or D) on your answer sheet.**

This is an airport sign. What does it mean?

Baggage must not be left unattended at any time

a) You always have to carry your baggage with you.
b) You do not need to be around your baggage.
c) You can leave your baggage at any time.
d) You have got to check your baggage at times.

7. Find the best answer for the following telephone conversation. Mark the correct letter (A, B, C or D) on the answer sheet.

A: Hello, Reservations. Jenny Rathbone speaking. Can I help you?
B: Yes, is Mr. Travers there, please?
A: No, _____

a) … I'm regret he's out at the moment. Would you like to give a message?
b) … I'm regret he's out at the moment. Would you like to leave a message?
c) … I'm afraid he's out at the moment. Would you like to leave a message?
d) … I'm afraid he's out at the moment. Would you like to give a message?

8. Read the text below and decide what type of text it is. Write the correct alternative (A, B, C or D) on your answer sheet.

a) a job advertisement
b) an article about a specific type of job
c) a description of a study programme
d) a letter sharing experience of a job

People visit leisure attractions for a variety of reasons: it could be for the view, for the ride, for learning, or just for the experience. Whichever attraction they choose, people take their leisure time seriously, and their expectations for quality and service are always high. So, whether you work in an historic building, a theme park, a museum, or a water world, you will be helping to satisfy people's dreams and expectations.

All leisure attractions need catering staff, but if you are technically minded, there are also jobs for electricians, plumbers, carpenters, and ground staff. Today, you can also be employed as a 'pirate', or a 'wild west cowboy' and these jobs are exciting, challenging, and … different! What brings them together is the need for them to be able to help others enjoy themselves, either for an hour, for a day, or sometimes even longer.

Whether you want to work for the whole year, a season, weekends, or evenings, the choice is yours. It's important that you are able to keep going, regardless of how you feel. You must always deliver to your guests the 'experience' that they have chosen and paid for.

Read the text above again and decide if the following statements are true (T), false (F) or if the text does not say (DS). Write the correct alternative on your answer sheet.

9. People come to leisure attractions to have fun.
a) T
b) F
c) DS

10. People working at a leisure attraction are expected to have the visitors' interests and wishes in mind at all times.
a) T
b) F
c) DS

Texts and sentences adapted from: DUCKWORTH, Michael. *Going International: English for Tourism. Workbook.* Oxford: Oxford University Press, 1998.

MASARYK INSTITUTE OF ADVANCED STUDIES

ČVUT ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

SPECIMEN OF ADMISSION TEST

Bachelor´s degree programme – Academic Year 2021/22 - Mathematics

1) Simplify the expression:

$$\left(\frac{6a}{6-3a}+\frac{2a}{a+2}+\frac{6a}{a^2-4}\right):\frac{2}{2-a}$$

a) $\frac{1}{a-2}$ **b)** $\frac{-1}{a+2}$ **c)** $\frac{a}{a+2}$ **d)** $\frac{a}{a-2}$

2) Determine, how many integers is the solution of the following inequality.

$$|2x-4| \leq 7$$

a) 5 **b)** 6 **c)** 7 **d)** 8

3) Solve, for x and y, the following system of equations:

$$x^2+y^2+3x=4$$
$$x+2y-4=0$$

a) $\left[\frac{4}{5};\frac{12}{5}\right],[0;2]$ **b)** $\left[-\frac{4}{5};\frac{12}{5}\right],[0;2]$ **c)** $[-4;0],[0;2]$ **d)** $[-4;0],[0;-2]$

4) Determine all the solutions of the equations located in the interval $(-\pi;\pi)$

$$\sin x+\sin 2x=0$$

a) $x_1=0;\ x_2=\frac{5\pi}{6};\ x_3=\pi$ **b)** $x_1=0;\ x_2=\frac{2\pi}{3};\ x_3=\frac{5\pi}{6}$

c) $x_1 = -\frac{5\pi}{6};\ x_2 = 0;\ x_3 = \frac{5\pi}{6}$ **d)** $x_1 = -\frac{2\pi}{3};\ x_2 = 0;\ x_3 = \frac{2\pi}{3}$

5) Calculate the area of isosceles triangle that is inscribed in a circle. The diameter of the circle is 12 cm.

a) 27 cm^2 **b)** $\frac{81}{2}\ cm^2$ **c)** $27\sqrt{3} cm^2$ **d)** $\frac{81\sqrt{5}}{5}\ cm^2$

6) The surface area of a cylinder with diameter 8 *cm* is $80\pi\ cm^2$. Determine the volume of this cylinder.

a) $128\pi\ cm^3$ **b)** $96\pi\ cm^3$ **c)** $64\pi\ cm^3$ **d)** $56\pi\ cm^3$

7) The edges of cuboid *a, b, c* are first three terms of an arithmetic progression. The sum of edges *a + b + c* is 24 cm and the volume of the cuboid is 312 cm^3. Determine the first term *a* and difference *d* of the arithmetic progression.

a) *a* = 3 cm; *d* = 5 **b)** *a* = 4 cm; *d* = 4 **c)** *a* = 5 cm; *d* = 3 **d)** *a* = 6 cm; *d* = 2

8) Find the equation of a line that passes through the points A[-3;1] and B[2;2].

a) $x + 5y - 2 = 0$ **b)** $x - 5y + 8 = 0$ **c)** $5x - y + 16 = 0$ **d)** $5x + y + 14 = 0$

9) There are 8 kinds of ice cream on offer in a sweet-shop. You can choose between two cone types (normal or sweet). You can also choose one or two out of five different decorating toppings. How many ice cream combinations can you possibly buy (in that sweet-shop)?

a) 400 **b)** 240 **c)** 160 **d)** 80

10) The population of a small town decreases every year by 5%. 7 220 people lived here at the end of 2020. How many people lived here at the end of 2018?

a) 7 942 **b)** 7 960 **c)** 8 022 **d)** 8 000

Solution: 1c; 2c; 3b; 4d; 5c; 6b; 7a; 8b; 9b; 10d

Solution procedures:

1) $\left(\frac{6a}{6-3a}+\frac{2a}{a+2}+\frac{6a}{a^2-4}\right):\frac{2}{2-a}=\frac{-6a(a+2)+3*2a(a-2)+3*6a}{3(a+2)(a-2)}\cdot\frac{2-a}{2}=$

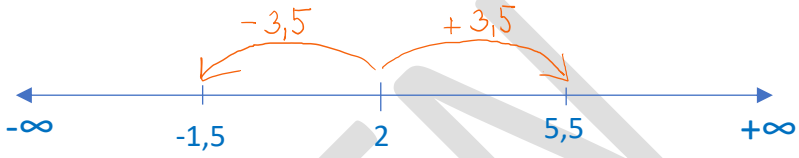
$\frac{-6a^2-12a+6a^2-12a+18a}{3(a+2)}*\frac{-1}{2}=\frac{-6a}{3(a+2)}*\frac{-1}{2}=\frac{-a}{a+2}*\frac{-1}{2}=\frac{a}{a+2}$ $\quad a\neq\pm2$

2) $|2x-4|\leq 7$

$2|x-2|\leq 7$

$|x-2|\leq 3{,}5$

$zero\ point: x-2=0\rightarrow x=2$



The distance from the zero (turning) point is less than 3,5 or is equal to 3,5

$x\in\langle-1{,}5;5{,}5\rangle \rightarrow x\in\{-1;0;1;2;3;4;5\}$ → 7 integers

3) $x^2+y^2+3x=4$

$x+2y-4=0 \rightarrow x=4-2y$

$(4-2y)^2+y^2+3(4-2y)=4$

$16-16y+4y^2+y^2+12-6y=4$

$5y^2-22y+24=0$

$y_{1,2}=\frac{22\pm\sqrt{22^2-4*5*24}}{2*5}=\frac{22\pm2}{10}$

$y_1=2;\ y_2=\frac{12}{5}\rightarrow x_1=0;\ x_2=\frac{-4}{5}\rightarrow [0;2];\left[\frac{-4}{5};\frac{12}{5}\right]$

4) $\sin x+\sin 2x=0$

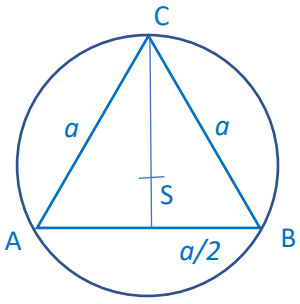
$\sin x+2sinx*cosx=0$

$\sin x\cdot(1+2cosx)=0$

$\sin x=0 \quad or \quad 1+2cosx=0 \rightarrow \cos x=-\frac{1}{2}$ in the interval $(-\pi;\pi)$

$x_1=0$ $\qquad x_2=-\frac{2\pi}{3};\ x_3=\frac{2\pi}{3}$

5)



$|CS|=r=\frac{2}{3}t_a=\frac{2}{3}v_a=6cm \rightarrow v_a=9cm$

$9^2=a^2-\left(\frac{a}{2}\right)^2$

$81=\frac{3a^2}{4}\rightarrow a^2=\frac{4\cdot81}{3}=108$

$a=\sqrt{108}=\sqrt{36*3}=6\sqrt{3}$

$$S = \frac{a \cdot v_a}{2} = \frac{6\sqrt{3} \cdot 9}{2} = 27\sqrt{3}\ cm^2$$

6) $S = 2\pi r^2 + 2\pi rv = 80\pi\ cm^2$ and $d = 8\ cm \ \rightarrow \ r = 4\ cm$

$S = 2\pi * 16 + 2\pi * 4 * v = 80\pi$

$32\pi + 8\pi v = 80\pi$

$8\pi v = 48\pi \ \rightarrow \ v = 6\ cm \ \rightarrow \ V = \pi r^2 v = \pi * 16 * 6 = 96\pi\ cm^2$

7) three terms of an arithmetic progression: $x - d; x; x + d$

$a + b + c = x - d + x + x + d = 24$

$3x = 24 \ \rightarrow \ x = 8$

$(x - d) * x * (x + d) = 312$

$(8 - d) * 8 * (8 + d) = 312$

$(8 - d) * (8 + d) = 39$

$64 - d^2 = 39$

$25 - d^2 = 0$

$(5 - d) * (5 + d) = 0$

$d_1 = 5;\ d_2 = -5 \ \rightarrow \ a = 3\ cm; b = 8\ cm; c = 13\ cm \ \rightarrow \ a = 3cm; d = 5$

(The second solution is *a= 13 cm; d = -5* and gives the same side lenghts)

8) A[-3;1] and B[2;2] gives the direction vector $\vec{u} = (5; 1)$ and the normal vector $\vec{n} = (1; -5)$

the equation is: $x - 5y + c = 0$

substitute A[-3;1] : $-3 - 5 * 1 + c = 0 \ \rightarrow \ c = -2$

$x - 5y - 2 = 0$

9) one topping or two out of five toppings

$8 * 2 * 5 \quad + \quad 8 * 2 * \binom{5}{2} = 80 + 16 * 10 = 80 + 160 = 240$

10) $x * 0{,}95 * 0{,}95 = 7220$

$x * 0{,}95^2 = 7220$

$x = 7220 : 0{,}95^2$

$x = 8000$