



VIDHVATH ACADEMY FOR COMPETITIVE EXAMS

+91 99722 58970, +91 97407 02455

SUBJECT WISE TEST: VPT035 SCIENCE & TECHNOLOGY TEST BOOKLET

Time Allowed: 60 mins

Maximum Marks: 100

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS BOOKLET DOES NOT HAVE ANY UNPRINTED OR TURN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
 2. ENCODE CLEARLY THE TEST BOOKLET SERIES A, B, C OR D AS THE CASE MAY BE IN THE APPROPRIATE PLACE IN THE ANSWER SHEET.
 3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. Do NOT write anything else on the Test Booklet.
-
4. This Test Booklet contains 50 items (Questions). Each item is printed in English. Each item comprises four responses (answers). You will select the response which you want to mark on the Answer Sheet. In case you feel that there is more than one correct response with you consider the best. In any case, choose ONLY ONE response for each item.
 5. You have to mark all your responses ONLY on the separate Answer Sheet provided. See direction in the answers sheet.
 6. All items carry equal marks. Attempt all items. Your total marks will depend only on the number of correct responses marked by you in the answer sheet. For every incorrect response 1/3rd of the allotted marks will be deducted.
 7. Before you proceed to mark in the Answer sheet the response to various items in the Test booklet, you have to fill in some particulars in the answer sheets as per instruction sent to you with your Admission Certificate.
 8. After you have completed filling in all responses on the answer sheet and the examination has concluded, you should hand over to Invigilator only the answer sheet. You are permitted to take away with you the Test Booklet.
 9. Sheet for rough work are appended in the Test Booklet at the end.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ASKED TO DO SO

1. Consider the following statements regarding Geostationary orbit GEO:

1. Satellites in geostationary orbit (GEO) circle the Earth East to west, opposite the Earth's rotation and travels at a faster rate than the Earth
2. Satellites in GEO must always orbit along Earth's equator, and satellites always have to follow a particular path around Earth.
3. GEO satellites are less useful for tasks such as telecommunication, because they move so fast across the sky and therefore require a lot of effort to track from ground stations.

Which of the statements given above is/are not correct?

- (a) 1 and 2 only
- (b) 3 only
- (c) 1 and 3 only
- (d) 2 and 3 only

2. Consider the following statements regarding INS Vishakhapatnam:

1. INS Vishakhapatnam is a state-of-the-art Scorpene Class attack submarines being built at the Mazgaon Docks Limited
2. INS Vishakhapatnam was built under Project 75 which envisages to build a total of four warships namely Visakhapatnam, Mormugao, Imphal and Surat
3. INS Vishakhapatnam is equipped to fight under Nuclear, Biological and Chemical warfare conditions.

Which of the statements given above is/are correct?

- (a) 2 only
- (b) 1 and 3 only
- (c) 3 only
- (d) 1, 2 and 3

3. Consider the following statements regarding ballistic and cruise missiles:

1. Cruise Missile is propelled for a short time after the launch while Ballistic Missile is self-propelled till the end of its flight

2. Ballistic Missile has heavy payload carrying capacity whereas the Cruise Missile payload capacity is limited.
3. Hypersonic cruise missiles travel at a speed of around 2-3 Mach and the Missiles that travel slower than sound are known as subsonic missiles.

Which of the statements given above is/are not correct?

- (a) 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 3 only

4. Consider the following statements regarding Fuel Cell Electric Vehicles:

1. Fuel cells and batteries convert mechanical energy into electrical energy.
2. The Fuel Cell Electric Vehicle combines hydrogen and oxygen to generate an electric current and water is the only by product.
3. The Fuel Cell Electric Vehicles need to be plugged in for charging, same like battery-powered Electric vehicles

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 and 3 only
- (c) 2 only
- (d) 1, 2 and 3

5. Consider the following statements regarding Quantum technology:

1. In traditional cryptography, the security is usually based on solving a certain mathematical problem while in Quantum Key Distribution; security is achieved through the laws of quantum physics.
2. Quantum cryptography is not considered as 'future-proof', as future advancements in the computational power can break quantum cryptosystem.
3. National Mission on Quantum Technology and Applications was

launched by Ministry of Electronics and Information Technology

Which of the statements given above is/are not correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

6. Consider the following statements regarding Block chain technology:

1. Block chain is an innovative distributed ledger technology which was first introduced in the design and development of crypto currency, Bit coin in 2009 by Satoshi Nakamoto
2. The innovation of a block chain is that it guarantees the fidelity and security of a record of data and generates trust by verification of a trusted third party.
3. "National strategy of Block chain Towards Enabling Trusted Digital Platforms" was released by Ministry of finance

Which of the statements given above is /are correct?

- (a) 1 only
- (b) 2 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

7. Consider the following statements regarding Digital currency and virtual Currency:

1. Crypto currency refers to any currency that exists online while digital currency, on the other hand refers to currency held as a record on a block chain database.
2. The digital currency will be backed by the government, while Crypto currencies are independent of any coalition or central authority and are determined only by strong encryption.
3. Digital currency can be a digital format of fiat money whereas crypto currencies is a purely virtual currency, that it has no official physical asset

Which of the statements given above is /are correct?

- (a) 1 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

8. Which of the following statement is Incorrect about Cryogenic Technology?

- (a) It is the study of the production and behavior of materials at extremely low temperatures that are below 150 degrees.
- (b) Cryogenic engines use liquid oxygen as the oxidizer and liquid nitrogen as the fuel.
- (c) Cryogenic Technology is clean technology and more economical.
- (d) Dhawan-1 is India's first privately developed fully cryogenic rocket engine by Sky root Aerospace.

9. What do you mean by 'Iron Dome', recently seen in the news?

- (a) It is a medium-range mobile surface-to-air missile (SAM) system developed by India
- (b) It is an air defence system developed by Israel.
- (c) It is a Man Portable Anti-Tank Guided Missile (MPATGM) developed by South Korea.
- (d) It is a next-generation missile-based standoff torpedo delivery system developed by the USA.

10. Consider the following statements in context of Light Fidelity (LiFi) Technology:

1. LiFi is a wireless optical networking technology, which uses radio waves for data transmission
2. In LiFi, the data rate is dependent on the line of sight and not on the signal quality at the device.
3. The Coverage distance of LiFi is more than WiFi.

Which of the statements given above is/are correct?

- (a) 2 only
- (b) 3 only
- (c) 1 and 2 only
- (d) None of the above

11. Consider the following statements regarding green hydrogen:

1. It is the hydrogen produced using fossil fuels such as natural gas and coal.
2. The production of green hydrogen requires less energy than other fuels and is less expensive to generate.
3. The government launched the National Hydrogen Energy Mission with a view to cutting down carbon emissions and to move from a fossil and import dependent economy to a net-zero economy by 2070.

Which of the statements given above is/are Incorrect?

- (a) 2 and 3 only
- (b) 1 only
- (c) 1 and 2 only
- (d) All of the above

12. Select the Incorrect statement about Solid-State Batteries in comparison with Li-Ion Batteries?

- (a) A solid-state lithium-metal battery replaces the polymer separator used in conventional lithium ion batteries with a solid-state separator.
- (b) A solid-state battery has higher energy density than a lithium-ion battery that uses liquid electrolyte solution.
- (c) A solid-state battery has a higher battery cost by 15-20% relative to the cost of lithium-ion batteries.
- (d) A solid-state battery has lower charging time and the ability to undertake more charging cycles than a lithium-ion battery.

13. The Block chain technology can be used in which of the following areas?

1. Store e-registration data for newly constructed properties

2. Electoral Voting
3. Data mining
4. Insurance

Select the correct answer using the codes given below:

- (a) 1 and 4 only
- (b) 1, 2 and 3 only
- (c) 2 and 3 only
- (d) All of the above

14. Consider the following statements about Internet of Things (IoT):

1. It is essentially a seamless connected network of embedded objects/devices, with identifiers, in which Machine to Machine (M2M) communication with human intervention is possible
2. Machine-to-machine (M2M) interaction provides better efficiency, greater accuracy and helps to maintain transparency.
3. Phones, Tablets and PCs are not included as part of IoT.

Which of the statements given above is/are correct?

- (a) 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) All of the above

15. Recently a 'Sun halo' was witnessed in different parts of Karnataka. In the context of this consider the following statements -

1. It occurs due to absorption of sunlight by the water vapour present in the atmosphere.
2. Sun halos are the indicator of drought.
3. It disrupts the radio transmission on the Earth.

Which of the statements given above is/are Incorrect?

- (a) 2 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) All of the above

16. Consider the following statements regarding Astrosat:

1. AstroSat is the first dedicated Indian astronomy mission aimed at studying celestial sources in X-ray, optical and UV spectral bands simultaneously.
2. AstroSat enables the simultaneous multi wavelength observations of various astronomical objects with a single satellite.
3. After injection into Orbit, the two solar panels of AstroSat need external robotics assistance to deploy in quick succession.

Which of the statements given above is/are correct?

- (a) 3 only
- (b) 1 and 3 only
- (c) 1 and 2 only
- (d) 2 and 3 only

17. Consider the following statements regarding INS-Vikrant:

1. INS-Vikrant is India's first indigenously designed and built aircraft carrier.
2. With commissioning of INS-VIKRANT, India has achieved 100% indigenization in FLOAT, MOVE, FIGHT category in warship.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

18. Consider the following statements regarding joint-military exercise Vajra Prahar:

1. Vajra Prahar is a joint military exercise conducted annually in India between Special Forces of India and the United Kingdom.
2. The 13th Edition of the Indo-US Joint Special Forces exercise commenced at Bakloh, Himachal Pradesh.
3. The exercise aims to share the best practices and experiences in areas

such as joint mission planning and operational tactics.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

19. Consider the following pairs:

Nuclear Reactor: Places

1. Kaiga: Karnataka
2. Kakrapar: Tamilnadu
3. Tarapur: Maharashtra
4. Narora: Gujarat
5. Kudankulam: Kerala

How many pairs given above are not correctly matched?

- (a) Only one pair
- (b) Only two pairs
- (c) Only three pairs
- (d) Only four pairs

20. Consider the following statements regarding Nanotechnology:

1. Nanotechnology is science, engineering, and technology conducted at the nanoscale which is about 1 to 10 nanometers.
2. Nano materials have relatively smaller surface area and small surface area to volume ratio
3. Below 50 nm, the laws of classical physics give way to quantum effects, provoking optical, electrical and magnetic behaviors different from those of the same material at a larger scale.

Which of the statements given above is/are correct?

- (a) 2 only
- (b) 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

21. In the context of Indian Railway consider about 'Kavach'

1. It is a terrain imaging system equipped with an optical and radar

system to reduce greenhouse gas emission by trains.

2. Kavach system has been developed by Research Design and Standards Organization (RDSO) in collaboration with Indian industry and trials facilitated by South Central Railway

Which of the statements given above is/are Correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

22. Consider the following statements in the context of Space mission:-

1. Mission "Vyom Mitra" is an unmanned mission which will carry a robot in the space
2. Solid Propellant 'Vikash engine' is to be used to enhance lifting power
3. The Gaganyaan mission envisages undertaking human spaceflight to Geosynchronous Transfer Orbit (GTO).

Which of the statements given above is/are Incorrect?

- (a) 1 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) All of the above

23. Consider the following statements regarding Black Holes:

1. Most black holes form from the remnants of a large star approximately 3 times the mass of sun that dies in a supernova explosion
2. If the Sun is suddenly replaced with a black hole of the same mass our Earth would be sucked in immediately.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

24. Consider the following statements regarding James Webb Space Telescope:

1. James Webb Space Telescope, an international collaboration between NASA and the Japanese Space Agency has captured new images of our solar system's largest planet, Jupiter.
2. The photographs captured a new view of the planet, its massive storms, colorful auroras, faint rings and two small moons of Jupiter namely Phobos and Deimos.
3. Jupiter's magnetic field also causes spectacular aurorae at the planet's poles

Which of the statements given above is /are correct?

- (a) 1 only
- (b) 2 and 3 only
- (c) 3 only
- (d) 1, 2 and 3

25. Consider the following statements regarding Mangroves:

1. According to the India State of Forest Report, 2021, the mangrove cover in India is less than 1% of the country's total geographical area
2. West Bengal accounts for the highest of India's mangrove cover, followed by odisha and Andaman and Nicobar Islands
3. Mangroves for the Future Initiative were developed by the World Bank and UNEP to promote investment in the conservation of coastal ecosystems.

Which of the statements given above is /are correct?

- (a) 1 only
- (b) 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

26. Consider the following statements regarding Ranganathittu Bird Sanctuary:

1. Ranganathittu is known to be an important nesting ground for several

species of resident birds is located on the banks of river Godavari

2. The Ranganathittu Bird Sanctuary was declared a Ramsar site making it the first wetland in Telangana to be designated as a Ramsar site.

Which of the statements given above is /are not correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

27. Consider the following pairs of Ramsar sites and the states in which they are located: Ramsar sites State

1. Udayamarthandapuram - Kerala
2. Nanda lake - Tamilnadu
3. Sirpur wetland - Madhya Pradesh
4. Satkosia Gorge - Odisha

How many pairs given above is /are correctly matched?

- (a) Only one pair
- (b) Only two pairs
- (c) Only three pairs
- (d) All four pairs

28. Consider the following statements regarding the Coral reefs:

1. Indonesia has the largest coral reef area in Southeast Asia and the Great Barrier Reef of the Queensland coast of Australia is the largest aggregation of coral reefs.
2. India has only three coral reef areas namely Gulf of Mannar, Andaman and Nicobar Islands, and Lakshadweep islands
3. Tropical Corals reefs can form even in deep, dark waters and does not need sunlight to grow

Which of the statements given above is/ are correct?

- (a) 1 only
- (b) 2 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

29. Consider the following statement regarding power sector:

1. Electricity is a state subject and responsibility of distribution rests with States.
2. Central Electricity Regulatory Commission, a key regulator of power sector is a non-statutory body functioning with quasi-judicial status under Ministry of Power
3. Central Electricity Regulatory Commission shall prepare a National Electricity Plan in accordance with the National Electricity Policy and notify such plan once in five years.

Which of the statements given above is/ are not correct?

- (a) 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

30. Consider the following pairs of bilateral military exercises India is part of:

Exercise Countries

1. AL NAJAH: Saudi Arabia
2. VINBAX: Vietnam
3. NOMADIC ELEPHANT: Sri Lanka
4. VAJRA PRAHAR: United Kingdom

How many of the above pairs are matched correctly?

- (a) Only one pair
- (b) Only two pairs
- (c) Only three pairs
- (d) All four pairs

31. Consider the following statements regarding the Laser Interferometer Gravitational-Wave Observatory Project:

1. Gravitational Waves are the 'ripples' in space-time travelling at the speed of light caused by some of the most violent and energetic processes in the Universe.
2. Detection of Gravitational Waves by LIGO will provide a test of Einstein's theory of general relativity and information about black holes and neutron stars existence.

3. The proposed LIGO India project at Theni, Tamilnadu will join the global network of gravitational wave detectors.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) All of the above

32. Consider the following statements regarding Human genome:

- 1. A genome refers to all of the genetic material in an organism, and the human genome differs largely between one individual and another.
- 2. Human Genome Project started in 1988 by World Health Organization whose goal was the complete mapping and understanding of all the genes of human beings.
- 3. Telomere-2-Telomere project has managed to sequence the remaining 8% of the human genome, 92% of which was already sequenced through the Human Genome Project (HGP).

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

33. Consider the following statements regarding Human genome:

- 1. A genome refers to all of the genetic material in an organism, and the human genome differs largely between one individual and another.
- 2. Human Genome Project started in 1988 by World Health Organization whose goal was the complete mapping and understanding of all the genes of human beings.
- 3. Telomere-2-Telomere project has managed to sequence the remaining 8% of the human genome, 92% of

which was already sequenced through the Human Genome Project (HGP).

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

34. Consider the following statements regarding DNA technology regulation Bill:

- 1. The DNA Technology Regulation Bill allows profiling of victims accused of crimes, and those reported missing, as well as storing of their DNA information solely in the National DNA Data Bank.
- 2. The Bill provides for the establishment of a DNA Regulatory Board and the Secretary, Department of Biotechnology, will be the ex officio Chairperson of the Board.
- 3. The Bill aims to minimise errors in criminal investigations and improve the justice delivery system.

Which of the statements given above is/are correct?

- (a) 1 and 3 only
- (b) 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

35. What is/are the significance of RNA interference (RNAi) technology which gained popularity in recent years?

- 1. Formulating drugs capable of reducing cholesterol levels.
- 2. Silencing the entire gene for protein synthesis.
- 3. Gene mapping and annotation in plants.
- 4. Treating acute viral infections

Which of the statements given above is/are correct?

- (a) 1 and 3 only
- (b) 2 and 4 only
- (c) 1, 3 and 4 only
- (d) All of the above

36. Consider the following statements:

1. Fire worship is mentioned in Rig Vedic texts.
2. Rigvedic texts mention the use of Iron.
3. The Atharvaveda is a collection of magic spells and charms to ward off the evil spirits and diseases.

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

37. The Central Board of Indirect Taxes & Customs (CBIC), is under which of the following ministries?

- (a) Ministry of Home Affairs
- (b) Ministry of Finance
- (c) Ministry of Commerce and Industry
- (d) Ministry of Law and Justice

38. Consider the following statements

1. The interest rate that the RBI pays to commercial banks when they park their excess cash with the central bank is called the repo rate.
2. The interest rate that the RBI charges when commercial banks borrow money from it is called the reverse repo rate.

Which of the statements given above is/are Incorrect?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

39. With reference to the Special Category Status (SCS), consider the following statements:

1. The concept of SCS was first brought into existence through the recommendations made by the First Finance Commission.
2. At present, Mizoram, Nagaland, Sikkim, Tripura, and Uttarakhand are the only states that have the Special Category Status.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

40. Which of the following are neighbouring countries of Papua New Guinea?

1. Indonesia
2. Australia
3. Sierra Leone
4. Djibouti

Select the correct answer using the code given below:

- (a) 1 and 2 only
- (b) 1, 3 and 4 only
- (c) 2 and 3 only
- (d) 1, 2, 3 and 4

41. Consider the following statements:

1. The High Seas are those areas of the world's oceans that are outside national jurisdictions.
2. The High Seas Treaty will become international law only when it is signed and ratified by at least 60 countries.
3. India has signed and ratified the treaty in 2023.

Which of the following statements is/are correct?

- (a) 1 and 2 only
- (b) 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

42. Consider the following statements about the 'Air of the Anthropocene' initiative:

1. It is a global project that aims to document air pollution levels using traditional photography techniques.
2. It employs light painting techniques and air quality sensors to visualize pollution levels.
3. The initiative has been implemented in several countries, including India.

Which of the following statements is/are correct?

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

43. 'Baswan Committee' and 'Kothari Committee', recently seen in the news is related to the

- (a) Railway Reforms
- (b) Empowering Tribals
- (c) Centre-State Relations
- (d) Civil Service Reforms

44. Which statement is not correct about Charles Darwin's frog (*Minervarya charlesdarwini*)?

- (a) It exhibits a unique upside-down mating behavior.
- (b) It is primarily found in the Amazon rainforest.
- (c) It is classified as a vulnerable species.
- (d) It has adapted to breeding in artificial water bodies.

45. Which of the following statements regarding *Aquilaria malaccensis* (agarwood) is/are correct?

- 1. *Aquilaria malaccensis* is an evergreen tree native to Northeast India, Bangladesh, Bhutan, and parts of Southeast Asia.
- 2. The oil and chips from *Aquilaria malaccensis* are highly valued in the market.
- 3. *Aquilaria malaccensis* is classified as Critically Endangered by the IUCN.

Select the correct answer using the codes given below:

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2, and 3

46. With reference to the NISAR satellite, which of the following statements is/are correct?

- 1. It is jointly developed by the National Aeronautics and Space Administration

(NASA) and the Indian Space Research Organization (ISRO).

2. It will be launched into a polar Sun-synchronous dawn-dusk orbit.

Select the correct answer using the code given below:

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

47. The term 'Tinzaparin' was recently seen in the news. It is a drug commonly used to

- (a) Reduce Obesity
- (b) Prevent Blood Clots
- (c) Treat Malaria
- (d) Treat Depression

48. With reference to the Chandipura vesiculovirus (CHPV), consider the following statements:

- 1. It is an RNA virus belonging to the Rhabdoviridae family, which also includes the rabies virus.
- 2. It was first identified in 1965 in Chandipura, a village in Maharashtra.
- 3. It occurs by the sting of a vector-infected species of sandfly.

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

49. Which of the following statements is/are correct regarding the Nine-Dash Line?

- 1. The Nine-Dash Line is a visual representation of China's claims on Chinese official maps in the South China Sea.
- 2. It covers almost 90% of the South China Sea and overlaps with the Exclusive Economic Zone claims of Brunei, Indonesia, Malaysia, the Philippines, Taiwan, and Vietnam.

3. The claims by China under the Nine-Dash Line were rejected by a UN Tribunal in 2016.

Select the correct answer using the code given below:

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2, and 3

50. Consider the following statements, with reference to the Exercise 'Khaan Quest':

- 1. It was first started as a bilateral event between Indian and Mongolian Armed Forces in 2003.
- 2. From 2006 onwards the exercise became a Multinational Peacekeeping Exercise.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2