



‘Everyone’s a Nobel Prize-winner’

Maria Goeppert-Mayer Regional Interdisciplinary English Competition

Dear Contestants,

You will have 90 minutes to do the quiz, which consists of 40 multiple-choice questions*. To answer them, you must decide which of these answers are correct (only **one** each time) and put the letter (a, b, c, or d) associated with the given answer into the grid on your answer card.

There is also one extra task which tests not only your ability to think logically, but also your spatial imagination. Please draw the picture on the grid paper provided on page 7.

- Mrs Cook has blood group AB and Mr Cook has blood group O. What blood group can their child have?
 - A or B**
 - A or B or O
 - AB or O
 - A or B or AB
- Water which doesn’t get soapy easily is
 - heavy
 - soft
 - hard**
 - distilled
- Where do the lines of latitude converge?
 - At the North Pole
 - At the Equator
 - At the South Pole
 - They do not**
- The street in Katowice named after Maria Goeppert-Mayer
 - connects Sosnowiec and Katowice.
 - is located in the city center.**
 - is adjacent to the Faculty of Mathematics, Physics and Chemistry, University of Silesia.
 - commemorates the 50 anniversary of awarding The Noble Prize to her
- A passenger car is turning to the left. Which wheel traces a circle at the largest radius?
 - Left front wheel
 - Right front wheel**
 - Right rear wheel
 - Each wheel traces the circle at the same radius
- Bobby was examining an angle measuring $14\frac{1}{2}$ degrees, using his magnifying glass that magnifies everything two times. Under the glass, how large would that angle measure?
 - 29°
 - $14\frac{1}{2}^\circ$**
 - $7\frac{1}{4}^\circ$
 - It depends on the size of the magnifying glass.

7. In this three-volume encyclopedia, each volume has 1,000 pages. How many pages are there between the last page of the R-Z volume and the first page of the L-Q volume, discounting the covers?

- a). 1,000
- b). 2,000
- c). 3,000
- d). **0**



8. Where does a human have the smallest bone?

- a). In the foot
- b). In the hand
- c). In the nose
- d). **In the ear**

9. What will happen if you enter a tight room, 100 % full of methane and strike a match?

- a). The match will go out.
- b). Everything will blow up.
- c). **Nothing.**
- d). The match will break.

10. What language do the inhabitants of the North Pole speak?

- a). English
- b). Icelandic
- c). Greenlandic
- d). **There is no native language of this area**

11. Most people from Garbul only speak the language, Garblese. However, most people who only speak Garblese come from Bilgo. Most people from Bilgo speak the language, Bilge. Which of the following statements can be deduced from this information?

- a). **Garblese is spoken by more people than Bilge.**
- b). There are fewer people in Garbul than in Bilgo.
- c). Some people from Garbul speak Bilge.
- d). Some people in Bilgo do not speak either Garbles or Bilge.

12. Working on the atom structure earned Maria Goeppert-Mayer the nickname:

- a). The Madonna of the Atom
- b). The Lady of the Onion
- c). **The Madonna of the Onion**
- d). The Queen of the Atom

13. Henry collects arachnids and insects. He put spiders and beetles into a matchbox. He had 8 insects together. The insects had 54 legs. How many spiders and beetles did Henry put into the box?

- a). **5 beetles and 3 spiders**
- b). 5 beetles and 5 spiders
- c). 3 beetles and 5 spiders
- d). 3 beetles and 3 spiders

14. What is the taste of sodium chloride?

- a). Sweet
- b). **Sour**
- c). Salty
- d). Tasteless

15. What kind of energy is released when coal, oil, gas and other fuel are burned?
- a). Mechanical b). Nuclear c). **Chemical** d). Kinetic
16. NASA received three messages in a strange language from a distant planet. The scientists studied the messages and found that "Necor Buldon Slock" means "Danger Rocket Explosion" and "Edwan Mynor Necor" means "Danger Spaceship Fire" and "Buldon Gimilzor Gondor" means "Bad Gas Explosion". What does "Slock" mean?
- a). Danger b). Explosion c). Nothing d). **Rocket**
17. On Earth, if the main source of light during the day is the sun, what is the main source of light on a moonlight night?
- a). The moon b). **The sun** c). The stars d). The lamps
18. The Mugwumpdee people divide their year into eighteen mugs of four wumps each, there being five dees in a wump. Next year the first day of the Mugwumpdee calendar coincides with ours. What date in our calendar would their first dee of the second wump in the third mug be?
- a). 15 Jan b). 25 Jan c). **15 Feb** d). 25 Feb
19. Marie Goeppert-Mayer was
- a). **the second female Noble laureate in physics.**
b). the second woman ever to win a Nobel prize.
c). the first U.S. woman to win a Noble prize.
d). All of the above are true.
20. What will happen if you put one sugar cube and one ice-cube in a glass of hot water?
- a). **Ice will melt and sugar will dissolve.** c). Ice and sugar will dissolve.
b). Ice and sugar will melt. d). Ice will dissolve and sugar will melt.
21. Take the number of days in a leap year, add the number of months with 30 days, divide by the number of loaves in 'a baker's dozen', add the number of days in March, add the square root of nine, divide by the number of days in a week. Which month are you left with?
- a). August b). **September** c). October d). November
22. What do the emu, ostrich and kiwi have in common?
- a). **They cannot fly.** c). They all live in Australia.
b). They can run very fast. d). They are all national symbols.
23. A man builds a house rectangular in shape. All sides have southern exposure. A big bear walks by, what color is the bear?
- a). Black b). Brown c). Grey d). **White**

24. The element sulphur is most likely to
- conduct heat and electricity
 - have a dull appearance**
 - be shiny
 - melt at a high temperature
25. Do we have any volcanoes in Poland?
- No, we don't.
 - Yes, we have some at the seaside.
 - Yes, but only the extinct ones.**
 - Yes, but only the dormant ones.
26. Which statement best describes most plants that grow in arid environments?
- They are unable to store moisture.
 - They do not need to be pollinated.
 - They have a complex root system.**
 - They grow only as ground cover.
27. A million is the name of a number representing the figure 1 with six noughts after it: 1,000,000. A googol is also the name of a number representing the figure 1 with 100 noughts after it: 10, 000, 000, 000,000,000,000,000,000,000,000,000,000,000,000, 000,000, 000, 000, 000, 000, 000, 000, 000,000, 000,000,000,000,000,000,000, 000,000.
- A large number! But the largest number ever named is a 'googolplex' which represents the figure 1 with one googol noughts after it. Can you work out how long it would take a printer, printing at 10 characters a second, to print it out?
- 100 seconds.
 - Ten thousand million million years.
 - 41.5 years.
 - One tenth of a googol second.**
28. Maria Goeppert –Mayer
- worked on the measurement of the speed of light.
 - discovered the isotopes.
 - developed the nuclear shell model of atomic nuclei.**
 - measured the charge on the electron.
29. People have learnt to measure temperature by means of thermometers which work because of the fact that:
- gas when heated decreases its volume
 - gas reacts to temperature change in a different way than liquid does
 - substances increase their volume proportionally to temperature increase**
 - each substance boils at a different temperature
30. If you put on your jacket so it is back to front and inside out , where would your right pocket be?
- On your right
 - Outside
 - Up the back
 - On your left**
31. What will happen to the air when compressed and cooled to a temperature of -200 C ?
- It will evaporate
 - It will liquefy**
 - It will blow up
 - It will get frozen

32. A baker once forgot to add baking powder (which contains baking soda) to a cake he was baking. How would his cake turn out?

- a). It would be semi-liquid except around the edges (it would not be uniformly heated)
- b). It would taste like anhydrous sodium chloride crystals
- c). It would as a whole cook too fast and the edges would get burnt
- d). **It would be comparatively hard and small**

33. If it rains 'cats and dogs' at midnight, can one expect sunny weather after 72 hours?

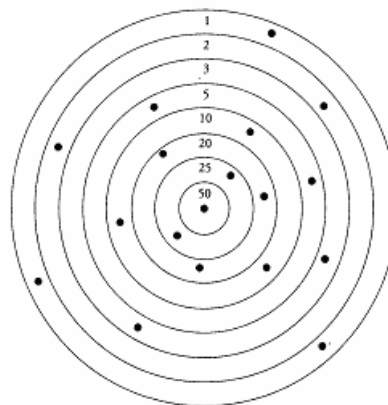
- a). Yes, why not?
- b). Not, the weather can't change so quickly
- c). **It depends where you are**
- d). Yes, but only if it rains for a short time

34. In 1963, Maria Goeppert-Mayer shared the Noble prize for Physics with:

- a). J. Hans D. Jensen, a German nuclear physicist
- b). Eugene Paul Wigner, a Hungarian American physicist
- c). **both of them**
- d). soomeone else

35. Three archers took six shots at the same target and each of them scored 71 points. Archer A in his two first shots scored 22 points, archer B in his first shot scored 3 points. Who hit the bull's eye?

- a). Archer A
- b). **Archer B**
- c). Archer C
- d). It cannot be decided



36. In the beginning there were many ways of keeping time. One method, which did not work on overcast days or at night, was the sundial. On what other factor was operation of a sundial dependent?

- a). Longitude
- b). **Latitude**
- c). Knowledge of calculus
- d). Altitude

37. If you add basic colors (red, blue, yellow) in adequate proportions, you can obtain:

- a). only color white
- b). every color except white
- c). only color black
- d). **different answer**

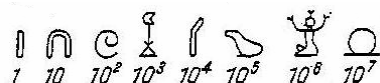
38. A boat has a ladder that has six rungs; each rung is one foot apart. The bottom rung is one foot from the water. The tide rises at 12 inches every 15 minutes. High tide peaks in one hour. When the tide is at its highest, how many rungs are under water?

- a). 4 b). **None** c). 3 d). 6

39. If you take hold of each end of a straight piece of string in each hand, while your arms are folded, what will happen when you unfold your arms?

- a). Your wrists will be tied together c). The string will be straight
b). **The string will have a knot in it** d). It cannot be done

40. The basic Egyptian digits are:



How much is: 

- a). 1027 b). 100967 c). 196700000 d). **1967**

EXTRA TASK:

There are some machines in a factory hall. Your task is to arrange any number of machines around the hall in such a way that you meet the following requirements:

- Machines cannot touch each other. There must be a space of one square between them.
- Machines may touch the walls.
- The total value of the machines must be as high as possible.

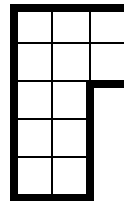
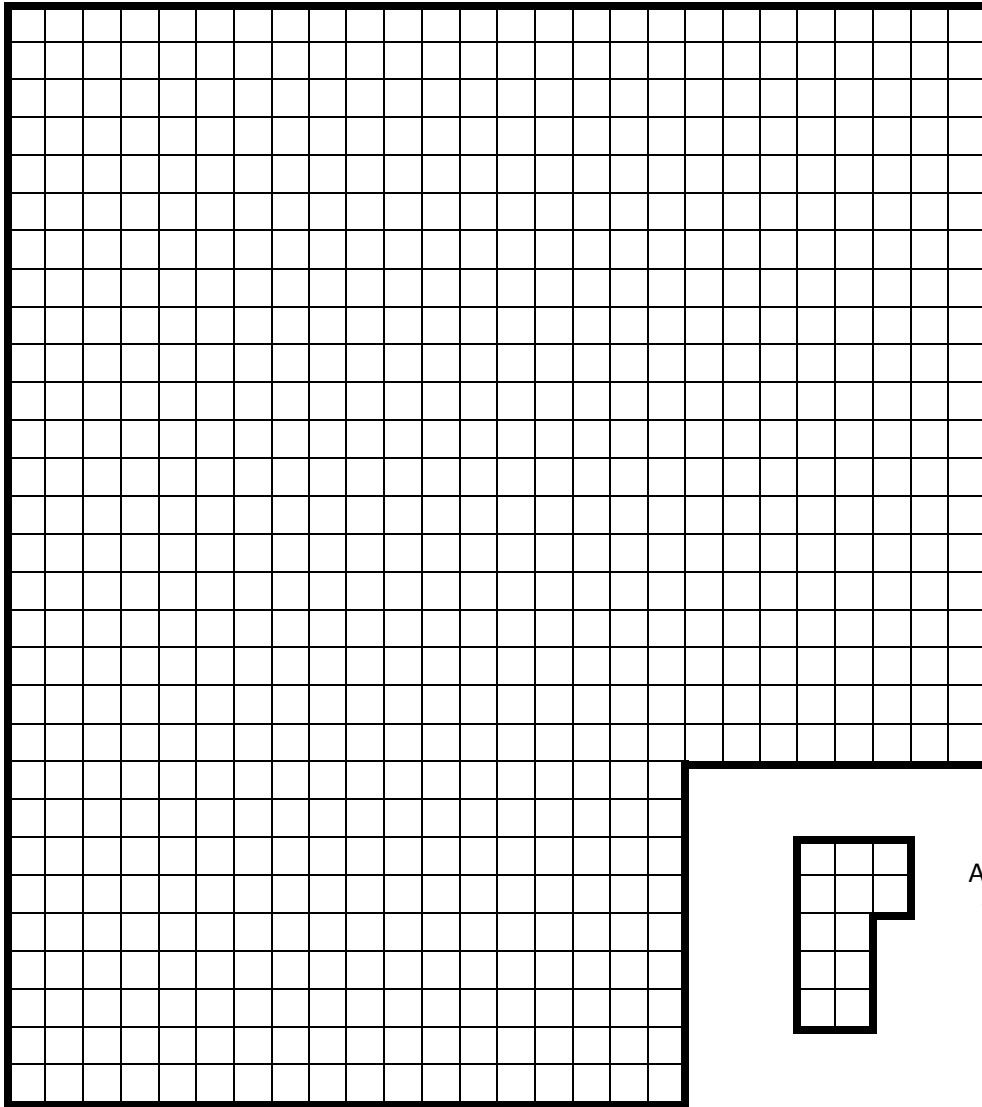
Knowing that A-type machines are worth 1000 € each and B-type 3000 € each sketch the arrangement of the machines and calculate their total value.

Good luck!

*The questions come from:

- www.brainbashers.com
- <http://www.scribd.com/>
- <http://www.mailpound.com>
- <http://answers.yahoo.com/>
- www.funtrivia.com
- Clive Doig "Beat the Teacher", BBC Books, Londyn 1988
- Stanisław Kowal "500 ZAGADEK MATEMATYCZNYCH", Wiedza Powszechna, Warszawa 1971
- "Miniatury matematyczne dla szkół gimnazjalnych", Wydawnictwo Aksjomat, Toruń 2005
- Bobiński Zbigniew(red), "Matematyka z wesołym Kangurem", Wydawnictwo Aksjomat, Toruń 1999
- Polsko-Ukraiński Konkurs Fizyczny „Lwiątko” <http://www.lwiatko.org/>

Factory Hall



A-type machine
worth 1000 €

B-type machine
worth 3000 €

