

Q.1) Department of Science and Technology has recently launched Cyber Physical Systems (CPS) Program. Which of the following statements are correct about it?

1. CPS is an interdisciplinary field that deals with the deployment of computer-based systems that do things in the physical world. For Cyber Physical Systems Example, self-driven cars produced by Google and Tesla.
2. The program will be initially started in some of the IITs and it will encourage greater synergy between Scientists and Industry.

Select the code from following:

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

Q.1) Solution (c)

Department of Science and Technology (DST) has launched Cyber Physical Systems (CPS) programme dealing with self-driven cars, autonomous unmanned vehicles and aircraft navigation systems. The programme is still at a nascent stage. Rs. 3,000-crore has been conceived for it and it will first take root in some of the Indian Institutes of Technology (IITs).

The thrust of the CPS initiative is to break silos in academia and encourage greater synergy between the university scientists and industry.

Under it, centres of excellence would be developed at the IITs and universities. Moreover, there will be dedicated courses on the subject.

CPS is an interdisciplinary field that deals with the deployment of computer-based systems that do things in the physical world. For Cyber Physical Systems example, self-driven cars produced by Google and Tesla. It is a mechanism controlled or monitored by computer-based algorithms, tightly integrated with the internet and its users. It involves transdisciplinary approaches, merging theory of cybernetics, design and process science and mechatronics. In it, physical and software components are deeply intertwined, each operating on different spatial and temporal scales. Both exhibit multiple and distinct behavioural modalities, and interact with each other in a myriad of ways that change with context. Autonomous unmanned vehicles (UAVs) and aircraft navigation systems and smart grids (where electricity is optimally distributed on the

basis of calculations in real time by micro-processors) also qualify as CPS.

Q.2) Japan has recognized Bitcoins as a legal currency like any other Fiat money. Which of the following statements regarding Bitcoins are correct?

1. Bitcoin is a digital currency held electronically.
2. It is regulated by the World bank.
3. They are also called 'Cryptocurrency'.

Select the code from below:

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

Q.2) Solution (c)

- Bitcoin is a form of digital currency or virtual currency created and held electronically. No one controls it that is not regulated by any central bank or government.
- They aren't printed, like dollars or euros – they're produced by people, and increasingly businesses, running computers all around the world, using software that solves mathematical problems.
- It is also called a "cryptocurrency" since it is decentralized and uses cryptography to prevent double-spending, a significant challenge inherent to digital currencies.
- Bitcoin is a distributed peer-to-peer digital currency that functions without the intermediation of any central authority.
- It can also be traded on an open market and its exchange rate fluctuates much like a stock market i.e. based on the demand.

Q.3) Consider the following statements regarding Single Actuator Wave Like Robot (SAW):

1. It is a tiny ingestible snake like robot and can navigate through stomach and intestines.
2. It has been made by 3D printing of individual blocks and interlocking them.
3. It is made for mars research and it can move on the difficult terrain.
4. The robot generates Sound waves to detect objects through SONAR.

Which of the above statements are correct?

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

Q.3) Solution (c)

Scientists have developed a tiny, ingestible 3D-printed snake-like robot called SAW (single actuator wave-like robot), that can navigate through the small intestines. The snake-like tiny robot was made from a set of interlocking 3D-printed “plastic” pieces that look like vertebrae.

The robot moves in a wave-like motion and can travel through the extremely squishy environment of the small intestine. The external shape of the robot is a 2D projection of a rotating helix, that result in a continuously moving wave. Its direction can be reversed simply by reversing the direction of rotation of the motor. In tests, the robot was able to move incredibly fast and cross a wide array of terrains, from water to rough, rocky soil.

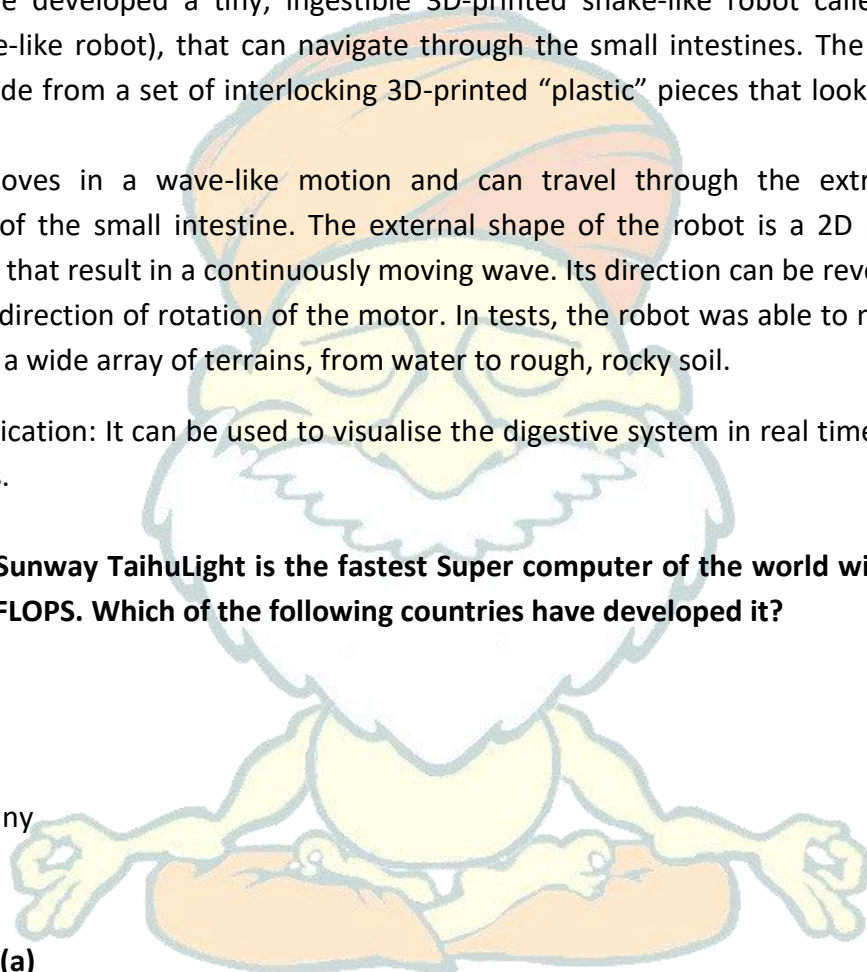
Potential application: It can be used to visualise the digestive system in real time, especially for colonoscopies.

Q.4) Current Sunway TaihuLight is the fastest Super computer of the world with a top speed of 124.5 PetaFLOPS. Which of the following countries have developed it?

- a) China
- b) USA
- c) Russia
- d) Germany

Q.4) Solution (a)

There is no U.S.-made system that comes close to the performance of China's new system, the Sunway TaihuLight. Its theoretical peak performance is 124.5 petaflops, according to the latest biannual release today of the world's Top500 supercomputers. It is the first system to exceed 100 petaflops. A petaflop equals one thousand trillion (one quadrillion) sustained floating-point operations per second.



The most important thing about Sunway TaihuLight may be its microprocessors. In the past, China has relied heavily on U.S. microprocessors in building its supercomputing capacity. The world's next fastest system, China's Tianhe-2, which has a peak performance of 54.9 petaflops, uses Intel Xeon processors.

TaihuLight, which is installed at China's National Supercomputing Center in Wuxi, uses ShenWei CPUs developed by Jiangnan Computing Research Lab in Wuxi. The operating system is a Linux-based Chinese system called Sunway Raise.

Q.5) National Green Tribunal has recently suspended the Environment clearance of Indian Neutrino Observatory (INO). Consider the following statements about INO:

1. It is being constructed in Theni District of Tamil Nadu.
2. It is being built on top of Bodi hills because of which large scale deforestation is required.
3. The main target of this establishment is to generate sustainable fusion energy.

Which of the above statements are correct?

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

Q.5) Solution (a)

India-Based Neutrino Observatory (INO)

- It country's most ambitious basic science project proposed to come up in Bodi west hills of Theni district of Tamil Nadu.
- It aims at building a world-class underground laboratory with a rock cover of approximately 1200 meter.
- Its mandate is to conduct basic research on the elementary particle called neutrino. It is jointly supported by Department of Atomic Energy (DAE) and Department of Science & Technology (DST), with DAE acting as the nodal agency.
- The observatory will be located underground in order to provide adequate shielding to the neutrino detector from cosmic background radiation.

- It will comprise a complex of caverns which will house detector which is 130 metres long, 26 metres wide and 30 metre high.

Q.6) Government of India has launched Bharat QR code to enable digital payments. Which of the following statements are correct about QR codes?

1. QR in QR code stands for Quick Response Code.
2. QR code is a two-dimensional (matrix) machine-readable bar code made up of black and white square. This code can be read by the camera of a smartphone.
3. It encodes same amount of data in one-tenth the space of a traditional bar code.

Select the code from following:

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

Q.6) Solution (d)

- QR code (Quick Response code) is a two-dimensional (matrix) machine-readable bar code made up of black and white square. This code can be read by the camera of a smartphone.
- It is used for storing URLs or other information that link directly to text, emails websites phone numbers. It is capable of 360 degrees (omni-directional), high speed reading.
- QR Code can store up to 7089 digits as compared to conventional bar codes which can store max 20 digits. It encodes same amount of data in one-tenth the space of a traditional bar code.
- It carries information both horizontally and vertically. It has error correction capability and data stored in it can be restored even if it is partially damaged or dirty.

Q.7) The Union Ministry of Electronics and Information Technology (MeitY) has launched Cyber Swachhta Kendra. The objective of this is:

- a) To remove pornographic stuff
- b) To create awareness for Swachcha Bharat Abhiyan

- c) To remove controversial content from Facebook and other Social Media
- d) To prevent botnet infections and malware analysis

Q.7) Solution (d)

The Union Ministry of Electronics and Information Technology (MeitY) has launched Cyber Swachhta Kendra in New Delhi for Botnet cleaning and Malware analysis. It was launched by Union Minister of Electronics and IT Ravi Shankar Prasad as part of Union Government's ambitious digital India initiative to create a secure cyber space by detecting botnet infections.

Besides, minister also launched some cyber security tools.

They are

- USB Pratirodh: It is a desktop security solution to protect from USB mass storage device threats.
- AppSamvid: It is a desktop solution to protect systems by allowing installation of genuine applications through white listing. It helps in preventing threats from malicious applications.
- M – Kavach : It is an indigenously developed mobile application to address the security threats in mobiles.

It is being operated by the Indian Computer Emergency Response Team (CERT-In) under provisions of Section 70B of the Information Technology (IT) Act, 2000.

Q.8) Which of the following statements are correct about the GraphAir technology?

- a) It is the process of making Graphene from Soya bean oil.
- b) It is a new process developed to clear heavy metal impurities from air using Graphene filters.
- c) It is the process of making graphene by collecting CO₂ from ambient air.
- d) None of the above

Q.8) Solution (a)

Scientists from Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) have made world's strongest material graphene commercially more viable by using soybean. They have developed a novel "GraphAir technology" which transforms soybean oil, a renewable, natural material into graphene films in a single step.

Earlier, graphene was produced in a highly-controlled environment with explosive compressed

gases that required long hours of operation at high temperatures and extensive vacuum processing. This production process was costly and was major roadblock in its commercialisation.

The technology grows graphene film in ambient air with a natural precursor, making its production faster and simpler. Soybean oil breaks down into a range of carbon building units when heat is applied. It makes it essential for the synthesis of graphene films.

Q.9) The Maharashtra government has approved a cloud seeding program for 2017 monsoon to produce sufficient rain. Which of the following compounds are used for Cloud seeding?

- a) Sulfuric acid
- b) Mercury oxide
- c) Nitric Acid
- d) Silver Iodide

Q.9) Solution (d)

Maharashtra Government has approved Rs. 250 crore Cloud Seeding Programme during 2017 monsoon season to produce sufficient rain. Under this programme, weather scientists using aircrafts will spray chemicals (silver iodide) over clouds hovering above Solapur district, a rain shadow region of Western Ghats in the state.

This will be the first controlled experiment to quantify the extent to which clouds form water drops large enough to make rain. This programme, coordinated by the Indian Institute of Tropical Meteorology, will be the first controlled experiment to quantify the extent to which clouds form water drops large enough to make rain. In this experiment, scientists will fly two aircraft and spray silver iodide and dry ice on 100 clouds and compare them with 100 unseeded clouds. Ground radar will be used to track the clouds and verify which ones contributed rain.

Q.10) Which of the following radiations can be used for wireless communication?

1. Radio waves
2. Microwaves
3. Infrared radiations
4. Visible light

Select the code from below:

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

Q.10) Solution (d)

Radio waves – are used to transmit television and radio programs.

Microwaves – are used to transmit satellite television and for mobile phones.

Infrared – is used to transmit information from remote controls.

Visible light – is used in Lifi, Lidar and photography.

Q.11) NASA is building a robotic spacecraft to refuel and repair satellites in the orbit. Which of the following statements are correct about this spacecraft?

1. The spacecraft will be used to perform in orbit satellite servicing in low earth orbits.
2. The spacecraft has been named 'Restore L spacecraft'.

Select the code from below:

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

Q.11) Solution (c)

The National Aeronautics and Space Administration (NASA) is building a robotic spacecraft dubbed as 'Restore-L Spacecraft' to refuel, repair satellites currently in orbit. In this regard, NASA has awarded a \$127 million contract to California-based satellite company Space Systems/Loral to build Restore-L Spacecraft.

Space Systems/Loral will provide NASA with spacecraft bus, critical hardware and services for the Restore-L mission. This mission will be launched in 2020 to perform in-orbit satellite servicing in low-Earth orbit.

It will help in extending life of existing satellites and reduce operation costs. It can also be used for cleaning space debris or testing asteroid platforms.

Q.12) Software giant Microsoft India has launched its first full-scale Cybersecurity Engagement Centre (CSEC) in India. In which of the following cities is it located?

- a) Bengaluru
- b) New Delhi
- c) Hyderabad
- d) Chennai

Q.12) Solution (b)

Software giant Microsoft India has launched its first full-scale Cybersecurity Engagement Centre (CSEC) in New Delhi. It is Microsoft's seventh Cybersecurity Centre in the world. It will function as a satellite to the its Redmond Digital Crimes Unit (DCU).

Microsoft's other six cyber security centres are located in Singapore, Tokyo, Beijing, Seoul, Berlin and Washington DC.

- It will help to build a trusted and secure computing environment, a critical enabler for India's digital transformation.
- It will provide protection across all end-points from sensors to the data centre, detection of attack using targeted signals, machine learning and behavioural monitoring.
- It will eventually help in closing the gap between discovery and action taken to neutralise the attack. It will enable and empower enterprises to manage modern security threats effectively.
- It will also expand Microsoft's public-private partnerships in India. The centre will also enable customers tap into a pool of resources such as security specialists and technologies at Microsoft.

Q.13) A relatively small piece of orbital debris can inflict a great deal of damage on satellites or spacecrafts orbiting in the space. This phenomenon is known as

- a) Kessler Syndrome
- b) Kepler Syndrome
- c) Newton Syndrome
- d) Laplace Syndrome

Q.13) Solution (a)

More than 5 decades of human space exploration since the first Soviet-launched Sputnik satellite in 1957 has produced this hazardous belt of orbiting debris in the space. There are estimated to be more than 100 million pieces are circling our planet in the lower orbit, posing a growing threat to future space exploration. These pieces of debris travel at high speeds. A relatively small piece of orbital debris can inflict a great deal of damage on satellites or spacecrafts orbiting in the space. This phenomenon is Kessler Syndrome which describes a self-sustaining cascading collision of space debris in low earth Orbit.

<https://www.youtube.com/watch?v=xgGm5odllh4>

Q.14) Which of the following statements are correct about Superconductors?

1. Superconductors are the materials with no electrical resistance i.e. theoretically there are no losses in electricity transmission.
2. To achieve this state, a conductor is superheated upto its critical temperature and before its melting point the electrons become free to move.

Which of the above statements are correct?

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

Q.14) Solution (a)

Superconductors are materials that conduct electricity with no resistance whatsoever. In order to achieve superconducting state, the element should have mobile electrons, and these

electrons should come together to form pairs, known as Cooper pairs. The majority of chemical elements become superconducting at sufficiently low temperature. Conductors are cooled to their critical temperature after which they show superconductivity.

Q.15) India has been ranked 138th in the 2016 ICT Development Index out of a total of 175 countries. Which of the following statements are correct about ICT Development Index?

1. The index is released by International Telecommunication Unit (ITU).
2. The IDI is based on 11 ICT indicators, grouped in three sub-indices: access, use and skills.

Select the code from below:

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

Q.15) Solution (c)

India has been ranked 138th in the 2016 ICT Development Index out of a total of 175 countries. In 2015, India ranked 135th position. The index was released as part of the annual Measuring the Information Society Report for 2016 of the International Telecommunications Union (ITU).

- The ICT Development Index (IDI) rankings compare the state of ICT development across countries. It is published annually by the UN ITU.
- The IDI is based on 11 ICT indicators, grouped in three sub-indices: access, use and skills.
- It is standard tool that governments, operators, researchers, development agencies and others can use to measure the digital divide and compare ICT performance within and across countries.
- Top 5 Countries: South Korea (1st), Iceland (2nd), Denmark (3rd), Switzerland (4th) and United Kingdom (5th).
- Bottom 5 Countries: Niger (175), Chad (174), Guinea-Bissau (173), South Sudan (172) and Burundi (171).

Q.16) Milk of which of the following mammal contains antimicrobial compounds that is resistant to the powerful antibiotic vancomycin

- a) Tasmanian devil

- b) Bandicoot
- c) Wombat
- d) Wallaby

Q.16) Solution (a)

Mother's milk from the marsupials known as Tasmanian devils could help the global fight against increasingly deadly "superbugs" which resist antibiotics,

Scientists at the University of Sydney found that peptides in the marsupial's milk killed resistant bacteria, including methicillin-resistant golden staph bacteria and enterococcus that is resistant to the powerful antibiotic vancomycin.

Source: <http://www.thehindu.com/todays-paper/tp-national/Milk-from-Tasmanian-devils-could-fight-superbugs-Study/article15621865.ece>

Q.17) Kigali agreement amends

- a) Cartagena Protocol
- b) Paris Agreement
- c) Kyoto Protocol
- d) Montreal Protocol

Q.17) Solution (d)

Kigali agreement is an amendment to Montreal Protocol.

Give through it - <http://indianexpress.com/article/explained/why-rwanda-hfc-agreement-is-a-big-deal-how-it-happened-3088553/>

Q.18) Recently a new species of Pika was discovered in Sikkim. Consider the following statements about Pika

1. They are members of rat family
2. They are a keystone species

Which of the following statements is/are correct?

- a) Only 1
- b) Only 2
- c) Both 1 and 2
- d) Nether 1 nor 2

Q.18) Solution (b)

Pikas are members of the rabbit family and look like tailless rats.

They are a keystone species and ecosystem engineers

Keystone species is a species whose addition to or loss from an ecosystem leads to major changes in occurrence of at least one other species.

Certain species in an ecosystem is considered more important in determining the presence of many other species in that ecosystem.

If keystone species is lost, it will result in the degradation of whole ecosystem.

Source: <http://www.thehindu.com/todays-paper/tp-national/new-species-of-pika-discovered/article9175091.ece>

Q.19) Contingent Reserve Arrangement and Fortaleza Declaration is concerned with

- a) SAARC and BRICS
- b) BRICS and BRICS
- c) LEMOA and BRICS
- d) BRICS and MERCOSUR

Q.19) Solution (b)

Contingent Reserve Arrangement (CRA) and National Development Bank (NDB) were announced as part of BRICS Fortaleza Declaration announced during 6th BRICS summit held in Fortaleza, Brazil in July 2014

Source: <http://economictimes.indiatimes.com/news/economy/policy/brics-contingent-reserve-arrangement-operational-arun-jaitley/articleshow/54734524.cms>

Q.20) Himansh is a

- a) Tributary of river Cauvery
- b) A newly found glacier in the Himalayas
- c) Glaciological research facility of India located in Spiti Valley
- d) A joint military exercise between Nepal and Bhutan

Q.20) Solution (c)

It is Indian government's initiatives to better study and quantify the Himalayan glacier responses towards the climate change.

It is located at a remote region in Spiti, Himachal Pradesh.

It has been established by the National Centre for Antarctic and Ocean Research (NCAOR), under the Ministry of Earth Sciences.

Source: <http://www.thehindu.com/sci-tech/science/High-altitude-glacial-lab-opens-in-the-Himalayas/article15477833.ece>

Q.21) Consider the following statements about Enforcement Directorate (ED)

- 1. It is under the Ministry of Home Affairs (MHA)
- 2. It is the law enforcement agency of the Foreign Exchange Management Act 1999 (FEMA) and the Prevention of Money Laundering Act 2002 (PMLA)

Select the correct statements:

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

Q.21) Solution (b)

It is the economic intelligence agency responsible for enforcing economic laws and fighting economic crime in India It is under the Department of Revenue, Ministry of Finance.

Directorate of Enforcement is a Multi Disciplinary Organization mandated with the task of enforcing the provisions of two special fiscal laws – Foreign Exchange Management Act, 1999 (FEMA) and Prevention of Money Laundering Act, 2002 (PMLA)

Source: http://www.business-standard.com/article/companies/ed-to-probe-cyrus-mistry-s-allegations-against-tata-sons-media-116102900361_1.html

