

MASARYKOVA UNIVERZITA

Centrum jazykového vzdělávání na Přírodovědecké fakultě

JAF03-4 (Angličtina pro fyziky)

Version S

Druh termínu

Vyberte datum

NAME:		UČO:
Listening:		Subtotal (33 points out of 55 to pass)
Grammar & Vocabulary:		
Reading:		

LISTENING

(TASK 1)

_____ points

TASK 1

(1 point per item; total: 10 points)

You will hear a climatologist giving a talk on climate. In statements 1 – 8 below fill in the gaps. Use just one word for each gap. You will hear the talk twice:

1. Human activities cause _____ to the atmosphere, oceans and composition of the air.
2. Therefore, scientists study the _____ of this phenomenon on sea levels, temperature, rainfall, hydrological resources.
3. The decisions we make are based on the _____ we have for the climate.
4. It seems that the models based on experience are no longer _____.
5. We need new information to build _____ for the future.
6. Scientists derive their predictions from processes that they can _____.
7. Scientists ask what controls the _____ of various climatic events.
8. The approach that scientists take is rather _____.
9. Scientists combine the small-scale processes in order to predict the emerging _____ of the complex system.
10. Many phenomena in the climate are not _____ from the small-scale processes.

GRAMMAR & VOCABULARY

(TASKS 2 – 6) _____ points

TASK 2

(1 point per item; total: 4 points)

Various parts of sentences 11 – 14 below are underlined. Write questions in which you ask about the underlined parts. Keep the structure of the original sentence (including tenses and all semantically important words), the only task is to transform it to a question.

Examples: He is going to write the final part of the thesis next month.

Which part of the thesis is he going to write next month?

11. Zero in questionnaire A corresponds to “disagree strongly”.

_____?

12. The articles published in Science contributed to his fame.

_____?

13. The invited authors’ contributions have resulted in an impressive book.

_____?

14. That student does not interpret his research data appropriately.

_____?

TASK 3

(1 point per item; total: 4 points)

In items 15 – 18, complete a new sentence so that it has a similar meaning to the original sentence(s). The number of words that you should use to complete the new sentence is given in the brackets.

Example: They published this book in England.

The book **was published (2 words)** in England.

15. I was silly to choose that university.

I shouldn’t _____ **(2 words)** that university.

16. “I’ll be prepared for the presentation of the new technologies”, she said to me.

She told me she _____ **(3 words)** for the presentation of the new technologies.

17. Would you like to join us in our qualitative research?

Are you interested _____ **(2 words)** us in our qualitative research?

18. She doesn’t study cartography at the faculty any more. She failed her exams.

She used _____ **(2 words)** cartography at the faculty.

TASK 4

(1 point per item; total: 3 points)

For questions 19 – 21, decide which answer (A, B, C or D) best fits each gap:

19. The experiment did not work well. _____, we decided to repeat it.

A: With reference to B: Provided that C: Despite the fact D: For this reason

20. He used an eight-point scale in the questionnaire, _____ a four-point one, used by me.

A: considering B: consequently C: in spite of D: as opposed to

21. “I think, _____ I am” is a philosophical statement proposed by the French thinker René Descartes.

A: actually B: therefore C: moreover D: even though

TASK 5

(1 point per item; total: 8 points)

Complete gaps 22– 29 in the text below with the following words. There are three words that you will not need to use:

**ASSUMED, BASED, CONCERNED, CONTRIBUTION, DEALS, DENSE, DEVELOPED,
DIMENSIONS, FORM, RANGE, REJECTED**

The nucleus is the small, (22) _____ region consisting of protons and neutrons at the center of an atom. The atomic nucleus was discovered in 1911 by Ernest Rutherford (23) _____ on the 1909 Geiger–Marsden gold foil experiment. After the discovery of the neutron in 1932, models for a nucleus composed of protons and neutrons were quickly (24) _____ by Dmitri Ivanenko and Werner Heisenberg. Almost all of the mass of an atom is located in the nucleus, with a very small (25) _____ from the electron cloud. Protons and neutrons are bound together to (26) _____ a nucleus by the nuclear force.

The diameter of the nucleus is in the (27) _____ of 1.75 fm (1.75×10^{-15} m) for hydrogen (the diameter of a single proton) to about 15 fm for the heaviest atoms, such as uranium. These (28) _____ are much smaller than the diameter of the atom itself (nucleus + electron cloud), by a factor of about 23,000 (uranium) to about 145,000 (hydrogen).

The branch of physics (29) _____ with the study and understanding of the atomic nucleus, including its composition and the forces which bind it together, is called nuclear physics.

TASK 6

(1 point per item; total: 6 points)

In sentences 30– 35 below, use the word given in brackets in capital letters to form a word that fits in the gap. Use only one word for each gap. Do not use **-ing** forms:

Example: This **procedure** should be carefully controlled and taken into account. (**PROCEED**)

30. Various statistical _____ showed no significant difference between the two types of sites. (**ANALYSE**)
31. He had no intention of getting drawn into a _____ discussion. (**HYPOTHESIS**)
32. The _____ process can delay the results. (**VERIFY**)
33. In order for the medicine to work _____ you must take the correct amount. (**EFFECTIVITY**)
34. What is an _____ in science? (**ASSUME**)
35. When preparing for a presentation, should I _____ it all? (**MEMORY**)

READING

(TASKS 7 – 9)

_____ points

TASK 7

(1 point per item; total: 5 points)

In the text below find five words that fit the meaning of explanations 36 – 40. Find **only one word** for each explanation. The words occur in the text in the same order as their explanations below the text. An example has been done for you:

The Unreality of Time

Philosophy and physics may seem like **polar** opposites, but they regularly address quite similar questions. Recently, physicists have revisited a topic with modern philosophical origins dating over a century ago: the unreality of time. What if the passage of time were merely an illusion? Can a world without time make sense?

While a world without the familiar passage of time may seem far-fetched, big names in physics, such as string theory pioneer Ed Witten and theorist Brian Greene, have recently embraced such an idea. A timeless reality may help reconcile differences between quantum mechanics and relativity, but how can we make sense of such a world? If physics does indeed suggest that the flow of time is illusory, then philosophy may be able to shed light on such a strange notion.

Example: completely opposite in character, quality or type: **polar**

36. deal with: _____

37. discussed a subject again: _____

38. one of the first people to do something new: _____

39. accepted with enthusiasm: _____

40. an idea or an understanding of something: _____

TASK 8*(1 point per item; total: 9 points)*

Nine parts of sentences have been removed from the text below. Choose one of parts (A – J) for each gap (41 – 49). Write the appropriate letter next to a number, e.g. **57 K**:

- A: both the physicist's and the philosopher's sensibilities
- B: and it's not possible for something to come from nothing
- C: perplex us about our existence
- D: that an intimate knowledge of science is essential for their discipline
- E: to contribute to our understanding of "fundamental questions"
- F: because philosophers haven't kept up with science
- G: well established by contemporary cosmology
- H: his religious and philosophical critics are absolutely right
- J: requires an immaterial explanation

Physicists have been giving philosophers a hard time lately. Stephen Hawking claimed in a speech last year that philosophy is "dead" (41) _____. More recently, Lawrence Krauss has insisted that "philosophy and theology are incapable of addressing by themselves the truly fundamental questions that (42) _____." David Albert, a distinguished philosopher of science, dismissively reviewed Krauss's book: "all there is to say about this [Krauss's claim that the universe may have come from nothing], as far as I can see, is that Krauss is dead wrong and (43) _____." Krauss — ignoring Albert's Ph.D. in theoretical physics — retorted in an interview that Albert is a "moronic philosopher."

Krauss doesn't deny that philosophers may have something (44) _____. And almost all philosophers of science — certainly Albert — would agree (45) _____. So it should be possible to at least start a line of thought that incorporates (46) _____.

There is a long tradition of philosophers' arguing for the existence of God on the grounds that the material (physical) universe as a whole (47) _____. Otherwise, they maintain, the universe would have to originate from nothing, (48) _____. One response to the argument is that the universe may have always existed and so never came into being, but the Big Bang, (49) _____ is often said to exclude this possibility.

TASK 9

(1 point per item; total: 6 points)

Read the text and decide which of the options A – D in items 50 – 55 is correct:

We live in an age of constant scientific discovery — a world shaped by revolutionary new technologies. More and more, scientific and technological issues dominate national discourse, from environmental debates on ozone depletion and acid rain, to economic threats from climate change and invasive species. Understanding these debates has become as basic as reading. All citizens need to be scientifically literate to appreciate the world around them and make informed personal choices.

Scientists and educators should be accountable for providing everyone with the background knowledge to help us cope with the fast-paced changes of today and tomorrow. What is scientific literacy and why is it important?

In my opinion, scientific literacy is a mix of concepts, history, and philosophy that help you understand the scientific issues of our time. Scientific literacy is rooted in the most general scientific principles and broad knowledge of science. If you can understand scientific issues in magazines and newspapers then you are scientifically literate.

Admittedly, this definition does not satisfy everyone. Some academics argue that science education should expose students to mathematical rigor and complex vocabulary. They want everyone to experience this taste of “real” science. But I feel strongly that those who insist that everyone must understand science at a deep level are confusing two important but separate aspects of scientific knowledge: doing science and using science. Logically, scientific literacy concerns only the latter.

Interestingly, intense study of a particular field of science does not necessarily make one scientifically literate. Indeed, I am often amazed at the degree to which working scientists are often uninformed in scientific fields outside their own field of professional expertise. I once asked a group of twenty-four Ph.D. physicists and geologists to explain the difference between DNA and RNA. I found only three colleagues who could do so, and they did research in areas where this knowledge was useful. Unfortunately, the education of professional scientists is often just as narrowly focused as the education of any other group of professionals, so scientists are just as likely to be ignorant of scientific matters outside their own specialty as anyone else.

50. According to the author
- A: national debate should be more focused on science.
 - B: scientific issues in magazines are difficult to understand.
 - C: people should participate more in discussing scientific issues.
 - D: scientific literacy is the responsibility of scientists and educators.
51. The definition provided by the author has been
- A: developed by the author himself.
 - B: understood with difficulty.
 - C: accepted by academics / generally accepted.
 - D: taken from mass-media.
52. In the author’s view, the defined term is linked to
- A: using science.
 - B: doing science.
 - C: experiencing real science.
 - D: deep understanding of science.
53. The author believes that
- A: narrow focus of science education is an advantage.
 - B: science education should be more interdisciplinary.
 - C: some aspects of scientific knowledge are confusing.
 - D: studying a scientific field leads to scientific literacy.
54. The majority of the scientists interviewed by the author
- A: demonstrated a high degree of scientific literacy.
 - B: did research in DNA and RNA outside their field.
 - C: found the information about DNA and RNA useful.
 - D: were ignorant of scientific issues outside their specialty.
55. The best title for the text is
- A: Education of professional scientists.
 - B: The level of professional expertise in science.
 - C: What does it mean to be scientifically literate?
 - D: Why is scientific literacy discussed in magazines?

WRITING

(TASK 10)

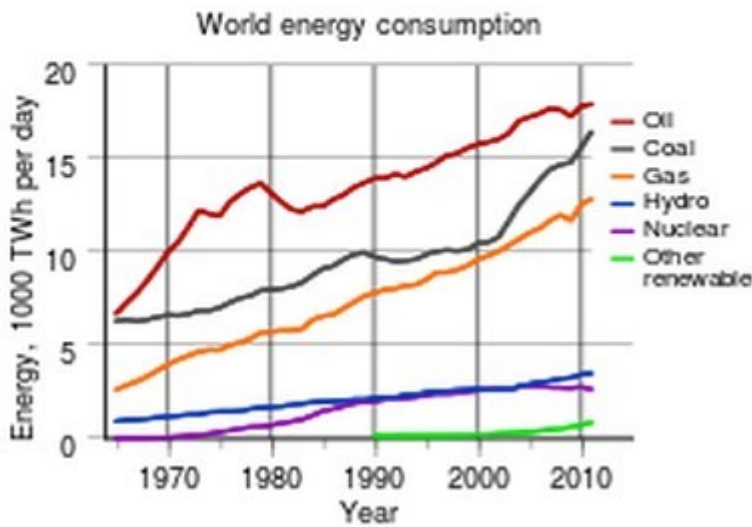
_____ points

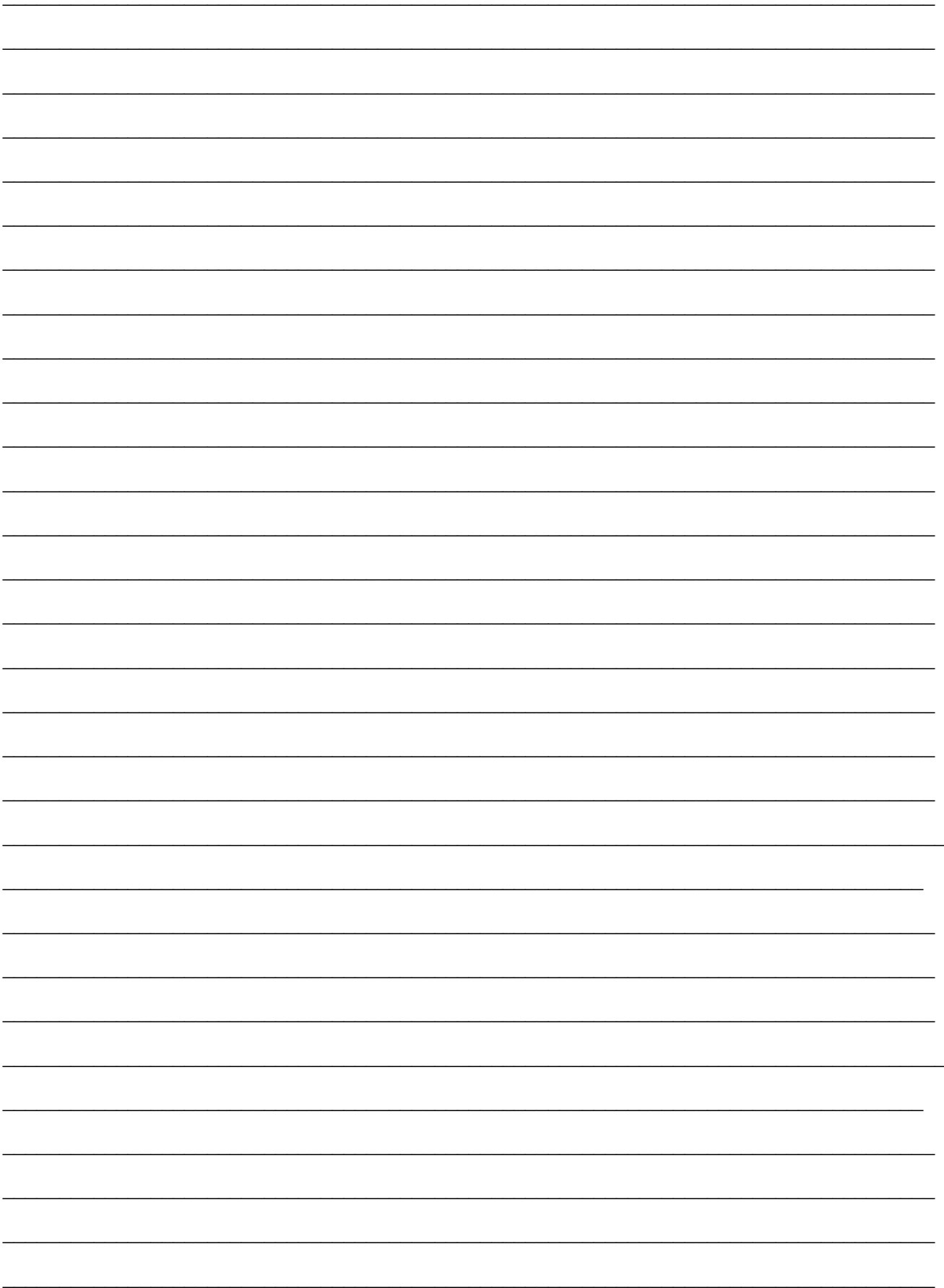
TASK 10

(total: 10 points)

Study the information in the graph and use it to write a comparative analysis. Add examples and reasons where relevant. Your writing should have a coherent / logical structure, i.e. opening, main, and closing parts. (160 words)

Describe and compare the trends in the consumption of individual types of energy sources using a variety of structures to indicate similarities and differences between them:





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KEY

LISTENING

(maximum: 10 points)

TASK 1

(1 point per item; total: 10 points)

Source: <http://edge.org/conversation/the-physics-that-we-know>

Length: 03:54

1. changes
2. impact/impacts
3. expectations
4. valid
5. infrastructure
6. measure/model
7. frequency
8. ambitious
9. properties
10. predictable

GRAMMAR & VOCABULARY

(maximum: 25 points)

TASK 2

(1 point per item; total: 4 points)

11. What does zero in questionnaire A correspond to?
12. What / Which articles / Which of his articles / What articles... contributed to his fame?
13. Whose / Which / Which authors' contributions have resulted in an impressive book?
14. Who does not interpret his research data appropriately? Which student does not...?

TASK 3

(1 point per item; total: 4 points)

15. have chosen/have studied
16. would be prepared
17. in joining
18. to study

TASK 4

(1 point per item; total: 3 points)

19. D
20. D
21. B

TASK 5

(1 point per item; total: 8 points)

Source: Adapted from https://en.wikipedia.org/wiki/Atomic_nucleus

Number of words: 194

22. dense
23. based
24. developed
25. contribution
26. form
27. range
28. dimensions
29. concerned

TASK 6

(1 point per item; total: 6 points)

30. analyses
31. hypothetical/hypothetic
32. verification
33. effectively
34. assumption
35. memorize/memorise

READING

(maximum: 20 points)

TASK 7

(1 point per item; total: 5 points)

Source: Adapted from <http://www.physicscentral.com/explore/plus/timeless.cfm>

Number of words: 135

36. address
37. revisited
38. pioneer
39. embraced
40. notion

TASK 8

(1 point per item; total: 9 points)

Source: Adapted from <http://opinionator.blogs.nytimes.com/2012/05/10/can-physics-and-philosophy-get-along/>.

Number of words: 291

41. F
42. C
43. H
44. E
45. D
46. A
47. I
48. B
49. G

TASK 9

(1 point per item; total: 6 points)

Source: Adapted and abbreviated from <http://www.actionbioscience.org/newfrontiers/hazen.html>

Number of words: 350

50. D
51. A
52. A
53. B
54. D
55. C