

**Q.1) With reference to India Innovation Index, consider the following statements?**

1. It is released by Ministry of Science and Technology.
2. It measures index based on innovation inputs and innovation outputs.

**Which of the above statements is/are correct?**

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

**Q.1) Solution (b)**

**Statement analysis**

Statement 1: NITI Aayog releases the India Innovation Index.

Statement 2: Index measures innovation inputs through 'Enablers' and innovation output as 'Performance'.

- **Enabler parameters** (factors that reinforce innovative capacities): Human Capital, Investment, Knowledge Workers, Business Environment, Safety and Legal Environment.
- **Performance parameters**: Knowledge Output, Knowledge Diffusion.

**Basics about India Innovation Index:**

The index has been developed on the lines of the Global Innovation Index (GII), to ameliorate the innovation ecosystem of Indian states and Union Territories (UTs) and to design policies to drive innovation across regions.

The states have been bifurcated into three categories:

- Major states: Top performers are Karnataka, Maharashtra, Tamil Nadu, Telangana.
- North-east and hill states: Top performers are Himachal Pradesh, Uttarakhand Manipur.
- UTs and City States: Top performers are Delhi, Chandigarh, Daman and Diu

The indicators that the survey uses include the level and quality of education and parameters such as:

- Number of PhD students and knowledge-intensive employment.

- Enrolment in engineering and technology and number of highly skilled professionals.
- Investment in R&D and number of patents and trademark applications filed.
- Internet subscribers.
- FDI inflows, business environment and safety and legal environment.

**Q.2) Consider the following statements regarding Traditional Knowledge Digital Library:**

1. It is a collaborative initiative of CSIR, Ministry of Science and Technology and Ministry of Health.
2. Data of traditional knowledge stored at TKDL is available to general public to make most benefit of centuries old practices.

**Which of the above statements is/are correct?**

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

**Q.2) Solution (a)**

**Explanation:**

Statement 1: TKDL was initiated in 2001, as collaboration between the Council of Scientific and Industrial Research (CSIR), Ministry of S&T, and Department AYUSH, Ministry of Health.

Statement 2: The database is **available to only patent examiners through TKDL Access** (Non-disclosure) Agreement.

**About Traditional Knowledge Digital Library**

- Traditional Knowledge Digital Library (TKDL) is an Indian digital knowledge repository of traditional knowledge (TK), especially about medicinal plants and formulations used in Indian systems of medicine.
  - TK is knowledge, know-how, skills and practices that are developed, sustained and passed on from generation to generation within a community, often forming part of its cultural or spiritual identity.

- TKDL database contains more than 3.9 lakh formulations/ practices from the Indian systems of medicine (Ayurveda, Yoga, Siddha, Unani and Sowa Rigpa) in digitized format
- All data are in five languages: English, German, French, Japanese and Spanish.
- It seeks to prevent misappropriation of the country's traditional medicinal knowledge at International Patent Offices by preventing the granting of patents for products developed utilizing Indian TK.
- Also, non-patent database serves to foster modern research based on traditional knowledge, by simplifying access to vast knowledge of practices.

**Q.3) Consider the following statements about PM Wi-Fi Access Network Interface (PM-WANI):**

1. It is similar to the concept of Public Call Office (PCO), where even a shopkeeper can provide Wi-Fi.
2. A customer can access the network of Wi-Fi only after eKYC authentication.

**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

**Q.3) Solution (c)**

**Explanation:**

**About PM Wi-Fi Access Network Interface**

- The initiative aims to elevate wireless internet connectivity in the country.
- This initiative will be operated by different stakeholders – Public Data Office, Public Data Office Aggregator, App Provider, and Central Registry.
- A PDOA will buy bulk bandwidth from licenced telecoms/ISPs, and re-sells it to multiple PDOs.
- This nationwide network of public Wi-Fi hotspots, termed PDOs after the public call office (PCO) concept rolled out by the Indian government to set up a nationwide network of landline public payphones.

- There will be no licence fee for providing broadband Internet through these public Wi-Fi networks, and any small shopkeeper can become Public Data office, on the similar line of PCO. **(So, Statement 1 is correct)**
- All data related to complete use data and usage log will be stored in India.
- A customer wanting to access the network from a PDO's premise can do so only after an eKYC authentication. **(So, Statement 2 is correct)**

**Q.4) Which of the following statements with reference to Narrow Band Internet of Things (NB-IoT) is/are correct?**

1. NB-IoT can only operate on 4G mobile networks.
2. Its application will lead to extended long range coverage and deep penetration indoors and underground.

**Select the correct code**

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

**Q.4) Solution (b)**

**Explanation**

- Narrowband IoT (NB-IoT) is a wireless communication standard for the Internet of Things (IoT) belonging to the category of low-power wide-area networks (LPWAN).
- It enables to connect devices that need small amounts of data, low bandwidth, and long battery life.
- NB-IoT can co-exist with 2G, 3G, and 4G mobile networks. **(Hence, Statement 1 is incorrect)**
- As, ability to co-exist on 2G, 3G and 4G network, its application will lead to extended long coverage and deep penetration indoors and underground. **(So, Statement 2 is correct)**

NB-IoT has various applications like

- smart city infrastructures such as connecting street lamps or dustbins,
- smart metering (electricity, gas, and water),
- intruder and fire alarms,

- measuring health parameters,
- tracking of persons, animals or objects

**Q.5) It is the practice of sending fraudulent communications that appear to come from a reputable source, usually through email. What it is?**

- a) Man-in-the Middle Attack
- b) Denial of Service Attack
- c) SQL injection
- d) Phishing

**Q.5) Solution (d)**

**Explanation:**

- **Phishing is the practice of sending fraudulent communications that appear to come from a reputable source, usually through email.** The goal is to steal sensitive data like credit card and login information or to install malware on the victim's machine. Phishing is an increasingly common cyber threat.
- Man-in-the-middle (MitM) attacks, also known as eavesdropping attacks, occur when attackers insert themselves into a two-party transaction. Once the attackers interrupt the traffic, they can filter and steal data.
  - Two common points of entry for MitM attacks:
  - On unsecure public Wi-Fi, attackers can insert themselves between a visitor's device and the network. Without knowing, the visitor passes all information through the attacker.
  - Once malware has breached a device, an attacker can install software to process all of the victim's information.
- A denial-of-service attack floods systems, servers, or networks with traffic to exhaust resources and bandwidth. As a result, the system is unable to fulfill legitimate requests. Attackers can also use multiple compromised devices to launch this attack. This is known as a distributed-denial-of-service (DDoS) attack.
- A Structured Query Language (SQL) injection occurs when an attacker inserts malicious code into a server that uses SQL and forces the server to reveal information it normally would not. An attacker could carry out a SQL injection simply by submitting malicious code into a vulnerable website search box.



**Q.6) Consider the following measures taken to secure Cyber Security measures taken in India:**

1. Cyber Swachhta Kendra is an initiative of Ministry of Electronics and Information Technology.
2. National Cyber Coordination Centre is established under Ministry of Defence.
3. CERT-In conducts regular training programmes for network / system administrators.

**Which of the given statements are correct?**

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

**Q.6) Solution (b)**

**Explanation:**

- 1) **Cyber Swachhta Kendra** –It has been set up for analysing BOTs/malware characteristics and providing information and enabling citizens for removal of BOTs/malware. In addition, "Cyber Swachhta Kendra" will strive to create awareness among citizens to secure their data, computers, mobile phones and devices such as home routers. It is a part of the Indian Computer Emergency Response Team (CERT-In), which is established under administrative control of Ministry of Electronics and Information Technology. (So, Statement 1 is correct)
- 2) **National Cyber Coordination Centre** – established under National Security Council Secretariat (NSCS) coordinates with different agencies at the national level for cyber security matters. NSCS is body under Prime Minister Office. (So, Statement 2 is incorrect)
- 3) **CERT –In** - CERT-In conducts regular training programmes for network / system administrators and Chief Information Security Officers (CISOs) of Government and critical sector organisations regarding securing the IT infrastructure and mitigating cyber-attacks. (So, Statement 3 is correct )

CERT-In is operational since January 2004. The constituency of CERT-In is the Indian Cyber Community. CERT-In is the national nodal agency for responding to computer security incidents as and when they occur.

In the recent Information Technology Amendment Act 2008, CERT-In has been designated to

serve as the national agency to perform the following functions in the area of cyber security:

- Collection, analysis and dissemination of information on cyber incidents.
- Forecast and alerts of cyber security incidents
- Emergency measures for handling cyber security incidents
- Coordination of cyber incident response activities.
- Issue guidelines, advisories, vulnerability notes and whitepapers relating to information security practices, procedures, prevention, response and reporting of cyber incidents.
- Such other functions relating to cyber security as may be prescribed

**Q.7) Consider the following statements regarding Mobile networks:**

1. 5G uses Radio Frequency waves to increase network speed.
2. 5G deployment is based on Optical Fibre infrastructure, while 4G deployment was based on microwave based cell-sites.
3. Latency in 5G will increase in comparison with 4G.

**Which of the above statements are *incorrect*?**

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

**Q.7) Solution (c)**

**Explanation:**

**Statement 1:** The increased speed is achieved partly by using higher-frequency radio waves than previous cellular networks. However, higher-frequency radio waves have a shorter useful physical range, requiring smaller geographic cells. For wide service, 5G networks operate on up to three frequency bands – low, medium, and high. A 5G network will be composed of networks of up to three different types of cells, each requiring specific antenna designs, each providing a different trade off of download speed vs. distance and service area. 5G cell phones and wireless devices connect to the network through the highest speed antenna within range at their location.

Statement 2: 5G deployment is based on optical fibre infrastructure. 4G LTE introduced IP-based

connectivity, replacing copper- or microwave-based cell sites with optical fibre.

Statement 3: Latency in 5G is 10 times less than 4G network. (In a network, latency measures the time it takes for some data to get to its destination across the network. It is usually measured as a round trip delay - the time taken for information to get to its destination and back again.)

**Q.8) Consider the following statements regarding Artificial Intelligence:**

1. As per National Strategy for Artificial Intelligence, National Information Centre has identified 5 key area m where AI can be used.
2. Responsible AI for Social Empowerment (RAISE-2020) has been organised by Ministry of Electronics and Information Technology and NITI Aayog.
3. High-frequency trading is form of stock trading which uses Artificial Intelligence.

**Which of the given statements are correct?**

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

**Q.8) Solution (c)**

**Statement analysis:**

**Statement 1: National Strategy for Artificial Intelligence- NITI Aayog** has identified five areas where AI can be useful. It has noted the lack of regulation around AI as a major weakness for India. (So, statement 1 is not correct.)

**Statement 2: RAISE 2020 (Responsible AI for Social Empowerment):** A global meeting of minds to exchange ideas and chart a course for using AI for social transformation, inclusion and empowerment in areas like Healthcare, Agriculture, Education and Smart Mobility, among other sectors. It has been organised jointly by NITI Aayog and Ministry of Electronics and Information Technology.

Statement 3: **High-frequency trading (HFT)** is a type of algorithmic financial trading characterized by high speeds, high turnover rates, and high order-to-trade ratios that leverages high-frequency financial data and electronic trading tools. It uses AI systems to make trading decisions at speeds several orders of magnitudes greater than any human is capable of, often making millions of trades in a day without any human intervention.



**Q.9) Consider the following statements with reference to Voice over WLAN (Vo-WLAN):**

1. Network provider usually charges extra payment to access Vo-WLAN.
2. It led to clarity in voice call than usually placed on general mobile network.
3. It can be accessed on only that device which has early access to HD calls.

**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) 1, 2 and 3

**Q.9) Solution (b)**

**Statement Analysis:**

**Statement 1:** Wi-Fi calling is included at no additional charge on compatible devices. Generally Wi-Fi calls to Indian numbers are free, even while traveling internationally. Wi-Fi calls to a country other than the India are charged international long distance rates regardless of whether or not you have Travel Pass or an international travel plan. **(So, Statement 1 is incorrect)**

**Statement 2: Key benefit of Wi-Fi calling**

- Improves voice quality in areas where network coverage is weak
- Incurs no additional charges – WiFi calls inside the India and to the India are typically included in your monthly voice plan
- Requires no add-on services and special plans – calls may count toward your minutes unless your plan is unlimited
- Needs no separate applications – the feature is built into most devices
- Uses your existing phone number – no additional logins are necessary

**Statement 3: one's device must be HD Voice capable to use Wi-Fi Calling.** For that phone usually are asked to have 4G enabled SIM. And only compatible device for Wi-Fi calling can use this feature. It's not available on all mobile phones.

**Q.10) Consider the following statements regarding Quantum Computing:**

1. Quantum enabled Science and Technology (QuST) has been initiated by Ministry of Electronics and Information Technology.
2. Apex committee headed by Prime minister takes all decision regarding National Mission on Quantum Technologies & Applications (NMQTA).

**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

**Q.10) Solution (d)**

**Explanation:**

**Statement 1:** In 2018, the Department of Science & Technology unveiled a programme called Quantum-Enabled Science & Technology (QuST) to accelerate research on Quantum computing. (So, Statement 1 is incorrect)

**Statement 2:** NMQTA has an apex committee taking all its decisions. It includes one chairman, one member secretary and 6 members. Currently, VK Saraswat is the chairman. (So, Statement 2 is incorrect)

**About NMQTA**

- Quantum Technologies & Applications is one of the 9 missions of national importance, under Prime Minister's Science and Technology Innovation Advisory Council (PM-STIAC).
- It runs through the Principal Scientific Advisor's office to contribute to scientific research for India's sustainable development.
- The mission will be functioning under the Science and Technology department, DST
- The areas of focus would both be in fundamental science and towards developing technology platforms in the following:
  - 1) Quantum Computing & Simulations
  - 2) Quantum Materials & Devices
  - 3) Quantum Communications
  - 4) Quantum Sensor & Metrology

**Q.11) Which of the following statements are correct with reference to 'Edge Computing'?**

1. In this computing data is analysed locally, which is opposite to conventional approach.
2. This is more expansive route to scalability than cloud computing.
3. It offers better security as processing, storage and application is distributing over large range.

**Select the appropriate option:**

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

**Q.11) Solution (b)**

**Statement Analysis:**

**Statement 1:** Edge computing enables data to be analysed, processed, and transferred at the edge of a network. Meaning, the data is analysed locally, closer to where it is stored, in real-time without latency. Current conventional Cloud computing systems perform all of their computations in the cloud using data centres.

**Statement 2:** Edge Computing offers a far less expensive route to scalability and versatility, allowing companies to expand their computing capacity through a combination of IoT devices and edge data centres. Establishment of separate data centres makes cloud computing more costly.

**Statement 3:** Edge computing offers better security by distributing processing, storage, and applications across a wide range of devices and data centres, which makes it less vulnerable to any single disruption to take down the network.

**Q.12) Consider the following statements with reference to 'Dark Net':**

1. Dark net are part of internet generally inaccessible to Internet Service Provider.
2. TOR browser creates several layers of IP to reach destination, which is generally deliberately hidden.

**Which of the statements given above is/are correct?**

- a) 1 only
- b) 2 only

- c) Both 1 and 2
- d) None of the above

**Q.12) Solution (c)**

**Explanation:**

- Dark Net is that part of the Internet which cannot be accessed through traditional search engines like Google nor is it accessible by normal browsers like Chrome or Safari.
- It generally uses non-standard communication protocols which make it inaccessible to internet service providers (ISPs) or government authorities.
- TOR browser was developed in the mid-1990s by the United States Naval Research laboratory employees to protect US intelligence communications online. Traffic from the browser creates several layers of IP (Internet Protocols) before reaching the destination site.
- Dark net is part of Deep Web which includes sites that are protected by passwords. For e.g. – One's Personal information on any website, which is encrypted. That information will be available to all through general Google search.

**Q.13) With reference to "Storage of Payment System Data", consider the following statements:**

1. RBI clarified that the entire payment data shall be stored in systems located only in India.
2. There is bar on the processing of payment transactions outside India.
3. The data should be deleted from the systems abroad and brought back to India not later than one business day or 24 hours from the payment processing, whichever is earlier

**Which of the statements given above are correct?**

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

**Q.13) Solution (c)**

**Explanation:**

1. The Reserve Bank of India (RBI) has clarified that payment system providers need to store entire payments data in a system only in India.

2. The data should include end-to-end transaction details and information pertaining to payment or settlement transaction that is gathered, transmitted as part of a payment message or instruction.
3. The data could be pertaining to customer data like name, mobile number, and Aadhar number, payment-sensitive data like customer and beneficiary account details and transaction data among others.
4. Further, the RBI clarified that in case the processing is done abroad, the data should be deleted from the systems abroad and brought back to India within one business day or 24 hours from the payment processing whichever is earlier.
5. In April 2018, Reserve Bank of India (RBI) had asked payment firms to ensure their data are stored exclusively on local servers. RBI had also set a deadline of six months for compliance which some foreign firms such as MasterCard and Visa had missed.
6. The main intent behind data localisation is to protect the personal and financial information of the country's citizens and residents from foreign surveillance and give local governments and regulators the jurisdiction to call for the data when required.
7. There is no bar on processing of payment transactions outside India if so desired by the PSOs. However, the data shall be stored only in India after the processing. The complete end-to-end transaction details should be part of the data.
8. In case the processing is done abroad, the data should be deleted from the systems abroad and brought back to India not later than the one business day or 24 hours from payment processing, whichever is earlier. The same should be stored only in India.

**Q.14) Dark Fibre is related to:**

- a) Darkest colour fibre used in Optical Fibre net
- b) Fibre used to provide network access to Dark net
- c) Extra optical fibre laid by companies to avoid competition
- d) None of the above

**Q.14) Solution (c)**

**Explanation:**

**About Dark Fibre**



- A dark fibre or unlit fibre is an unused optical fibre, available for use in fibre-optic communication.
- Dark fibre originally referred to the potential network capacity of telecommunication infrastructure. Dark fibre may be leased from a network service provider.
- Dark fibre can be used to create a privately operated optical fibre network that is run directly by its operator over dark fibre leased or purchased from another supplier.
- This is opposed to purchasing bandwidth or leased line capacity on an existing network. Dark fibre networks may be used for private networking, or as Internet access or Internet infrastructure networking.
- In a bid to cut down on capital expenditure, telecom service providers —Reliance Jio Infocomm, Bharti Airtel and Vodafone Idea — have reached out to Bharat Broadband Network Limited to use dark fibre laid by latter. That will enhance rural presence of these telecom companies.

**Q.15) Consider the following statements regarding Prominent models of Internet governance:**

1. Multi-stakeholder Model is supported by Western countries.
2. Multi-Lateral Model is supported by Russia and China.
3. Multi-lateral model give recognition to technical expertise of corporates.

**Which of the statements given above is/are correct?**

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

**Q.15) Solution (a)**

**Explanation:**

**Multi-stakeholder Model**

- It is supported by western nations like US.
- This governance model is based on decentralized governance institutions where non-state actors like corporates, NGOs & civil society have a say in making globally acceptable norms regulating cyberspace.

- It gives recognition to technical expertise of corporates.

#### Multilateral Model

- It is supported by Russia and China
- This model emphasis on the agreements between multiple governments with limited involvement of non-state actors.
- This model holds sovereignty of nation state in managing cyberspace and provides the scope for the exercise of inherent right of self-defence and the law of state responsibility, including countermeasures in the cyberspace.

#### Q.16) Global Cyber-Security Index is released by:

- a) World Economic Forum
- b) Global Alliance for ICT and Development
- c) International Telecommunication Union
- d) Computer Aid International

#### Q.16) Solution (c)

#### Explanation:

#### The Global Cybersecurity Index (GCI)

- It is released by International Telecommunication Union.
- It is a multi-stakeholder initiative to raise cybersecurity awareness and to measure the commitment of countries to cybersecurity and its wide field of application cutting across industries and sectors.
- Each country's level of development is analyzed within five categories:
  - Legal Measures,
  - Technical Measures,
  - Organizational Measures,
  - Capacity Building and
  - Cooperation.

#### Q.17) Consider the following statements about Government Instant Messaging System (GIMS):

1. It is developed by National Informatics Centre (NIC).
2. Servers are hosted in India only; however data processing may take place outside India also.
3. Only government employee can join this platform for messaging service.

**Which of the statements given above are *incorrect*?**

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

**Q.17) Solution (c)**

Explanation: Government Instant Messaging System (GIMS) is a prototype of an Indian equivalent of popular messaging platforms, such as Whatsapp and Telegram for secure internal use.

**Statement 1:** GIMS is designed and developed by the Kerala unit of National Informatics Centre (NIC).

**Statement 2:** The server hosting GIMS is installed within the country and the information stored would be in the government-based cloud — NIC-operated data centres that are only meant for use by the government and its departments. So processing of data will take place in India only. (Hence, Statement 2 is incorrect)

**Statement 3:** The GIMS (Sandes app) can be used by both government officials and individual users. It requires a mobile number or government email ID for sign up. Once signed up, users can send and receive messages as well as new create groups or send multimedia content such as images and videos. (Hence, statement 3 is incorrect)

**Q.18) Which of the following is NOT one of the nine pillars of Digital India?**

- a) e-Kranti - Electronic Delivery of Services.
- b) Electronics Manufacturing
- c) Affordable Internet availability
- d) Universal access to mobile connectivity.

**Q.18) Solution (c)**

**Explanation:**

**Nine pillars of Digital India**

- 1) Broadband Highways
- 2) Universal Access to Mobile Connectivity
- 3) Public Internet Access Programme
- 4) e-Governance: Reforming Government through Technology
- 5) e-Kranti - Electronic Delivery of Services
- 6) Information for All
- 7) Electronics Manufacturing
- 8) IT for Jobs
- 9) Early Harvest Programmes

**Q.19) In the context of optical fibres, consider the following statements:**

1. A transparent cladding material, which has a refractive index more than that of the core, surrounds the core of the optical fibre.
2. Light is propagated in an optical fibre by total internal reflection.

**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

**Q.19) Solution (b)**

**Explanation:**

**Statement 1:** The core of the optical fibre is surrounded by a layer called the 'cladding', which has a refractive index less than that of the core is one of the conditions for total internal reflection of light. (So, Statement 1 is incorrect)

**Statement 2:** Optical fibres use total internal reflection to transmit light. It has a solid core of dense glass surrounded by a less dense cladding. The light ray passing through the inner core is reflected back instead of being refracted to the rarer cladding. (Hence, Statement 2 is correct)

### About Optical Fibres

- An optical fiber is a flexible, transparent fiber made by drawing glass (silica) or plastic to a diameter slightly thicker than that of a human hair.
- Optical fibers are used most often as a means to transmit light between the two ends of the fiber and find wide usage in fiber-optic communications, where they permit transmission over longer distances and at higher bandwidths (data transfer rates) than electrical cables.
- Fibers are used instead of metal wires because signals travel along them with less loss; in addition, fibers are immune to electromagnetic interference, a problem from which metal wires suffer.
- Fibers are also used for illumination and imaging, and are often wrapped in bundles so they may be used to carry light into, or images out of confined spaces, as in the case of a fiberscope.
- Specially designed fibers are also used for a variety of other applications, some of them being fiber optic sensors and fiber lasers.
- Optical fibers typically include a core surrounded by a transparent cladding material with a lower index of refraction.
- Light is kept in the core by the phenomenon of total internal reflection which causes the fiber to act as a waveguide.
- Fibers that support many propagation paths or transverse modes are called multi-mode fibers, while those that support a single mode are called single-mode fibers (SMF)

**Q.20) Consider the following statements with reference to Telecom Regulatory Authority of India**

1. TRAI is an executive body established by Cabinet resolution.
2. Telecommunications Dispute Settlement and Appellate Tribunal adjudicate dispute between licensor and licensee.
3. TRAI also fix minimum tariff that should be charged by telecom providers to prevent monopoly.

**Which of the above statements are *incorrect*?**

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



d) 1, 2 and 3

**Q.20) Solution (b)**

**Statement analysis:**

**Statement 1:** It was established by an Act of Parliament (Telecom Regulatory Authority of India Act, 1997) to regulate telecom services, including fixation/revision of tariffs for telecom services. So it is a statutory body. (Hence, Statement 1 is incorrect)

**Statement 2:** The TRAI Act was amended to establish a Telecommunications Dispute Settlement and Appellate Tribunal (TDSAT) to take over the adjudicatory and disputes functions from TRAI.

TDSAT was set up to adjudicate any dispute between a licensor and a licensee, between two or more service providers, between a service provider and a group of consumers, and to hear and dispose of appeals against any direction, decision or order of TRAI. (So, Statement 2 is correct)

**Statement 3:** There has been demand in market over fixing minimum price of tariff, so that any telecom firm will not do Predatory pricing. But currently, there is no such provision of Minimum tariff in mobile telecom services.

**Q.21) With reference to Indian Maritime Situational Awareness System (IMSAS), consider the following statements:**

1. It is a high performance intelligent software system that provides Global Maritime Situational Picture and Marine planning tools.
2. It is indigenously developed by Indian National Centre for Ocean Information Services (INCOIS).

**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

**Q.21) Solution (b)**

| Statement 1 | Statement 2 |
|-------------|-------------|
|-------------|-------------|

| Correct  | Incorrect   |
|--|---|
| Indian Maritime Situational Awareness System (IMSAS) is high performance intelligent software system that provides Global Maritime Situational Picture, Marine planning tools and Analytical capabilities to Indian Navy. It provides Maritime Operational Picture from Naval HQ to each individual ship in sea to enable Naval Command and Control. | It is indigenously developed by the Defence Research and Development Organisation (DRDO). Centre for Artificial Intelligence & Robotics (CAIR), Bengaluru of DRDO and Indian Navy has jointly conceptualised and developed the product and the BEL, Bengaluru has implemented it. |

**Q.22) Consider the following pairs:**

| Ramsar site         | State/UT          |
|---------------------|-------------------|
| 1. Kabartal Wetland | West Bengal       |
| 2. Keetham lake     | Uttar Pradesh     |
| 3. Tso Kar Wetland  | Jammu and Kashmir |

**Which of the pairs given above are *incorrectly* matched?**

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

**Q.22) Solution (d)**

- **Kabartal Wetland** also known as **Kanwar Jheel**, it covers 2,620 hectares of the Indo-Gangetic plains in the Begusarai district of **Bihar**.
- **Soor Sarovar** Lake also known as **Keetham lake** situated within the Soor Sarovar Bird Sanctuary alongside river Yamuna in Agra, **Uttar Pradesh**.
- **Tso Kar Wetland** Complex is India's 42nd Ramsar site and a second one in **Ladakh** after Tso Moriri.

**Q.23) With reference to Eastern Dedicated Freight Corridor (EDFC), consider the following statements:**

1. It will run across six States of India.
2. It is implemented by a special purpose vehicle established by the Ministry of Road Transport and Highways.

**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

**Q.23) Solution (a)**

| Statement 1  | Statement 2  |
|--|--|
| Correct  | Incorrect  |
| Eastern Dedicated Freight Corridor (EDFC) will be the 1,856 km long from Ludhiana in Punjab to Dankuni in West Bengal having double electrified tracts. <b>It will run across six States</b> i.e starts in Punjab, and passes through the states of Jharkhand, Bihar, Uttar Pradesh (UP) and Haryana before finally ending at West Bengal. | The project is being implemented by Dedicated Freight Corridor Corporation of India Limited (DFCCIL), <b>a special purpose vehicle established by the Ministry of Indian Railways</b> for the construction, operation and maintenance of the dedicated freight corridors. DFCCIL is also responsible for planning, development, mobilisation of financial resources and operation of the DFCs. |



**Q.24) With reference to Pradhan Mantri Street Vendor's Atma Nirbhar Nidhi (PM SVANidhi) scheme, consider the following statements:**

1. The vendors can avail a working capital loan of up to Rs. 50,000.
2. The loan under the scheme is provided without any collateral.
3. A programme of Socio-Economic Profiling of PM SVANidhi beneficiaries is one of its components.

**Which of the statements given above is/are correct?**

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

**Q.24) Solution (c)**

| Statement 1   | Statement 2   | Statement 3  |
|---|---|--|
| Incorrect   | Correct   | Correct  |
| The Ministry of Housing and Urban Affairs (MoHUA) has launched Pradhan Mantri Street Vendor's Atma Nirbhar Nidhi (PM SVANidhi), for providing affordable <b>working capital loan up to 10 thousand rupees</b> to Street Vendors for | The loan is repayable in monthly installments within a year. The loans would be provided <b>without collateral</b> and there will be no penalty | <b>A programme of Socio-Economic Profiling of PM SVANidhi beneficiaries</b> and their families was recently launched as an |

|   |                             |   |
|---|-----------------------------|---|
| facilitating resumption of their livelihoods adversely affected by the COVID-19 pandemic. | on early repayment of loan. | additional component of PM SVANidhi Scheme. |
|---|-----------------------------|---|

**Q.25) Who among the following started first-ever infanticide prohibition home in India called Balhatya Pratibandhak Griha?**

- a) Ramabai Ranade
- b) Tarabai Shinde
- c) Dhondo Keshav Karve
- d) Savitribai Phule

**Q.25) Solution (d)**

In 1863, **Jyotirao and Savitribai Phule** started the first-ever infanticide prohibition home in India called **Balhatya Pratibandhak Griha**. It helped pregnant Brahmin widows and rape victims deliver children.

**Q.26) Which of the following Countries have successfully retrieved lunar samples?**

- 1. Russia
- 2. USA
- 3. China
- 4. India

**Select the correct answer using the code given below:**

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

**Q.26) Solution (a)**

- China's Chang'e 5 lunar mission returned to Earth carrying around 2 kilograms of the first fresh rock samples from the moon.



- With this, China became the third country after the United States and the Soviet Union, to collect lunar samples.

**Q.27) The Zou people or Zomi are an indigenous community living in which of the following State of India?**

- a) Assam
- b) Tripura
- c) Mizoram
- d) Manipur

**Q.27) Solution (d)**

- **Manipur's Zomi ethnic group** has renewed its demand for the creation of Zoland Territorial Council (ZTC) under the Sixth Schedule of the Constitution, a self-administered zone on the lines of the Bodoland Territorial Council in Assam.
- The Zou people or Zomi are an indigenous community living along the frontier of India and Burma. They are a sub-group of the Zo people (Mizo-Kuki-Chin).

**Q.28) Which of the following film media units are recently merged with National Film Development Corporation (NFDC)?**

1. Directorate of Film Festivals
2. Film and Television Institute of India
3. National Film Archives of India
4. Children's Film Society, India

**Select the correct answer using the code given below:**

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

**Q.28) Solution (c)**

- Union Cabinet has approved to merge four of its film media units, namely **Films Division, Directorate of Film Festivals, National Film Archives of India, and Children's Film Society, India** with the National Film Development Corporation (NFDC) Ltd. by expanding the Memorandum of Articles of Association of NFDC, which will then carry out all the activities hitherto performed by them.
- The merger of Film Media Units under one corporation will lead to convergence of activities and resources and better coordination, thereby ensuring synergy and efficiency in achieving the mandate of each media unit.

**Q.29) The San Isidro Movement by artists and activists demanding greater freedom of expression was started in which of the following country?**

- a) Cuba
- b) China
- c) Venezuela
- d) France

**Q.29) Solution (a)**

- **In Cuba, a campaign by artists and activists demanding greater freedom of expression** has been in news recently.
- Cuba has been under an authoritarian communist regime for more than 60 years.
- The Movimiento San Isidro, or the **San Isidro Movement (MSI)**, started two years ago to protest state censorship of artistic works.
- It started in September 2018, when the Cuban government sought to enforce Decree 349 which is a law that would have given powers to the nation's Culture Ministry to restrict cultural activity it did not approve of.
- To protest against the decree, artists, poets, journalists and activists gathered in San Isidro, It is a Black-majority locality that is among Havana's poorest yet most culturally active wards, and which also forms part of the Old Havana UNESCO World Heritage Site.

**Q.30) The Sustainable Mountain Development Summit is organized by which of the following organisation?**

- a) The Energy and Resources Institute (TERI)
- b) The International Centre for Integrated Mountain Development (ICIMOD)
- c) Central Himalayan Institute for Nature & Applied Research
- d) Indian Mountain Initiative (IMI)

**Q.30) Solution (d)**

- The 9<sup>th</sup> edition of **Sustainable Mountain Development Summit (SMDS)** was held in Dehradun. It was organized by **Indian Mountain Initiative (IMI)**.
- The summit seeks to deliberate on issues such as migration, water security, climate resilience and innovative solutions for the farm sector, and disaster risk reduction in the Indian Himalayas.
- The theme for this year is Emerging Pathways for Building a Resilient Post COVID-19 Mountain Economy, Adaptation, Innovation and Acceleration.
- The first edition was organized in 2011 in Nainital.

**Read the following passage and answer the questions that follow each passage. Your answer to these questions should be based on passage only.**

**Passage 1**

At this stage of civilisation, when many nations are brought in to close and vital contact for good and evil, it is essential, as never before, that their gross ignorance of one another should be diminished, that they should begin to understand a little of one another's historical experience and resulting mentality. It is the fault of the English to expect the people of other countries to react as they do, to political and international situations. Our genuine goodwill and good intentions are often brought to nothing, because we expect other people to be like us. This would be corrected if we knew the history, not necessarily in detail but in broad outlines, of the social and political conditions which have given to each nation its present character.

**Q.31) According to the author of 'Mentality' of a nation is mainly product of its**

- a) history
- b) politics
- c) international position
- d) present character

**Q.31) Solution (a)**

....that they should begin to understand a little of one another's historical experience and resulting mentality.

This makes it clear that option a is the correct answer.

### Passage 2

The dangerous illusion of technology is that it can create stronger, top-down accountability of service providers in implementation-intensive services within existing public sector organizations. One notion is that electronic management information systems (EMIS) keep better track of inputs and those aspects of personnel that are 'EMIS visible' can lead to better services. A recent study examined attempts to increase attendance of Auxiliary Nurse Midwife (ANMs) at clinics in Rajasthan, which involved high-tech time clocks to monitor attendance. The study's title says it all: Band-Aids on a Corpse. E-governance can be just as bad as any other governance when the real issue is people and their motivation.

**Q.32) In the context of the passage, we can infer that the title "Band Aids on a Corpse" suggests that:**

- a) the nurses who attended the clinics were too poorly trained to provide appropriate medical care
- b) the electronic monitoring system was a superficial solution to a serious problem
- c) the clinics were better funded, but performance monitoring did not result in any improvement
- d) the nurses attended the clinics, but the clinics were ill-equipped

### Q.32) Solution (b)

In the context of the passage, it suggests that it was a superficial solution to a more serious problem. The other choices are focusing too much on the nurses and the clinics, but that is not the main idea of the passage.

In the context of the passage, the example of nurses is just a small suggestion of a superficial solution to a bigger problem. We should not forget that the question asks us to answer in the context of the passage.

Hence, option b is correct.

**Direction for the following 3 (three) items:**

**Study the following information and answer the questions that follow**

| Village | % of literates in total population (male and female) | % of literates in the male population | % of literates in the female population |
|---------|--|---------------------------------------|---|
| A       |  | 72                                    | 70                                      |
| B       | 61   | 64                                    | 56                                      |
| C       | 73.8   | 75                                    | 72                                      |
| D       | 60   |                                       | 60                                      |
| E       | 70   |                                       | 70                                      |

**Note:** Some of the data is deliberately missing. You need to calculate the values based on the given data to answer the given questions

**Q.33) Only 40% and 20% of females were graduates in villages A and C respectively. If the female population of villages A and C were equal, what was the respective ratio of a number of non-graduate females (including illiterate females) in villages A and C?**

- a) 81:107
- b) 90:107
- c) 90:121
- d) 40:49

**Q.33) Solution (b)**

Let females in village A = X

=> Females in village C = X

Literate females in village A =  $(70/100) * X = 7X/10$

Graduate females in village A =  $(40/100) * 7X/10 = 7X/25$

Literate females in village C =  $(72/100) * X = 18X/25$

Graduate females in village C =  $(20/100) * 18X/25 = 18X/125$

Therefore, the required ratio of number of non-graduate females (including illiterate females) in villages A and C



$$= (X - 7X/10):(X - 18X/25)$$

$$= (18X/25):(107X/125)$$

$$= 90:107$$

**Q.34) If in village E, 40% of male literates and 40% of female literates were graduates, what per cent of the total population were graduates?**

- a) 32%
- b) 35%
- c) 28%
- d) 40%

**Q.34) Solution (c)**

In village E,

Let number of males = X and Number of females = Y

$$\Rightarrow \text{Total literate population} = (70/100)*(X+Y)$$

$$\text{Literate males} = (70/100)*X$$

$$\text{Literate females} = (70/100)*Y$$

$$\text{Literate males who are graduates} = (40/100)*7X/10 = 7X/25$$

$$\text{Literate females who are graduates} = (40/100)*7Y/10 = 7Y/25$$

$$\text{Therefore, the required \%} = [(7X/25) + (7Y/25)]/X+Y = (7/25)*100 = 28\%$$

**Q.35) In village B, the number of females was what per cent less than the number of males?**

- a) 20%
- b) 30%
- c) 32%
- d) 40%

**Q.35) Solution (d)**

In village B,

Let number of males = X and Number of females = Y

=> Total literate population =  $61/100 \cdot (X+Y)$

Literate males =  $(64/100) \cdot X$

Literate females =  $(56/100) \cdot Y$

$(64X/100) + (56Y/100) = 61/100 \cdot (X+Y)$

$64X + 56Y = 61X + 61Y$

$3X = 5Y$

$X/Y = 5/3$

Required % =  $[(5-3)/5] \cdot 100 = 40\%$

