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UPSC PRELIMS 2022
DETAILED ANSWER KEY
GS PAPER 1



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1. “Rapid Financing Instrument” and “Rapid Credit Facility” are related to the provisions of lending by which one of the following?

(a) Asian Development Bank

(b) International Monetary Fund

(c) United Nations Environment Programme Finance Initiative

(d) World Bank

Correct Option: (b)

Explanation:

Rapid Financing Instrument (RFI)

The Rapid Financing Instrument (RFI) provides rapid financial assistance, which is available to all member countries facing an urgent balance of payments need. The RFI was created as part of a broader reform to make the IMF’s financial support more flexible to address the diverse needs of member countries. The RFI replaced the IMF’s previous emergency assistance policy and can be used in a wide range of circumstances.

Rapid Credit Facility (RCF)

The Rapid Credit Facility (RCF) provides rapid concessional financial assistance to low-income countries (LICs) facing an urgent balance of payments (BoP) need with no ex post conditionality where a full-fledged economic program is neither necessary nor feasible. The RCF was created under the Poverty Reduction and Growth Trust (PRGT) as part of a broader reform to make the Fund’s financial support more flexible and better tailored to the diverse needs of LICs, including in times of crisis. There are three windows under RCF: (i) a “regular window” for urgent BoP needs caused by wide range of sources including domestic instability, emergencies and

fragility; (ii) an “exogenous shock window” for urgent BoP needs caused by a sudden, exogenous shock; and (iii) a “large natural disaster window” for urgent BoP needs arising from natural disasters where damage is assessed to be equivalent to or exceed 20 percent of the member’s GDP. Access under the RCF is subject to annual and cumulative limits, with higher access limits applying for the large natural disaster window. For higher income countries that are non-PRGT eligible, a similar Rapid Financing Instrument (RFI) is available.

2. With reference to the Indian economy, consider the following statements:

1. An increase in Nominal Effective Exchange Rate (NEER) indicates the appreciation of rupee.
2. An increase in the Real Effective Exchange Rate (REER) indicates an improvement in trade competitiveness.
3. An increasing trend in domestic inflation relative to inflation in other countries is likely to cause an increasing divergence between NEER and REER.

Which of the above statements are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Correct Option: (c)

Explanation:

- Statement 1 is correct: NEER is a measure of value of a currency against a weighted average of several foreign currencies. An increase in



NEER indicates appreciation of rupee.

- Statement 2 is incorrect: An increase in REER implies that exports become more expensive and imports become cheaper; therefore, an increase indicates a loss in trade competitiveness.
- Statement 3 is correct: The NEER is the weighted geometric average of the bilateral nominal exchange rates of the home currency in terms of foreign currencies. The REER is the weighted average of NEER adjusted by the ratio of domestic price to foreign prices. Increasing trend in domestic inflation relative to inflation in other countries creates a divergence in NEER and REER.

3. With reference to the Indian economy, consider the following statements:

1. If the inflation is too high, Reserve Bank of India (RBI) is likely to buy government securities.
2. If the rupee is rapidly depreciating, RBI is likely to sell dollars in the market.
3. If interest rates in the USA or European Union were to fall, that is likely to induce RBI to buy dollars.

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

Correct Option: (b)

Explanation:

- Statement 1 is incorrect: If the inflation is high RBI tries to reduce the liquidity from the market, by selling Government securities to the public via open market operation.
- Statement 2 is correct: Rupee depreciation means fall in value of rupee with respect to dollar. In free floating exchange rate regime, depreciation takes place when the demand for dollar is more than the supply. Thus, RBI is likely to sell dollars in the economy to increase the supply of the dollar.
- Statement 3 is correct: If the interest rate in US and EU falls, there will be an inflow of dollars in the Indian market, leading to appreciation of the rupee. To reduce the supply of dollar in the economy, RBI will like to buy the dollars from the market.

4. With reference to the “G20 Common Framework”, consider the following statements:

1. It is an initiative endorsed by the G20 together with the Paris Club.
2. It is an initiative to support Low Income Countries with unsustainable debt.

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

Correct Option: (c)

Explanation:



- Statement 1 is correct: Initiative endorsed by G20 together with Paris Club.
- Statement 2 is correct: It is an initiative to support low income countries with unsustainable debt.

5. With reference to the India economy, what are the advantages of “Inflation-Indexed Bonds (IIBs)”?

1. Government can reduce the coupon rates on its borrowing by way of IIBs.
2. IIGs provide protection to the investors from uncertainty regarding inflation.
3. The interest received as well as capital gains on IIBs are not taxable.

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

Correct Option: (a)

Explanation:

- Statement 1 is correct:
- Statement 2 is correct: Inflation indexed bonds provides protection to investors from uncertainty regarding inflation.

6. With reference to foreign-owned e-commerce firms operating in India, which of the following statements is/are correct?

1. They can sell their own goods in addition to offering their platforms as market-places.

2. The degree to which they can own big sellers on their platforms is limited.

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

Correct Option: (b)

Explanation:

- **Statement 1 is incorrect:** E-commerce firms can't sell their own products in addition to offering their platforms as market place.
- **Statement 2 is correct:** Big sellers have the limit of 20% for sale on e-commerce platform

7. Which of the following activities constitute real sector in the economy?

1. Farmers harvesting their crops
2. Textile mills converting raw cotton into fabrics
3. A commercial bank lending money to a trading company
4. A corporate body issuing Rupee Denominated Bonds overseas

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 2, 3 and 4 only

(c) 1, 3 and 4 only

(d) 1, 2, 3 and 4

Correct Option: (a)

Explanation:



- The real sector of the economy deals with the production side, while the nominal economy deals with the financial side. Financial activities majorly support real (production) activity, but does not contribute itself too much except the factor income it generates.

8. Which one of the following situations best reflects “Indirect Transfers” often talked about in media recently with reference to India?

- (a) An Indian company investing in a foreign enterprise and paying taxes to the foreign country on the profits arising out of its investment
- (b) A foreign company investing in India and paying taxes to the country of its base on the profits arising out of its investment
- (c) An Indian company purchases tangible assets in a foreign country and sells such assets after their value increases and transfers the proceeds to India

(d) A foreign company transfers shares and such shares derive their substantial value from assets located in India

Correct Option: (d)
Explanation:

- Indirect transfers refer to situations where when foreign entities own shares or assets in India, the shares of such foreign entities are transferred instead of a direct transfer of the underlying assets in India.

9. With reference to the expenditure made by an organization or a company, which of the following statements is/are correct?

- Acquiring new technology is capital expenditure.
- Debt financing is considered capital expenditure, while equity financing is considered revenue expenditure.

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

Correct Option: (a)
Explanation:

- Statement 1 is correct:** Acquiring new technology is considered as capital expenditure as it will generate profit in the future time and helps in creation of new assets.
- Statement 2 is incorrect:** Debt Financing and equity financing are considered under capital expenditure.

10. With reference to the Indian economy, consider the following statements:

- A share of the household financial savings goes towards government borrowings.
- Dated securities issued at market-related rates in auctions form a large component of internal debt.

Which of the above statements is/are correct?

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



Correct Option: (c)

Explanation:

- **Statement 1 is correct:** A share of household financial savings goes to the government borrowings, as part of public accounts of India. It mainly consists of provident fund.
- **Statement 2 is correct:** Dated securities means regular government bonds, whereas T-bills are considered separately. Dated securities issued at market related rates comprise a large share of internal debt.

11. Consider the following statements:

1. Pursuant to the report of H.N. Sanyal Committee, the Contempt of Courts Act, 1971 was passed.
2. The Constitution of India empowers the Supreme Court and the High Courts to punish for contempt of themselves.
3. The Constitution of India defines Civil Contempt and Criminal Contempt.
4. In India, the Parliament is vested with the powers to make laws on Contempt of Court.

Which of the statements given above is/are correct?

(a) 1 and 2 only

(b) 1, 2 and 4 only

(c) 3 and 4 only

(d) 3 only

Correct Option: (b)

Explanation:

- **Statement 1 is correct:** Contempt of Courts Act, 1971 was passed on the recommendation of H. N. Sanyal Committee.
- **Statement 2 is correct:** Constitution Of India empowers Supreme Court and High Courts to punish for contempt of themselves. High courts have the power to punish for contempt for lower courts under respective jurisdiction.
- **Statement 3 is incorrect:** Constitution of India does not define any type of contempt of court, neither Civil contempt nor criminal contempt.
- **Statement 4 is correct:** In India it is the Parliament who has the power to legislate over Contempt of Court.

12. With reference to India, consider the following statements:

1. Government law officers and legal firms are recognized as advocates, but corporate lawyers and patent attorneys are excluded from recognition as advocates.
2. Bar Councils have the power to lay down the rules relating to legal education and recognition of law colleges.

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

Correct Option: (b)

Explanation:



- **Statement 1 is incorrect:** Government law officers, legal firms, corporate lawyers and patent attorneys all are recognized as advocates.
- **Statement 2 is correct:** Bar councils have the powers to lay down rules relating to legal education and recognition of law colleges.

13. Consider the following statements:

1. A bill amending the Constitution requires a prior recommendation of the President of India.
2. When a Constitution Amendment Bill is presented to the President of India, it is obligatory for the President of India to give his/her assent.
3. A Constitution Amendment Bill must be passed by both the Lok Sabha and Rajya Sabha by a special majority and there is no provision for joint sitting.

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

Correct Option: (b)

Explanation:

- **Statement 1 is incorrect:** No prior approval of the President is required for the Constitutional Amendment Act.
- **Statement 2 is correct:** It is obligatory for the President to give

his assent, when a Constitutional Amendment Bill is presented before him. The President cannot exercise any veto power regarding the Constitutional Amendment Bill.

- **Statement 3 is correct:** Constitutional Amendment Bill needs to be passed by both the houses separately by a special majority, and no joint sitting is allowed regarding Constitutional Amendment Bill.

14. Consider the following statements:

1. The Constitution of India classifies the ministers into four ranks viz. Cabinet Minister, Minister of State with Independent Charge, Minister of State and Deputy Minister.
2. The total number of ministers in the Union Government, including the Prime Minister, shall not exceed 15 percent of the total number of members in the Lok Sabha.

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

Correct Option: (b)

Explanation:

- **Statement 1 is incorrect:** Constitution of India does not define any categorisation of ministers.
- **Statement 2 correct:** The total number of ministers including prime minister should not exceed 15% of the total membership of Lok Sabha.



15. Which of the following is/are the exclusive power(s) of Lok Sabha?

1. To ratify the declaration of Emergency
2. To pass a motion of no-confidence against the Council of Ministers
3. To impeach the President of India

Select the correct answer using the code given below:

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

Correct Option: (b)

Explanation:

- Statement 2 is correct: Article 75 of the Constitution says that the council of ministers shall be collectively responsible to the Lok Sabha. It means that the ministry stays in office so long as it enjoys confidence of the majority of the members of the Lok Sabha. In other words, the Lok Sabha can remove the ministry from office by passing a no-confidence motion. The motion needs the support of 50 members to be admitted.
- Statement 1 is incorrect: If the President is satisfied that a grave emergency exists whereby the security of India or of any part of the territory thereof is threatened, whether by war or external aggression or armed rebellion, he may, by Proclamation, made a declaration to that effect in respect of the whole of India or of such part of the territory. Every Proclamation

issued under this article shall be laid before each House of Parliament.

- Statement 3 is incorrect: If Parliament. These charges should be signed by one-fourth members of the House (that framed the charges), and a 14 days' notice should be given to the President. After the impeachment resolution is passed by a majority of two-thirds of the total membership of that House, it is sent to the other House, which should investigate the charges. The President has the right to appear and to be represented at such investigation. If the other House also sustains the charges and passes the impeachment resolution by a majority of two-thirds of the total membership, then the President stands removed from his office from the date on which the resolution is so passed.

16. With reference to anti-defection law in India, consider the following statements:

1. The law specifies that a nominated legislator cannot join any political party within six months of being appointed to the House.
2. The law does not provide any time-frame within which the presiding officer has to decide a defection case.

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



Correct Option: (b)

Explanation:

Statement 1 is incorrect: A nominated member of a House becomes disqualified for being a member of the House if he joins any political party after the expiry of six months from the date on which he takes his seat in the House. This means that he may join any political party within six months of taking his seat in the House without inviting this disqualification. (Source: LakshmiKant)

Statement 2 is correct: The law does not specify a time-period for the Presiding Officer to decide on a disqualification plea.

17. Consider the following statements:

1. Attorney General of India and Solicitor General of India are the only officers of the Government who are allowed to participate in the meetings of the Parliament of India.
2. According to the Constitution of India, the Attorney General of India submits his resignation when the Government which appointed him resigns.

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

Correct Option: (d)

Explanation:

Statement 1 is Incorrect: Solicitor General do not participate in the meetings of Parliament. Article 88 in The Constitution Of India 1949. Rights of Ministers and Attorney General in respects Houses Every

Minister and the Attorney General of India shall have the right to speak in, and otherwise to take part in the proceedings of either House, any joint sitting of the Houses, and any committee of Parliament of which he may be named a member, but shall not by virtue of this article be entitled to vote Officers of Parliament.

Attorney General: The Attorney General has the right to speak and to take part in the proceedings of both the Houses of Parliament or their joint sitting and any committee of the Parliament of which he may be named a member, but without a right to vote. He enjoys all the privileges and immunities that are available to a member of Parliament.

Solicitor General: In addition to the AG, there are other law officers of the Government of India. They are the solicitor general of India and additional solicitor general of India. They assist the AG in the fulfilment of his official responsibilities. It should be noted here that only the office of the AG is created by the Constitution. In other words, Article 76 does not mention about the solicitor general and additional solicitor general.

18. With reference to the writs issued by the Courts in India, consider the following statements:

1. Mandamus will not lie against a private organization unless it is entrusted with a public duty.
2. Mandamus will not lie against a Company even though it may be a Government Company.
3. Any public minded person can be a petitioner to move the Court to obtain the writ of Quo Warranto.



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

Correct Option: (c)

Explanation:

Mandamus

It literally means 'we command'. It is a command issued by the court to a public official asking him to perform his official duties that he has failed or refused to perform. **It can also be issued against any public body, a corporation, an inferior court, a tribunal or government for the same purpose. The writ of mandamus cannot be issued (a) against a private individual or body; (b) to enforce departmental instruction that does not possess statutory force; (c) when the duty is discretionary and not mandatory; (d) to enforce a contractual obligation; (e) against the president of India or the state governors; and (f) against the chief justice of a high court acting in judicial capacity.**

Quo-Warranto

Quo-Warranto In the literal sense, it means 'by what authority or warrant'. It is issued by the court to enquire into the legality of claim of a person to a public office. Hence, it prevents illegal usurpation of public office by a person. The writ can be issued only in case of a substantive public office of a permanent character created by a statute or by the Constitution. It cannot be issued in cases of ministerial office or private office. **Unlike the other four writs, this can be sought by any interested person and not necessarily by the aggrieved person.**

19. With reference to Ayushman Bharat Digital Mission, consider the following statements:

1. Private and public hospitals must adopt it.
2. As it aims to achieve universal health coverage, every citizen of India should be part of it ultimately.
3. It has seamless portability across the country.

Which of the statements given above is/are correct?

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

Correct Option: (b)

Explanation:

Participation in ABDM is voluntary including for citizens. Participation of a healthcare facility or an institution is also voluntary and shall be taken by the respective management (government or private management). However, once the management decides to register the respective healthcare facility/institution in ABDM, it is essential for all the healthcare professionals serving the said facility/institution to register in Healthcare Professionals Registry so that the institution can become fully integrated with the National Digital Health Ecosystem (NDHE). It is possible for a healthcare professional to be a part of two facilities/hospitals, one of which may be a part of NDHE and the other one may not be a part NDHE. In such a case, the healthcare professional will be required to use their Healthcare Professional ID (HPID) only in the institution which is participating in the ecosystem.



20. With reference to Deputy Speaker of Lok Sabha, consider the following statements:

1. As per the Rules of Procedure and Conduct of Business in Lok Sabha, the election of Deputy Speaker shall be held on such date as the Speaker may fix.
2. There is a mandatory provision that the election of a candidate as Deputy Speaker of Lok Sabha shall be from either the principal opposition party or the ruling party.
3. The Deputy Speaker has the same power as of the Speaker when presiding over the sitting of the House and no appeal lies against his rulings.
4. The well established parliamentary practice regarding the appointment of Deputy Speaker is that the motion is moved by the Speaker and duly seconded by the Prime Minister.

Which of the statements given above are correct?

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

Correct Option: (a)
Explanation:

Deputy Speaker of Lok Sabha

Like the Speaker, the Deputy Speaker is also elected by the Lok Sabha itself from amongst its members. He is elected after the election of the Speaker has taken place. **The date of election of the Deputy Speaker is fixed by the Speaker.** Whenever the office of the Deputy Speaker falls vacant, the Lok

Sabha elects another member to fill the vacancy.

Upto the 10th Lok Sabha, both the Speaker and the Deputy Speaker were usually from the ruling party. **Since the 11th Lok Sabha, there has been a consensus that the Speaker comes from the ruling party (or ruling alliance) and the post of Deputy Speaker goes to the main opposition party.**

The Deputy Speaker performs the duties of the Speaker's office when it is vacant. **He also acts as the Speaker when the latter is absent from the sitting of the House. In both the cases, he assumes all the powers of the Speaker.** He also presides over the joint sitting of both the Houses of Parliament, in case the Speaker is absent from such a sitting.

At any time before noon on the day preceding the date so fixed, **any member may give notice in writing, addressed to the Secretary-General, of a motion that another member be chosen as the Deputy Speaker of the House and the notice shall be seconded by a third member** and shall be accompanied by a statement by the member whose name is proposed in the notice that the member proposed is willing to serve as Deputy Speaker.

21. Among the following crops, which one is the most important anthropogenic source of both methane and nitrous oxide?

- (a) Cotton
 (b) Rice
 (c) Sugarcane
 (d) Wheat

Correct Option: (b)
Explanation:



Methane and nitrous oxide are emitted from conventional and modified rice cultivation systems.

22. “System of Rice Intensification” of cultivation, in which alternate wetting and drying of rice fields is practised, results in:

1. Reduced seed requirement
2. Reduced methane production
3. Reduced electricity consumption

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

Correct Option: (d)
Explanation:

System of Rice Intensification (SRI) includes a method called Alternate Wetting and Drying (AWD) which is a form of controlled or intermittent irrigation of the rice crops. The benefits from the programme include **reduction in methane emissions** from traditional rice cultivation, and significant **reduction in water consumption**. The crop yields are maintained and not affected negatively, and the programme leads to the creation of community organisation and strengthening of networks through the formation of farmer groups. Typically, farmers use diesel to pump large amounts of water to flood their fields. With intermittent flooding, water pumps are run for shorter periods of time, reducing fuel consumption.

Benefits and Impacts of SRI

- To increase paddy yields usually by 20-50% and sometimes 100% or more;
- To reduce required seeds for transplanting by 60-80%;
- To reduce use of chemical fertilizers and agrichemicals;
- To reduce irrigation water by 25-50%;
- To reduce production costs usually by 10-20%; and
- With increased output and reduced costs, farmers’ net income is increased.

23. Which one of the following lakes of West Africa has become dry and turned into a desert?

- (a) Lake Victoria
- (b) Lake Faguibine**
- (c) Lake Oguta
- (d) Lake Volta

Correct Option: (b)
Explanation:

One example of increasing aridity in Mali appears in Lake Faguibine. These false-color Landsat satellite images of the lake show how it changed over the decades.

Lying at the end of a series of basins watered by the Niger River when it floods, Lake Faguibine has experienced widely fluctuating water levels since the turn of the twentieth century but, at its fullest, has ranked among the largest lakes in West Africa. In 1974, this lake covered roughly 590 square kilometers (230 square miles). Starting in the late 1980s, a drop in precipitation steadily dried the lake. By the late 1990s, the traditional livelihoods of fishing, agriculture, and livestock herding became impractical. Even though normal



rainfall resumed after the year 2000, the lake remained nearly dry.

24. Gandikota canyon of South India was created by which one of the following rivers?

- (a) Cauvery
- (b) Manjira
- (c) Pennar
- (d) Tungabhadra

Correct Option: (c)

Explanation:

Penna (also known as Pinakini, Pennar, Penner, Penneru (Telugu), Pennai (Tamil)) is a river of southern India.

India has always been a popular tourist destination for its historic forts, stunning palaces and dense jungles.

Now, a lesser known gorge in the southern state of Andhra Pradesh is drawing visitors.

The gorge is a stunning maze of jagged rocks layered in shades of red. The Penna river meanders through the canyon floor as it cuts through the Erramala hills.

The area is now known as the Grand Canyon of India because of its resemblance to the famous US landmark.

It's also home to two ancient temples and a 12th Century fort that sits atop the hills surrounding the gorge.

25. Consider the following pairs Peak Mountains

1. Namcha Barwa - Garhwal Himalaya
2. Nanda Devi – Kumaon Himalaya
3. Nokrek – Sikkim Himalaya

Which of the pairs given above is/are correctly matched ?

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

Correct Option: (b)

Explanation:

Namcha Barwa is in an isolated part of southeastern Tibet rarely visited by outsiders. It stands inside the Great Bend of the Yarlung Tsangpo River as the river enters its notable gorge across the Himalaya, emerging as the Siang and becoming the Brahmaputra. On other hand the **Garhwal Himalayas** are mountain ranges located in the Indian state of Uttarakhand

Kumaun Himalayas, west-central section of the Himalayas in northern India, extending 200 miles (320 km) from the Sutlej River east to the Kali River. The range, comprising part of the Siwalik Range in the south and part of the Great Himalayas in the north, lies largely within the state of Uttarakhand, northwest of Nepal. It rises to 25,646 feet (7,817 metres) at Nanda Devi, the range's highest peak.

The Nokrek Biosphere Reserve is located in the northeast of India on the Tura Range, which forms part of the Meghalaya Plateau (average altitude: 600 metres).

26. The term "Levant" often heard in the news roughly corresponds to which of the following regions ?

- (a) Region along the eastern Mediterranean shores
- (b) Region along North African shores stretching from Egypt to Morocco



- (c) Region along Persian Gulf and Horn of Africa
- (d) The entire coastal areas of Mediterranean Sea

Correct Option: (a)

Explanation:

Levant, the region along the eastern Mediterranean shores, roughly corresponding to modern-day Israel, Jordan, Lebanon, Syria, and certain adjacent areas.

27. Consider the following countries :

1. Azerbaijan
2. Kyrgyzstan
3. Tajikistan
4. Turkmenistan
5. Uzbekistan

Which of the above have borders with Afghanistan ?

- (a) 1, 2 and 5 only
- (b) 1, 2, 3 and 4 only
- (c) 3, 4 and 5 only**
- (d) 1, 2, 3, 4 and 5

Correct Option: (c)

Explanation:

Afghanistan is completely landlocked—the nearest coast lies along the Arabian Sea, about 300 miles (480 km) to the south—and, because of both its isolation and its volatile political history, it remains one of the most poorly surveyed areas of the world. It is bounded to the

- east and south by Pakistan
- to the west by Iran
- **to the north by the Central Asian states of Turkmenistan, Uzbekistan, and Tajikistan.**

- It also has a short border with Xinjiang, China, at the end of the long, narrow Wakhan Corridor, in the extreme northeast.

28. With reference to India, consider the following statements :

1. Monazite is a source of rare earths.
2. Monazite contains thorium.
3. Monazite occurs naturally in the entire Indian coastal sands in India.
4. In India, Government bodies only can process or export monazite.

Which of the statements given above are correct?

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

Correct Option: (b)

Explanation:

The resources of xenotime, another **rare-earth bearing mineral, are negligible in India.** AMD has established **about 2000 tonnes of xenotime-bearing heavy mineral concentrate containing 2% xenotime in the riverine heavy mineral placer deposits of Chhattisgarh and Jharkhand.**

Monazite is a mineral mainly containing rare earths and thorium—a prescribed substance to be handled by the Department of Atomic Energy (DAE). Accordingly, Indian Rare Earths Ltd. (IREL) wholly owned by the Govt. of India, under the administrative control of the Dept. of Atomic Energy (DAE) utilises monazite mainly for production of rare earth compounds, and thorium, as needed in the Department of Atomic Energy.



29. In the northern hemisphere, the longest day of the year normally occurs in the:

- (a) First half of the month of June
- (b) Second half of the month of June**
- (c) First half of the month of July
- (d) Second half of the month of July

Correct Option: (b)
Explanation:

Explanation: summer solstice, the two moments during the year when the path of the Sun in the sky is farthest north in the Northern Hemisphere (June 20 or 21) or farthest south in the Southern Hemisphere (December 21 or 22).

At the summer solstice, the Sun travels the longest path through the sky, and that day therefore has the most daylight. When the summer solstice happens in the Northern Hemisphere, the North Pole is tilted about 23.4° ($23^\circ 27'$) toward the Sun. Because the Sun's rays are shifted northward from the Equator by the same amount, the vertical noon rays are directly overhead at the Tropic of Cancer ($23^\circ 27' N$). Six months later, the South Pole is inclined about 23.4° toward the Sun. On this day of the summer solstice in the Southern Hemisphere, the Sun's vertical overhead rays progress to their southernmost position, the Tropic of Capricorn ($23^\circ 27' S$).

30. Consider the following pairs :
Wetland / Lake Location

1. Hokera Wetland – Punjab
2. Renuka Wetland – Himachal Pradesh
3. Rudrasagar Lake — Tripura
4. Sasthamkotta Lake – Tamil Nadu

How many pairs given above are correctly matched ?

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

Correct Option: (b)
Explanation:

HOKERA WETLAND- JAMMU AND KASHMIR

RENUKA WETLAND- HIMACHAL PRADESH

RUDRASAGAR LAKE- TRIPURA

SASTHAMKOTTA LAKE- KERALA

31. Consider the following :

1. Aarogya Setu
2. CoWIN
3. DigiLocker
4. DIKSHA

Which of the above are built on top of open-source digital platforms?

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

Correct Option: (d)
Explanation:

An open source platform is any platform that allows access to its source code to any other users or developers. An open source platform is one aspect of a wide availability of open source products. In contrast with closed source software, which is a type of proprietary software that reserves rights only to authorized individuals, open source software aims to allow equal access to anyone and everyone. Open source products



are oftentimes part of the free software movement, and the associated Free Software Foundation founded by Richard Stallman in 1985. Rather than being concerned with the cost of the software, the free software movement, and associated foundation, aim to ensure that software users are free to run software, study the software, modify the software, and share such modifications. However, not all open source platforms are part of the free software movement, but they are almost always part of the open source software movement.

- Aarogya Setu , India’s coronavirus (COVID-19) contact-tracing and self-assessment app is now open source .
- DigiLocker is an initiative by the government to offer Indian citizens a free platform to store and access important documents. The platform uses several open source technologies to deliver a mass solution and contributes back to the ever-growing community.
- DIKSHA is built using Sunbird ED, a fully functional solution building block available as open-source software under MIT license and is part of Sunbird, a “Made in India, Made for the World” digital public good (DPG).
- Co-WIN, which is owned by the Ministry of Health and Family Welfare, was developed using open source software. This type of software allows users to modify the source code and distribute it.

32. With reference to Web 3.0, consider the following statements :

1. Web 3.0 technology enables people to control their own data.
2. In Web 3.0 world, there can be blockchain based social networks.
3. Web 3.0 is operated by users collectively rather than a corporation.

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

Correct Option: (d)
Explanation:

1. Web 3.0 is the next version of the internet, where services will run on blockchain. It is a decentralised internet that runs on a public blockchain, which is also used for cryptocurrency transactions.
2. It will be permissionless and democratic. For instance: Twitter will not be able to censor posts and Facebook will not be able to maintain a database of billions of users that can be potentially used to influence elections.
3. In a Web 3.0 universe, people will control their own data and will be able to move around from social media to email to shopping using a single personalized account, creating a public record on the blockchain of all of that activity.
4. All data will be interconnected in a decentralized way, unlike the current generation of the internet (Web 2.0), where data is mostly stored in centralized repositories.



5. – Three key features of Web 3.0 are: Ubiquity, Semantic Web, Artificial Intelligence and 3D Graphics.

– Examples of Web 3.0: The most recent example of Web 3.0 are the NFTs or non-fungible tokens.

hence , all the statements are correct.

33. With reference to "Software as a Service (SaaS)", consider the following statements :

1. SaaS buyers can customise the user interface and can change data fields.
2. SaaS users can access their data through their mobile devices.
3. Outlook, Hotmail and Yahoo! Mail are forms of SaaS. .

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

Correct Option: (d)
Explanation:

1. Software as a service (SaaS) allows users to connect to and use cloud-based apps over the Internet. Common examples are email, calendaring and office tools (such as Microsoft Office 365).
2. SaaS provides a complete software solution which you purchase on a pay-as-you-go basis from a cloud service provider. You rent the use of an app for your organisation and your users connect to it over the

Internet, usually with a web browser. Statement 1 is incorrect.

3. Access app data from anywhere. With data stored in the cloud, users can access their information from any Internet-connected computer or mobile device. And when app data is stored in the cloud, no data is lost if a user's computer or device fails. Statement 2 is correct.
4. If you have used a web-based email service such as Outlook, Hotmail or Yahoo! Mail, then you have already used a form of SaaS. With these services, you log into your account over the Internet, often from a web browser. The email software is located on the service provider's network and your messages are stored there as well. You can access your email and stored messages from a web browser on any computer or Internet-connected device. Statement 3 is correct.

34. Which one of the following statements best reflects the idea behind the "Fractional Orbital Bombardment System" often talked about in media ?

- (a) A hypersonic missile is -launched into space to counter the asteroid approaching the Earth and explode it in space.
 (b) A spacecraft lands on another planet after making several orbital motions.
(c) A missile is put into a stable orbit around the Earth and deorbits over a target on the Earth.
 (d) A spacecraft moves along a comet with the same speed and places a probe on its surface.'



Correct Option: (c)

Explanation:

A Fractional Orbital Bombardment System (FOBS) is a warhead delivery system that uses a low earth orbit towards its target destination. Just before reaching the target, it deorbits through a retrograde engine burn.

The idea behind FOBS is, a warhead is put into a stable orbit and it deorbits over the target.

If the target and the launch position is lined up and the warhead keeps going round, it will complete a circle. Obviously, with the earth moving during this, it is more of a spiral than a ring, but the horizontal movement is countered in such a way that the warhead still goes over the target.

35. Which one of the following is the context in which the term “qubit” is mentioned ?

(a) Cloud Services

(b) Quantum Computing

(c) Visible Light Communication Technologies

(d) Wireless Communication Technologies

Correct Option: (b)

Explanation:

The phrase ‘quantum supremacy’ was coined in the year 2011 by John Preskill, Professor of Theoretical Physics at the California Institute of Technology.

- Quantum supremacy refers to a problem-solving process by the quantum computer that cannot be solved by a classical computer in its normal lifetime.
- The concept is related to the speed at which a quantum computer performs.

- Quantum computers are different from binary digital electronic computers that are based on transistors (a semiconductor device used to amplify or switch electronic signals and electrical power).
- The common digital computing requires the data to be encoded into binary digits (bits), each of which is always in one of two definite states (0 or 1).
- Quantum computation uses quantum bits (qubits).

Quantum Bit (Qubit)

- A quantum bit (qubit) is the smallest unit of quantum information, which is the quantum analog of the regular computer bit, used in the field of quantum computing.
- They operate according to two key principles of quantum physics: superposition and entanglement. Superposition means that each qubit can represent both a ‘1’ and a ‘0’ at the same time.
- Entanglement means that qubits in a superposition state can be correlated with each other; that is, the state of one qubit (whether it is a 1 or a 0) can depend on the state of another qubit. It means that particles remain connected so that actions performed on one affect the other, even when separated by great distances. The phenomenon so riled Albert Einstein that he called it "spooky action at a distance."
- Using these two principles, qubits can act as more sophisticated switches, enabling quantum computers to function in ways that allow them to solve difficult



problems that are unmanageable using today's computers.

36. Consider the following communication technologies :

1. Closed-circuit Television
2. Radio Frequency Identification
3. Wireless Local Area Network

Which of the above are considered Short-Range devices/technologies ?

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

(d). 1, 2 and 3

Correct Option: (d)

Explanation:

Short Range Devices (SRD) are radio devices that offer a low risk of interference with other radio services, usually because their transmitted power, and hence their range, is low. The definition 'Short Range Device' may be applied to many different types of wireless equipment, including various forms of:

- Access control (including door and gate openers)
- Alarms and movement detectors
- Closed-circuit television (CCTV)
- Cordless audio devices, including wireless microphones
- Industrial control
- Local Area Networks
- Medical implants
- Metering devices
- Remote control
- Radio frequency identification (RFID)
- Road Transport Telematics
- Telemetry.

Short range devices often benefit from a relaxed regulatory regime compared with other radio communications equipment. As a general principle, a user is licence free to operate such equipment, some specific cases may require an individual licence.

37. Consider the following statements :

1. Biofilms can form on medical implants within human tissues.
2. Biofilms can form on food and food processing surfaces.
3. Biofilms can exhibit antibiotic resistance.

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

Correct Option: (d)

Explanation:

1. Biofilm is an association of microorganisms in which microbial cells adhere to each other on living or non-living surfaces within a self-produced matrix of extracellular polymeric substance.
2. Biofilm formation is a multi-step process starting with attachment to a surface then formation of micro-colony that leads to the formation of three dimensional structure and finally ending with maturation followed by detachment.
3. During biofilm formation many species of bacteria are able to communicate with one another through a specific mechanism called quorum sensing. It is a system of



- stimulus to co-ordinate different gene expression.
4. Bacterial biofilm is less accessible to antibiotics and the human immune system and thus poses a big threat to public health because of its involvement in a variety of infectious diseases. Statement 3 is correct.
 5. Biofilms may form on living or non-living surfaces and can be prevalent in natural, industrial and hospital settings.
 6. Biofilms can be present on the teeth of most animals as dental plaque, where they may cause tooth decay and gum disease. Statement 1 is correct
 7. A combination of several pathogens can synergistically interact to form biofilms in the food industry. In food-processing environments, bacteria are able to exist as multispecies biofilms, from where both spoilage and pathogenic bacteria can contaminate food. For instance in the fishing industry, fresh fish products can suffer from biofilm formation by mixed pathogenic species (*Aeromonas hydrophila*, *L. monocytogenes*, *S. enterica*, or *Vibrio* spp.), which can imply significant health and economic issues. Synergistic interactions have been observed in a fresh-cut produce processing plant, where *E. coli* interacted with *Burkholderia caryophylli* and *Ralstonia insidiosa* to form mixed biofilms. Statement 2 is correct.

38. Consider the following statements in respect of probiotics :

1. Probiotics are made of both bacteria and yeast.
2. The organisms in probiotics are found in foods we ingest but they do not "naturally occur in our gut.
3. Probiotics help in the digestion of milk sugars.

Which of the statements given above is/are correct ?

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

Correct Option: (c)
Explanation:

1. Probiotics are foods that are made up of good live bacteria or yeasts that naturally stay in the human body. Human body is a host to good and bad bacteria. Whenever one gets an infection, there is more bacteria that is bad.

Probiotic supplements add good bacteria to the human body.

1. These are a combination of beneficial bacteria and yeasts that naturally stay in the human body. Bacteria is not always a negative addition to the body, it is positive too.

Probiotics are part of a larger picture concerning bacteria and your body which is called your microbiome. These microbes are a combination of:

1. Bacteria.
2. Fungi (including yeasts)



3. Viruses
4. Protozoa

Statement 1 is correct.

Benefits of Probiotics in a Nutshell

1. Help the digestive system of the body
2. Keeping bad bacteria from getting out of control and making one ill
3. Create vitamins in the body
4. Help support the cells that line your gut to prevent bad bacteria that you may have consumed from entering your blood.
5. Breakdown and absorption of medications

Statement 2 is incorrect. And statement 3 is correct.

39. In the context of vaccines manufactured to prevent COVID-19 pandemic, consider the following statements:

1. The Serum Institute of India produced COVID-19 vaccine named Covishield using mRNA platform.
2. Sputnik V vaccine is manufactured using vector based platform.
3. COVAXIN is an inactivated pathogen based vaccine.

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

Correct Option: (b)

Explanation:

1. COVISHIELD vaccine is based on the platform which uses a recombinant, replication-deficient chimpanzee adenovirus vector encoding the SARS-CoV-2 Spike (S) glycoprotein. Following administration, the genetic material of part of coronavirus is expressed which stimulates an immune response. Hence the statement is incorrect.
2. Sputnik V is the world's first registered vaccine based on a well-studied human adenovirus vector platform. It has been approved for use in 71 countries with a total population of 4 billion people. The vaccine is named after the first Soviet space satellite. The launch of Sputnik-1 in 1957 reinvigorated space research around the world, creating a so-called "Sputnik moment" for the global community. The vaccine's efficacy is 97.6%, based on the analysis of data on the incidence of coronavirus among Russians vaccinated with both vaccine components between December 5, 2020 and March 31, 2021. Statement 2 is correct.
3. Covaxin is an inactivated viral vaccine. This vaccine is developed with Whole-Virion Inactivated Vero Cell-derived technology. They contain inactivated viruses, which cannot infect a person but still can teach the immune system to prepare a defence mechanism against the active virus. Statement 3 is correct.

40. If a major solar storm (solar-flare) reaches the Earth, which of the following are the possible effects on the Earth ?



1. GPS and navigation systems could fail.
2. Tsunamis could occur at equatorial regions.
3. Power grids could be damaged.
4. Intense auroras could occur over much of the Earth.
5. Forest fires could take place over much of the planet.
6. Orbits of the satellites could be disturbed.
7. Shortwave radio communication of the aircraft flying over polar regions could be interrupted.

- Astronauts: Astronauts on spacewalks face health risks from possible exposure to solar radiation outside the Earth's protective atmosphere.
- Other: Aircraft flights, power grids, and space exploration programmes are vulnerable.

Source: <https://www.space.com/solar-flares-effects-classification-formation>

41. "Climate Action Tracker" which monitors the emission reduction pledges of different countries is a :

Select the correct answer using the code given below:

- (a) 1, 2, 4 and 5 only
 (b) 2, 3, 5, 6 and 7 only
(c) 1,3, 4, 6 and 7 only
 (d) 1, 2, 3, 4, 5, 6 and 7.

Correct Option: (c)

Explanation:

Impact of Solar Flares and CMEs on Earth

- Space-dependent services: Solar storms can hit operations of space-dependent services like global positioning systems (GPS), radio, and satellite communications.
- Radio communication: Geomagnetic storms interfere with high-frequency radio communications and GPS navigation systems.
- Magnetosphere: CMEs, with ejectiles loaded with matter travelling at millions of miles an hour, can potentially create disturbances in the magnetosphere, the protective shield surrounding the Earth.

(a) Database created by coalition of research organisations

(b) Wing of "International Panel of Climate Change"

(c) Committee under "United Nations Framework Convention on Climate Change"

(d) Agency promoted and financed by United Nations Environment Programme and World Bank

Correct Option: (a)

Explanation:

The Climate Action Tracker is an independent scientific analysis that tracks government climate action and measures it against the globally agreed Paris Agreement aim of "holding warming well below 2°C, and pursuing efforts to limit warming to 1.5°C." A collaboration of two organisations, Climate Analytics and NewClimate Institute, the CAT has been providing this independent analysis to policymakers since 2009. CAT quantifies and evaluates climate change mitigation targets, policies and action. It also aggregates country action to the global level, determining likely temperature increases during the 21st



century using the MAGICC climate model. CAT further develops sectoral analysis to illustrate required pathways for meeting the global temperature goals.

42. Consider the following statements :

1. "The Climate Group" is an international non-profit organization that drives climate action by building large networks and runs them.
2. The International Energy Agency in partnership with the Climate Group launched a global initiative "EP100".
3. EP100 brings together leading companies committed to driving innovation in energy efficiency and increasing competitiveness while delivering on emission reduction goals.
4. Some Indian companies are members of EP100.
5. The International Energy Agency is the Secretariat to the "Under2 Coalition".

Which of the statements given above are correct?

- (a) 1, 2, 4 and 5
- (b) 1, 3 and 4 only**
- (c) 2, 3 and 5 only
- (d) 1, 2, 3, 4 and 5

Correct Option: (b)
Explanation:

1. CLIMATE GROUP IS an international non-profit founded in 2003, with offices in London, New York, New Delhi, Amsterdam and Beijing. Their mission is to drive climate action. Fast. This group builds and run networks. Statement 1 is correct.

2. EP100 is a global initiative led by the international non-profit Climate Group, bringing together over 120 energy smart businesses committed to measuring and reporting on energy efficiency improvements. Statement 2 is incorrect. Statement 3 is correct.
3. Mahindra and Mahindra became the first Indian company to join the EP100 initiative. Statement 4 is correct.
4. Climate Group is the Secretariat to the Under2 Coalition and works with governments to accelerate climate action through four work streams:
 - Pathways
 - Policy action
 - Transparency
 - Diplomacy

Statement 5 is incorrect.

43. "If rainforests and tropical forests are the lungs of the Earth, then surely wetlands function as its kidneys." Which one of the following functions of wetlands best reflects the above statements?

- (a). The water cycle in wetlands involves surface runoff, subsoil percolation and evaporation.
- (b). Algae from the nutrient base upon which fish, crustaceans, molluscs, birds, reptiles and mammals thrive.
- (c). Wetlands play a vital role in maintaining sedimentation balance and soil stabilization.

(d). Aquatic plants absorb heavy metals and excess nutrients.

Correct Option: (d)
Explanation:



The water cycle in wetlands involves surface runoff, subsoil percolation and evaporation.

Explanation: Your kidneys remove wastes and extra fluid from your body. Your kidneys also remove acid that is produced by the cells of your body and maintain a healthy balance of water, salts, and minerals. In the same manner As sediment, excess nutrients and chemicals flow off of the land, wetlands filter the run off before it reaches open water. Nutrients are stored and absorbed by plants or microorganisms. Sediment settles at the bottom after reaching an area with slow water flow

44. In the context of In WHO Air Quality Guidelines, consider the following statements:

1. The 24-hour mean of PM_{2.5} should not exceed 15 ug/m³ and annual mean of PM_{2.5} should not exceed 5 µg/m³.
2. In a year, the highest levels of ozone pollution occur during the periods of inclement weather.
3. PM₁₀ can penetrate the lung barrier and enter the bloodstream.
4. Excessive ozone in the air can trigger asthma.

Which of the statements given above are correct?

(a) 1, 3 and 4

(b) 1 and 4 only

(c) 2, 3 and 4

(d) 1 and 2 only

Correct Option: (b)

Explanation:

Solution: (b) 1 and 4 only

Explanation: The updated guidelines state that annual average concentrations of PM_{2.5} should not exceed 5 µg/m³, while 24-hour average exposures should not exceed 15 µg/m³

the highest levels of ozone pollution occur during periods of sunny weather.

PM₁₀ are capable of penetrating deep into the lungs but PM_{2.5} can even enter the bloodstream

Long-term exposure to ozone is linked to aggravation of asthma, and is likely to be one of many causes of asthma development. Studies in locations with elevated concentrations also report associations of ozone with deaths from respiratory causes.

45. With reference to "Guchhi" sometimes mentioned in the news, consider the following statements:

1. It is a fungus.
2. It grows in some Himalayan forest areas.
3. It is commercially cultivated in the Himalayan foothills of north- eastern India.

Which of the statements given above is/are correct?

(a) 1 only

(b) 3 only

(c) 1 and 2

(d) 2 and 3

Correct Option: (c)

Explanation:

Explanation:Guchhi mushroom is a species of fungus in the family Morchellaceae of the Ascomycota.



Grows in himalayan foothills

The mushrooms cannot be cultivated commercially and grow in conifer forests across temperature regions, and the foothills in Himachal Pradesh, Uttaranchal, and Jammu and Kashmir.

46. With reference to polyethylene terephthalate, the use of which is so widespread in our daily lives, consider the following statements :

1. Its fibres can be blended with wool and cotton fibres to reinforce their properties.
2. Containers made of it can be used to store any alcoholic beverage.
3. Bottles made of it can be recycled into other products.
4. Articles made of it can be easily disposed of by incineration without causing greenhouse gas emissions.

Which of the statements given above are correct ?

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

Correct Option: (a)

Explanation:

Solution: (a) 1 and 3

Explanation: They are often used in durable-press blends with other fibres such as rayon, wool, and cotton, reinforcing the inherent properties of those fibres while contributing to the ability state govt bans it and says its harmful

PET is completely recyclable, and is the most recycled plastic in the U.S and worldwide. More than 1.5 billion pounds of

used PET bottles and containers are recovered in the United States each year for recycling.

The burning of plastics releases toxic gases like dioxins, furans, mercury and polychlorinated biphenyls (better known as BCPs) into the atmosphere, and poses a threat to vegetation, and human and animal health.

47. Which of the following is not a bird ?

- (a) Golden Mahseer
 (b) Indian Nightjar
 (c) Spoonbill
 (d) White Ibis

Correct Option: (a)

Explanation:

Solution: (a) Golden Mahseer

Explanation: mahseer—a large freshwater fish also called the tiger of the water and found only in the Cauvery river basin

The Indian nightjar species are nocturnal birds with long pointed wings and short legs

The Spoonbill is a unique aquatic bird with an odd-shaped, flattened beak

White Ibises are large wading birds with football-shaped bodies

48. Which of the following are nitrogen-fixing plants ?

1. Alfalfa
2. Amaranth
3. Chickpea
4. Clover
5. Purslane (Kulfa)
6. Spinach



Select the correct answer using the code given below :

(a) 1, 3 and 4 only

(b) 1, 3, 5 and 6 only

(c) 2, 4, 5 and 6 only

(d) 1, 2, 4,5 and 6

Correct Option: (a)

Explanation:

- Amaranth, spinach, purslane are not nitrogen fixing plants and we have to provide nitrogen through fertilizers for their proper growth and development.

49. "Biorock technology" is talked about in which one of the following situations ?

(a) Restoration of damaged coral reefs

(b) Development of building materials using plant residues

(c) Identification of areas for exploration/extraction of shale gas

(d) Providing salt licks for wild animals in forests/protected areas.

Correct Option: (a)

Explanation:

Explanation: BIOROCK OR Mineral Accretion Technology is a coral reef restoration technology that utilizes low voltage electricity to improve the health and growth rates of corals and other marine organisms.

- The technology works by passing a small amount of electrical current through electrodes in the water.
- When a positively charged anode and negatively charged cathode are placed on the seafloor, with an electric current flowing between

them, calcium ions combine with carbonate ions and adhere to the structure (cathode).

- This results in calcium carbonate formation. Coral larvae adhere to the CaCO₃ and grow quickly.
- Fragments of broken corals are tied to the biorock structure, where they are able to grow at least four to six times faster than their actual growth as they need not spend their energy in building their own calcium carbonate skeletons.

50. The "Miyawaki method" is well known for the:

(a) Promotion of commercial farming in arid and semi-arid areas

(b) Development of gardens using genetically modified flora

(c) Creation of mini forests in urban areas

(d) Harvesting wind energy on coastal areas and on sea surfaces

Correct Option: (c)

Explanation:

Solution: (c) Creation of mini forests in urban areas

Explanation: The method involves planting two to four trees per square metre. Miyawaki forests grow in two to three years and are self-sustaining.

51. In the Government of India Act 1919, the functions of Provincial Government were divided into "Reserved" and "Transferred" subjects. Which of the following were treated as "Reserved" subjects?

1. Administration of Justice
2. Local Self-Government
3. Land Revenue



4. Police

Select the correct answer using the code given below:

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

Correct Option: (c)

Explanation:

Explanation: The reserved subjects came under the heading of law and order and included justice, the police, land revenue, and irrigation. The transferred subjects (i.e., those under the control of Indian ministers) included local self-government, education, public health, public works, and agriculture, forests, and fisheries.

52. In medieval India, the term “Fanam” referred to:

- (a) Clothing
(b) Coins
 (c) Ornaments
 (d) Weapons

Correct Option: (b)

Explanation:

Fanam.—Anglicised form of Tamil paṇam (q. v.); Sanskrit paṇa (q. v.); a gold coin equal to (1/20) of a varṇa. Note: *fanam* is defined in the “Indian epigraphical glossary” as it can be found on ancient inscriptions commonly written in Sanskrit, Prakrit or Dravidian languages

53. Consider the following freedom fighters:

1. Barindra Kumar Ghosh
2. Jogesh Chandra Chatterjee

3. Rash Behari Bose

Who of the above was/were actively associated with the Ghadar Party?

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

Correct Option: (d)

Explanation:

BARINDRA KUMAR GHOSH-
ANUSHILAN SAMITI

JOGESH CHANDRA CHATTERJEE-
ANUSHILAN SAMITI

RASH BEHARI BOSE- GHADR PARTY

54. With reference to the proposals of Cripps Mission, consider the following statements:

1. The Constituent Assembly would have members nominated by the Provincial Assemblies as well as the Princely States.
2. Any Province, which is not prepared to accept the new Constitution would have the right to sign a separate agreement with Britain regarding its future 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

Correct Option: (b)

Explanation:



Explanation: A Constituent Assembly would consist of the members elected by the Lower House of the Indian Legislature and the representatives of the Princely States nominated by their rulers.

55. With reference to Indian history, consider the following texts:

1. Nettipakarana
2. Parishishtaparvan
3. Avadanashataka
4. Trishashtilakshana Mahapurana

Which of the above are Jaina texts?

(a) 1, 2 and 3

(b) 2 and 4 only

(c) 1, 3 and 4

(d) 2, 3 and 4

Correct Option: (b)

Explanation:

The Avad?na?ataka or "Century of Noble Deeds" is an anthology in Sanskrit of one hundred Buddhist legends, approximately dating to the same time as the Ashokavadana.

Option 3 is incorrect. So by eliminating, we get option (b) as correct.

The Parishishtaparvan also known as the Sthaviravalicharitra is a 12th-century Sanskrit mahakavya by Hemachandra which details the histories of the earliest Jain teachers.

Mahapurana or Trishashtilakshana Mahapurana is a major Jain text composed largely by "Acharya" Jinasena during the rule of Rashtrakuta ruler Amoghavarsha and completed by his pupil Gunabhadra in the 9th century CE. Mahapurana consists of two parts. The first part is ?di pur??a written by "Acharya" Jinasena. The second part is

Uttarapurana which is the section composed by Gunabhadra.

56. With reference to Indian History, consider the following pairs:

Historical person Known as

1. Aryadeva — Jaina scholar
2. Dignaga — Buddhist scholar
3. Nathamuni — Vaishnava scholar

How many pairs given above are correctly matched?

(a) None of the pairs

(b) Only one pair

(c) Only two pairs

(d) All three pairs

Correct Option: (c)

Explanation:

Explanation: ARYADEVA- BUDDHIST SCHOLAR

?ryadeva (3rd century), a disciple of N?g?rjuna, is a central figure in the development of early Indian Madhyamaka philosophy. ?ryadeva's *Hundred Verses Treatise (Bai lun)* was one of the three basic texts of the Chinese Madhyamaka school founded by the central Asian monk Kum?raj?va (b. 344–d. 413), which accordingly was called the Sanlun (Jpn. Sanron), or "three-treatise" school. According to the biography that Kum?raj?va translated into Chinese, ?ryadeva was born into a South Indian Brahmin family, became N?g?rjuna's disciple, was renowned for his skill in debate, and was murdered by a student of a defeated teacher

DIGNAGA- BUDDHIST SCHOLAR

Dign?ga, (born c. 480 CE—died c. 540), Buddhist logician and author of



the *Pramāṇasamuccaya* (“Compendium of the Means of True Knowledge”), a work that laid the foundations of Buddhist logic. Dignāga gave a new definition of “perception”: knowledge that is free from all conceptual constructions, including name and class concepts. In effect he regarded only pure sensation as perception. In his theory of inference he distinguished between inference for oneself and inference for the other and laid down three criteria of a valid middle term (*hetu*)—i.e., that it should “cover” the minor premise (*pakṣa*), be present in the similar instances (*sapakṣa*), and be absent in dissimilar instances (*vipakṣa*). In his *Hetucakra* (“The Wheel of Reason”), Dignāga set up a matrix of nine types of middle terms, of which two yield valid conclusions, two contradictory, and the rest uncertain conclusions. Dignāga’s tradition was further developed in the 7th century by Dharmakīrti.

NATHAMUNI-VAISHNAVA SCHOLAR

Sri Ranganathamuni, popularly known as Srīman Nathamuni, was a Vaishnava theologian who collected and compiled the *Nalayira Divya Prabandham*. Considered the first of Sri Vaishnava *āchāryas*, Nathamuni is also the author of *Yogarahasya*, and *Nyāyatattva*

57. With reference to Indian history, consider the following statements:

1. The first Mongol invasion of India happened during the reign of Jalal-ud-din Khalji.
2. During the reign of Ala-ud-din Khalji, one Mongol assault marched up to Delhi and besieged the city.
3. Muhammad-bin-Tughlaq temporarily lost portions of north-west of his kingdom to Mongols.

Which of the statements given above is/are correct?

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

Correct Option: (b)

Explanation:

- Statement 1 is incorrect: Chengiz Khan invaded India during the reign of Iltumish for the first time. He was the founder and first Great Khan of the Mongol Empire.
- Statement 2 is correct: During the reign of Ala-ud-din Khalji, one of the Mongol invasion reached till the outskirts of Delhi city and besieged it.
- Statement 3 is incorrect: Muhammad-bin-Tughlaq defeated the Mongols and he had not lost any of the portions of his kingdom to them.
- Source: *The Mongols and Delhi Sultanate*- Cambridge

58. With reference to Indian history, who of the following were known as “Kulah-Daran”?

- (a) Arab merchants
 (b) Qalandars
 (c) Persian calligraphists

(d) Sayyids

Correct Option: (d)

Explanation:

- The Sayyids were claimed to descent from the Prophet through his



daughter Fatima. They Commanded special respect in Muslim society.

- Even the Timur protected the life of Sayyids during his invasion in India. Although his policy was one of general slaughter.
- The sayyids put on a pointed cap (kulah) and they were known as 'Kulah Daran' during Delhi sultanate.
- Source: History of Medieval India by V.D Mahajan

59. With reference to Indian history, consider the following statements:

1. The Dutch established their factories/werehouses on the east coast on lands granted to them by Gajapati rulers.
2. Alfonso de Albuquerque captured Goa from the Bijapur Sultanate.
3. The English East India Company established a factory at Madras on a plot of land leased from a representative of the Vijayanagara empire.

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

Correct Option: (b)
Explanation:

- Statement 1 is incorrect: Next to the Portuguese, the Dutch set their feet in India.
- In 1602, the United East India Company of the Netherlands was

formed and given permission by the Dutch government to trade in the East Indies including India.

- Gajapati Rule has declined in 1541. The last ruler was Kakharua Deva.
- Statement 2 is correct: Alfonso de Albuquerque captured Goa from the Bijapur sultanate king Adil Shahis with the help of Vijaynagara Empire.
- Statement 3 is correct: the English East India Company established a factory in Madras in 1639 on land leased from representatives of Vijayanagara Empire called the Nayakas.

60. According to Kautiyla's Arthashastra, which of the following are correct?

1. A person could be a slave as a result of a judicial punishment.
2. If a female slave bore her master a son, she was legally free.
3. If a son born to a female slave was fathered by her master, the son was entitled to the legal status of the master's son.

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

Correct Option: (c)
Explanation:

61. Consider the following statements :

1. Tight monetary policy of US Federal Reserve could lead to capital flight.
2. Capital flight may increase the interest cost of firms with existing



External Commercial Borrowings (ECBs).

3. Devaluation of domestic currency decreases the currency risk associated with ECBs.

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

Correct Option: (a)

Explanation:

- Statement 1 is correct: Tight monetary policy of the US federal Reserve could lead to capital flight. It is also called 'Taper Tantrum'.
- Statement 2 is correct: Interest risk associated with capital flight: capital flight increases the interest rate on firms with Existing borrowings.
- Statement 3 is incorrect: Capital Risk associated with capital flight: Devaluation of domestic currency will increase the risk with external commercial borrowings.
- It will increase the liability of domestic firms in terms of domestic currency.

62. Consider the following States :

1. Andhra Pradesh
2. Kerala
3. Himachal Pradesh
4. Tripura

How many of the above are generally known as tea-producing States ?

(a) Only one State

(b) Only two States

(c) Only three States

(d) All four States

Correct Option: (d)

Explanation:

- Option (d) is correct: Assam, West Bengal, Tamil Nadu, and Kerala are the major tea producing states in India.
- Other states that produce tea include Himachal Pradesh, Uttarakhand, Meghalaya, Andhra Pradesh and Tripura.

63. Consider the following statements :

1. In India, credit rating agencies are regulated by Reserve Bank of India.
2. The rating agency popularly known as ICRA is a public limited company.
3. Brickwork Ratings is an Indian credit rating agency.

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

Correct Option: (b)

Explanation:

- Statement 1 is incorrect: Credit Rating Agencies (CRA) analyze a debtor's ability to repay the debt and also rate their credit risk.
- All the credit rating agencies in India are regulated by SEBI (Credit Rating Agencies) Regulations, 1999 of the



Securities and Exchange Board of India Act, 1992.

- There are a total of six credit agencies in India viz, CRISIL, CARE, ICRA, SMREA, Brickwork Rating, and India Rating and Research Pvt. Ltd.
- **Statement 2 is correct:** ICRA Limited is a public limited company that was set up in 1991 in Gurugram. The company was formerly known as Investment Information and Credit Rating Agency of India Limited.
- **Statement 3 is correct:** Brickwork Ratings is recognised as external credit assessment agency (ECAI) by Reserve Bank of India (RBI) to carry out credit ratings in India.
- Brickwork Rating was established in 2007 and is promoted by Canara Bank. It offers ratings for bank loans, SMEs, corporate governance rating, municipal corporation, capital market instrument, and financial institutions.

64. With reference to the 'Banks Board Bureau (BBB), which of the following statements are correct ?

1. The Governor of RBI is the Chairman of BBB.
2. BBB recommends for the selection of heads for Public Sector Banks.
3. BBB helps the Public Sector Banks in developing strategies and capital raising plans.

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

Correct Option: (b)

Explanation:

- **Statement 1 is incorrect:** It is not mandated that the Governor of RBI will be the chairman of Bank Board Bureau (BBB).
- **Statement 2 & 3 are correct:** The BBB is empowered to select the heads of Public sector Banks. It also helps PSBs to develop strategies and capital raising plans.
- The broad agenda of the Banks Board Bureau was the administration of state-owned lenders. Its functions involve:
 - providing assistance to Public Sector Banks to restructure their business strategies
 - Assisting banks with the strategies to deal with issues of bad loans or stressed assets
 - Strategies for raising capitals through innovative financial instruments and methods
 - Recommendations to the government on top-level appointments like full-time Directors, non-Executive Chairman in PSBs.
 - suggest plans for consolidation and merger with other banks while they are trapped in the problem of high collective gross NPAs.
 - To advise the Central Government on matters relating to appointments, confirmation or extension of tenure and termination of services of the Directors of nationalised banks.
 - To build a data bank containing data relating to the performance of nationalised banks and its officers.
 - To advise the Central Government on the formulation and enforcement of a code of conduct and ethics for



managerial personnel in nationalised banks.

- To advise the Central Government on evolving suitable training and development programs for managerial personnel in nationalised banks.
- So By Elimination the other two statements are correct.

65. With reference to Convertible Bonds, consider the following statements :

1. As there is an option to exchange the bond for equity, Convertible Bonds pay a lower rate of interest.
2. The option to convert to equity affords the bondholder a degree of indexation to rising consumer prices.

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

Correct Option: (c)
Explanation:

- Both the statements are correct.
- Convertible bonds: Convertible bonds are hybrid securities that offer investors the best of both stocks and bonds. Like any other kind of bond, they provide a guaranteed income stream and pay back the amount you originally lent the company.
- Convertible bonds typically carry lower interest rates payments than straight corporate bonds—the savings in interest expense can be significant. Investors accept the

lower interest payments because the conversion option offers the opportunity to benefit from increases in the stock price. Hence statement 1 is correct.

- Governments might use indexation as a way to potentially alleviate the negative effects inflation can have on the recipients of transfer payments and entitlements. Social Security payments, for example, are indexed to the annual increase in the Consumer Price Index.

66. Consider the following:

1. Asian Infrastructure Investment Bank
2. Missile Technology Control Regime
3. Shanghai Cooperation Organisation

India is a member of which of the above ?

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

(d) 1, 2 and 3
Correct Option: (d)
Explanation:

- India is the member of all the Organizations.
- The SCO currently comprises eight Member States (China, India, Kazakhstan, Kyrgyzstan, Russia, Pakistan, Tajikistan and Uzbekistan).
- Missile Technology Control Regime: On 27 June, India became a full member of the MTCR after a “deal” was struck with Italy. This marks the first entry into any multilateral export control regime for India.



- Asian Infrastructure Investment Bank: On 24 October 2014, twenty-one countries signed a Memorandum of Understanding (MOU) regarding the AIIB in Beijing, China: Bangladesh, Brunei, Cambodia, India, Kazakhstan, Kuwait, Laos, Malaysia, Myanmar, Mongolia, Nepal, Oman, Pakistan, Philippines, Qatar, Singapore, Sri Lanka, Thailand, Uzbekistan and Vietnam.

67. Consider the following statements :

- Vietnam has been one of the fastest growing economies in the world in the recent years.
- Vietnam is led by a multi-party political system.
- Vietnam's economic growth is linked to its integration with global supply chains and focus on exports.
- For a long time Vietnam's low labour costs and stable exchange rates have attracted global manufacturers.
- Vietnam has the most productive e-service sector in the Indo-Pacific region.

Which of the statements given above are correct?

- (a) 2 and 4
(b) 3 and 5
(c) 1, 3 and 4
(d) 1 and 2

Correct Option: (c)

Explanation:

- Statement 1 is correct: According to a forecast by PricewaterhouseCoopers in February 2017, Vietnam may be the

fastest-growing of the world's economies, with a potential annual GDP growth rate of about 5.1%, which would make its economy the 10th-largest in the world by 2050.

- Statement 3 is correct: Vietnam's economic growth is linked to its integration with global supply chains and focus on exports.
- Statement 4 is correct: Vietnam has low labour costs and stable exchange rates which attract global investments.

68. In India, which one of the following is responsible for maintaining price stability by controlling inflation ?

- (a) Department of Consumer Affairs
(b) Expenditure Management Commission
(c) Financial Stability and Development Council

(d) Reserve Bank of India

Correct Option: (d)

Explanation:

- Option (d) is correct: Reserve bank OF India is responsible for maintaining price stability and controlling inflation.
- It is the responsibility of MPC in India, but RBI itself plays a large role in MPC and also carries out task of monetary policy committee.
- So RBI is the correct answer if MPC is not given in the options.

69. With reference to Non-Fungible Tokens (NFTs), consider the following statements :

- They enable the digital representation of physical assets.



2. They are unique cryptographic tokens that exist on a blockchain.
3. They can be traded or exchanged at equivalency and therefore can be used as a medium of commercial transactions.

Which of the statements given above are correct?

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

Correct Option: (d)

Explanation:

- All the statements are correct:
- NFTs typically contain references to digital files such as photos, videos, and audio. Because NFTs are uniquely identifiable, they differ from cryptocurrencies, which are fungible. The market value of an NFT is associated with the digital file it references.
- Non-fungible tokens (NFTs) are cryptographic assets on a blockchain with unique identification codes and metadata that distinguish them from each other. Unlike cryptocurrencies, they cannot be traded or exchanged at equivalency. This differs from fungible tokens like cryptocurrencies, which are identical to each other and, therefore, can serve as a medium for commercial transactions.
- NFTs are unique cryptographic tokens that exist on a blockchain and cannot be replicated.
- NFTs can represent real-world items like artwork and real estate.

- "Tokenizing" these real-world tangible assets makes buying, selling, and trading them more efficient while reducing the probability of fraud.
- NFTs can also function to represent individuals' identities, property rights, and more.
- The distinct construction of each NFT has the potential for several use cases. For example, they are an ideal vehicle to digitally represent physical assets like real estate and artwork. Because they are based on blockchains, NFTs can also work to remove intermediaries and connect artists with audiences or for identity management. NFTs can remove intermediaries, simplify transactions, and create new markets.

70. Consider the following pairs:

Reservoirs States

1. Ghataprabha – Telangana
2. Gandhi Sagar – Madhya Pradesh
3. Indira Sagar – Andhra Pradesh
4. Maithon – Chhattisgarh

How many pairs given above are not correctly matched ?

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

Correct Option: (a)

Explanation:

Only one pair is correct.

- Ghataprabha- Karnataka
- Gandhi Sagar- Madhya Pradesh



- Indira Sagar – Madhya Pradesh
- Maithon- Jharkhand

71. In India, which one of the following compiles information on industrial disputes, closures, retrenchments and lay-offs in factories employing worker?

- (a) Central Statistics Office
- (b) Department for Promotion of Industry and Internal Trade
- (c) Labour Bureau**
- (d) National Technical Manpower Information System

Correct Option: (c)

Explanation:

- **Statement (c) is correct:** Labour Bureau has been bringing out Statistics on 'Industrial Disputes, Closures, Retrenchments and Lay-offs in India?' based on the voluntary returns received every month from the Labour Departments of the States and Union Territories and the Regional Labour Commissioners

72. In India, what is the role of the Coal Controller's Organization (CCO) ?

1. CCO is the major source of Coal Statistics in Government of India.
2. It monitors progress of development of Captive Coal/Lignite blocks.
3. It hears any objection to the Government's notification relating to acquisition of coal-bearing areas.
4. It ensures that coal mining companies deliver the coal to end users in the prescribed time.

Select the correct answer using the code given below:

(a) 1, 2 and 3

(b) 3 and 4 only

(c) 1 and 2 only

(d) 1, 2 and 4

Correct Option: (a)

Explanation:

- Statement 1 is correct: Coal Controller has been made the statistical authority with respect to coal and lignite statistics. Entrusted with the responsibility of carrying out Annual Coal & Lignite survey and publishing of Provisional Coal Statistics and Coal Directory of India.
- Statement 2 is correct: Functioning of the Coal Controller's Organisation (CCO) is entrusted with the task of monitoring captive mines.
- Statement 3 is correct: Coal Controller is the competent authority under this act to hear any objection to the Central Government's Notification relating to acquisition of coal bearing land and to furnish his reports to Central Govt.

73. If a particular area is brought under the Fifth Schedule of the Constitution of India, which one of the following statements best reflects the consequence of it?

(a) This would prevent the transfer of land of tribal people to non-tribal people.

(b) This would create a local self-governing body in that area.

(c) This would convert that area into a Union Territory.

(d) The State having such areas would be declared a Special Category State.



Correct Option: (a)**Explanation:**

- **Statement (a) is correct:** Governor can make regulations for the peace and good government of a scheduled area after consulting the tribes advisory council. Such regulations may prohibit or restrict the transfer of land by tribal to non tribal members or among members of the scheduled tribes, regulate the allotment of land to members of the scheduled tribes.
- **Statement b is incorrect:** Tribal advisory council is an advisory body, not a governing body.
- **Statement c and d are incorrect (Self explanatory)**

74. Consider the following statements:

1. The India Sanitation Coalition is a platform to promote sustainable sanitation and is funded by the Government of India and the World Health Organization.
2. The National Institute of Urban Affairs is an apex body of the Ministry of Housing and Urban Affairs 'in Government of India and provides innovative solutions to address the challenges of Urban India.

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**

Correct Option: (d)**Explanation:**

- **Statement 1 is incorrect:** ISC is a multi-stakeholder platform that brings together the private sector, government, financial institutions, civil society groups, media, donors/bi-lateral/multilateral, experts etc. to work in the sanitation space to drive sustainable sanitation through a partnership model.
- **Statement 2 is incorrect:** The National Institute of Urban Affairs (NIUA) is India's leading national think tank on urban planning and development. As a hub for generation and dissemination of cutting-edge research in the urban sector, NIUA seeks to provide innovative solutions to address the challenges of a fast urbanising India.
- It is against this backdrop that in 1976, NIUA was appointed as an apex body to support and guide the Government of India in its urban development plans. Since then, it has worked closely with the Ministry of Housing and Urban Affairs, alongside other government and civil sectors, to identify key areas of research, and address the lacunae in urban policy and planning. W

75. Which one of the following has been constituted under the Environment (Protection) Act, 1986?

- (a) Central Water Commission
- (b) Central Ground Water Board
- (c) Central Ground Water Authority**
- (d) National Water Development Agency



Correct Option: (c)

Explanation:

- **Option (c) is correct:** Central Ground Water Authority has been constituted under Section 3 (3) of the Environment (Protection) Act, 1986 to regulate and control development and management of groundwater resources in the country.

76. With reference to the “United Nations Credentials Committee”, consider the following statements:

1. It is a committee set up by the UN Security Council and works under its supervision.
2. It traditionally meets in March, June and September every year.
3. It assesses the credentials of all UN members before submitting a report to the General Assembly for approval.

Which of the statements given above is/are correct?

(a) 3 only

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

Correct Option: (a)

Explanation:

- Statement 1 is incorrect: The United Nations Credentials Committee is a committee of the United Nations General Assembly
- Statement 2 is incorrect: A Credentials Committee is appointed at the beginning of each regular session of the General Assembly.

- Statement 3 is correct: Its main purpose is to report to the Assembly regarding the credentials of the body's representatives.

77. Which one of the following statements best describes the ‘Polar Code’?

(a) It is the international code of safety for ships operating in polar waters.

(b) It is the agreement of the countries around the North Pole regarding the demarcation of their territories in the polar region.

(c) It is a set of norms to be followed by the countries whose scientists undertake research studies in the North Pole and South Pole.

(d) It is a trade and security agreement of the member countries of the Arctic Council.

Correct Option: (a)

Explanation:

- **Statement (a) is correct:** Polar Code is International Code for Ships Operating in Polar Waters. The Polar Code covers the full range of design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in the inhospitable waters surrounding the two poles

78. With reference to the United Nations General Assembly, consider the following statements:

1. The UN General Assembly can grant observer status to the non-member States.



2. Inter-governmental organisations can seek observer status in the UN General Assembly.
3. Permanent Observers in the UN General Assembly can maintain missions at the UN headquarters.

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

Correct Option: (d)

Explanation:

- Statement 1 is correct: The United Nations General Assembly may grant non-member states, international organizations and other entities Permanent Observer Status.
- Statement 2 is correct: General Assembly decided that observer status would be confined to States and intergovernmental organizations whose activities cover matters of interest to the Assembly.
- Statement 3 is correct: Permanent Observers may participate in the sessions and workings of the General Assembly and maintain missions at the UN Headquarters.

79. With reference to the “Tea Board” in India, consider the following statements:

1. The Tea Board is a statutory body.
2. It is a regulatory body attached to the Ministry of Agriculture and Farmers Welfare.
3. The Tea Board’s Head Office is situated in Bengaluru.

4. The Board has overseas offices at Dubai and Moscow.

Which of the statements given above are correct?

- (a) 1 and 3
 (b) 2 and 4
 (c) and 4

(d) 1 and 4

Correct Option: (d)

Explanation:

- **Statement 1 is correct:** The Tea Board of India is an autonomous and statutory body created under the Tea Act, 1953
- **Statement 3 is incorrect:** Headquarters is in Kolkata
- **Statement 4 is correct:** Offices are located in Kolkata, London, Moscow and Dubai

80. Which one of the following best describes the term “greenwashing” ?

(a) Conveying a false impression that a company’s products are eco-friendly and environmentally sound

- (b) Non-inclusion of ecological/environmental costs in the Annual Financial Statements of a country
 (c) Ignoring the disastrous ecological consequences while undertaking infrastructure development

(d) Making mandatory provisions for environmental costs in a government project/programme

Correct Option: (a)

Explanation:



- **Statement (a) is correct:** Greenwashing is the process of conveying a false impression or providing misleading information about how a company's products are more environmentally sound.
- Greenwashing is considered an unsubstantiated claim to deceive consumers into believing that a company's products are environmentally friendly.

81. Consider the following statements :

1. High clouds primarily reflect solar radiation and cool the surface of the Earth.
2. Low clouds have a high absorption of infrared radiation emanating from the Earth's surface and thus cause warming effect.

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

Correct Option: (d)
Explanation:

- **Statement 1 is incorrect:** High clouds are often thin and do not reflect very much. They let lots of the Sun's warmth in. They radiate less energy into space than the lower, warmer clouds. Therefore, high clouds work to "trap" more energy than the low clouds.
- **Statement 2 is incorrect:** Low clouds are often quite thick and reflect lots of sunlight back to space.

Low clouds are excellent reflectors. But, they don't stop the longwave energy from escaping to space. Therefore, low clouds help to cool the Earth.

82. Consider the following statements:

1. Bidibidi is a large refugee settlement in north-western Kenya.
2. Some people who fled from South Sudan civil war live in Bidibidi.
3. Some people who fled from civil war in Somalia live in Dadaab refugee complex in Kenya.

Which of the statements given above is/are correct?

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

Correct Option: (c)
Explanation:

- **Statement 1 is incorrect:** Bidibidi Refugee Settlement is a refugee camp in northwestern Uganda.
- **Statement 2 is correct:** Bidibidi is home to over 270,000 South Sudanese refugees
- **Statement 3 is correct:** Dadaab camps were established 30 years ago to accommodate Somalis fleeing their country's civil war

83. Consider the following countries

1. Armenia
2. Azerbaijan
3. Croatia
4. Romania



5. Uzbekistan

Which of the above are members of the Organization of Turkic States?

- (a) 1, 2 and 4
- (b) 1 and 3
- (c) 2 and 5**
- (d) 3, 4 and 5

Correct Option: (c)

Explanation:

- The Organization of Turkic States, formerly called the Turkic Council or the Cooperation Council of Turkic Speaking States, is an international organization comprising prominent independent Turkic countries: Azerbaijan, Kazakhstan, Kyrgyzstan, Turkey and Uzbekistan.

84. Consider the following statements

1. Gujarat has the largest solar park in India.
2. Kerala has a fully solar powered International Airport.
3. Goa has the largest floating solar photovoltaic project in India.

Which of the statements given below is/are correct?

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

Correct Option: (b)

Explanation:

- **Statement 1 is incorrect:** India's Bhadla Solar Park in Rajasthan is the largest solar power park in the world.
- **Statement 2 is correct:** Kerala's Cochin International Airport Ltd (CIAL) is the first airport in the world that would be running fully on solar power.

85. With reference to the United Nations Convention on the Law of Sea, consider the following statements:

1. A coastal state has the right to establish the breadth of its territorial sea up to a limit not exceeding 12 nautical miles, measured from baseline determined in accordance with the convention.
2. Ships of all states, whether coastal or land-locked, enjoy the right of innocent passage through the territorial sea.
3. The Exclusive Economic Zone shall not extend beyond 200 nautical miles from the baseline from which the breadth of the territorial sea is measured.

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**

Correct Option: (d)

Explanation:

- **Statement 1 is correct:**
- **Statement 2 is correct:** The innocent passage has been codified in the United Nations Convention on



the Law of the Sea (UNCLOS III) was adopted in 1982, it is also known as the Law of the Sea Treaty. Its purpose is to establish a comprehensive set of rules governing the oceans and to replace previous U.N. Conventions on the Law of the Sea, 1958 (UNCLOS I) which was adopted in 1958 and another in 1960 (UNCLOS II), since these two conventions were believed to be inadequate.

- The term Innocent Passage is defined under international law referring to a ship or aircraft's right to enter and pass through another's territory so long as it is not prejudicial to the peace, good order or security of the other state. Under Article 19 of the UNCLOS III it is defined "Passage is innocent so long as it is not prejudicial to the peace, good order or security of the coastal State." Such passage shall take place in conformity with this Convention and with other rules of international law. The right of innocent passage of foreign ships through the territorial waters of a coastal state is one of the oldest and most universally recognized rules of public international law.

86. Which one of the following statements best reflects the issue which Senkaku Islands, sometimes mentioned in the news?

(a) It is generally believed that they are artificial islands made by a country around South China Sea.

(b) China and Japan engage in maritime disputes over these islands in East China Sea

(c) A permanent American military base has been set up there to help Taiwan to increase its defence capabilities.

(d) Through International Courts of Justice declared them as no man's land, some South-East Asian countries claim them.

Correct Option: (b)

Explanation:

Japan and China claim the uninhabited islands, known as the Senkaku in Japan and Tiaoyu in China, as their own, but Japan has administered them since 1972. The Senkaku/Diaoyu Islands were formally claimed by Japan in 1895. After Japan's defeat in World War II, the island chain was controlled by the US until 1971 before its return. Since then, Japan has administered the island chains. China began to reassert claims over the Senkaku/Diaoyu Islands in the 1970s, citing historic rights to the area. However, Japan does not recognise Chinese claims. More recently, there has been a flare up in the region. The Japanese government said on Thursday it had protested to China regarding a set of names recently assigned by Beijing to seabed zones in the East China Sea, including the Senkaku/Diaoyu islands.

What is the dispute about?

- The dispute is over the claim of Senkaku islands, which have been controlled by the Japanese since 1895.
- However, between 1945 to 1972, the islands were administered by the United States. In 1971, the US handed over the authority to Japan in 1971.
- The island chain, claimed by China, Taiwan and Japan, is made up of five islets and three barren rocks covering an area of 7 square kilometres



87. Consider the following pairs

Country *Important reason for being in the news recently*

1. Chad Setting up of permanent military base by China
2. Guinea Suspension of Constitution and Government by military
3. Lebanon Severe and prolonged economic depression
4. Tunisia Suspension of Parliament by President

How many pairs given above are correctly matched?

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

Correct Option: (c)

Explanation:

Pair 1 is incorrectly matched:



Pair 2 is correctly matched:

The president of Guinea was detained after a successful military coup in the West African nation. The coup was reportedly led by special task forces led by Colonel Mamady Doumbouya, the head of Guinean Special Forces.

Pair 3 is correctly matched:

Lebanon's economy collapsed after it defaulted on about \$31 billion of Eurobonds in March 2020, with its currency sinking more than 90 per cent against the US dollar on the black market. Political bickering and indecision by the previous parliament forced the economy into a tailspin.

Inflation in the country has continued to surge and reached 206 per cent in April as the country elected a new parliament, which will have to put in place reforms to secure \$3bn from the International Monetary Fund.

Lebanon's economy contracted about 58 per cent between 2019 and 2021, with gross domestic product plummeting to \$21.8bn in 2021, from about \$52bn in 2019, said the World Bank.

The depression is among the world's worst economic collapses since the 1850s, the Washington lender said in January. It is the largest contraction on a list of 193 countries.

Pair 4 is correctly matched:



Tunisia's President Kais Saied on Monday extended his months-long suspension of parliament until new elections in December 2022, while calling for a July referendum on constitutional reforms.

88. Consider the following pairs :

Region often mentioned, in the news *Country*

- | | |
|-----------------|------------|
| 1. Anatolia | - Turkey |
| 2. Amhara | - Ethiopia |
| 3. Cabo Delgado | - Spain |
| 4. Catalonia | - Italy |

How many pairs given above are .correctly matched?

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

Correct Option: (b)
Explanation:

Pair 1 is correctly matched:

One of the great crossroads of ancient civilizations is a broad peninsula that lies between the Black Sea and the Mediterranean Sea. Called Asia Minor (Lesser Asia) by the Romans, the land is the Asian part of modern Turkey, across Thrace. It lies across the Aegean Sea to the east of Greece and is usually known by its ancient name Anatolia.



Pair 2 is correctly matched:



Pair 3 is incorrectly matched:

Cabo Delgado is a region in Mozambique.





Pair 4 is incorrectly matched:

Catalonia is a region of Spain.



89. With reference to Indian laws about wildlife protection, consider the following statements:

1. Wild animals are the sole property of the government.
2. When a wild animal is declared protected, such animal is entitled for equal protection whether it is found in protected areas or outside.
3. Apprehension of a protected wild animal becoming a danger to human life is sufficient ground for its capture or killing.

Which of the statements given above is/are correct?

(a) 1 and 2

(b) 2 only

(c) 1 and 3

(d) 3 only

Correct Option: (a)

Explanation:

Statement 1 is correct: In a significant verdict, the Bombay High Court has ruled that wild animals including tiger should be treated as "government property for all purposes" and any damage caused by them should be compensated by the Government.

Statement 2 is correct: The law governing the subject of wildlife, the Wildlife (Protection) Act, 1972, does not discriminate between animals found in protected areas and outside. It provides for equal protection for wild animals irrespective of where they are found.

Statement 3 is incorrect: Only if the wild animal becomes a danger to human life or is diseased or disabled beyond recovery can it be allowed to be captured or killed by the competent authority, the Chief Wildlife Warden of the State. This provision is applicable to wild animals listed in Schedule I of the Wildlife (Protection) Act, 1972, which includes leopards. Mere apprehension or fear that a wild animal could endanger human life is not a ground for capture or killing.

90. Certain species of which one of the following organisms are well known as cultivators of fungi?

(a) Ant

(b) Cockroach

(c) Crab

(d) Spider



Correct Option: (a)

Explanation:

Fungi and insects are two hyperdiverse groups of organisms that have interacted for millennia. Over time, some insects have come to rely on fungi for a variety of resources, including room and board. Ants, wasps, beetles and a variety of other insects have adapted to using fungi primarily for reinforcing structures or as sources of food, with the most extreme examples resulting in cultivation of fungal crops. Chief among these examples are the mushroom-farming ants and termites, and the wood-boring beetles and wasps.

91. Consider the following pairs :

Site of Ashoka's major rock edicts	Location in the State of
1. Dhauli	- Odisha
2. Erragudi	- Andhra Pradesh
3. Jaugada	- Madhya Pradesh
4. Kalsi	- Karnataka

How many pairs given above are correctly matched?

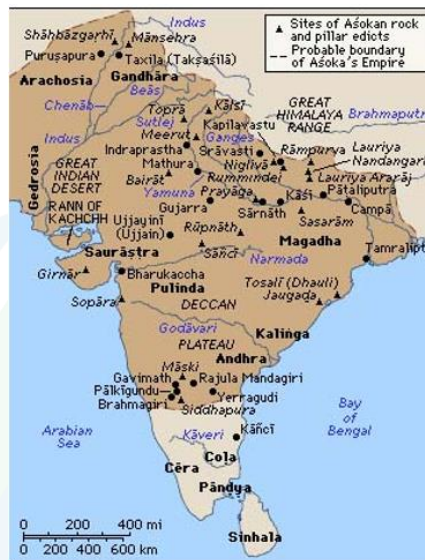
- (a) Only one pair
- (b) Only two pairs**
- (c) Only three pairs
- (d) All four pairs

Correct Option: (b)

Explanation:

- Pair 1 is correctly matched: Dhauli is located in Odisha.

- Pair 2 is correctly matched: Erragudi or Yerragudi is located in Andhra Pradesh
- Pair 3 is incorrectly matched: Jaugada is located in Odisha.
- Pair 4 is incorrectly matched: Kalsi is located in Uttarakhand.



92. Consider the following pairs:

King	Dynasty
------	---------

- | | |
|-----------------|---------------------|
| 1. Nannuka | - Chandela |
| 2. Jayashakti | - Paramara |
| 3. Nagabhata II | - Gurjara-Pratihara |
| 4. Bhoja | - Rashtrakuta |

How many pairs given above are correctly matched?

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



Correct Option: (b)

Explanation:

Pair 1 is correctly matched

The Chandellas of Bundelkhand

The Chandellas of Bundelkhand trace their descent to a mythical ancestor named Chandratreya, born of the moon. The Chandellas initially ruled as feudatories of the Gurjara-Pratiharas of Kannauj, and were involved in conflicts with the Pratiharas, the Palas, and the Kalachuris of Chedi (who bordered the Chandellas on the south). The Chandellas are well-known for their art and architecture, most notably for the fully developed Nagara-style temples at their original capital Khajuraho. The Lakshmana Temple (c. 930–950 CE), the Vishvanatha Temple (c. 999–1002 CE), and the Kandariya Mahadeva Temple (c. 1030 CE) were constructed during the reigns of Chandella rulers Yashovarman, Dhanga, and Vidyadhara respectively. They also commissioned a number of water bodies, palaces and forts at other places, including their strongholds of Jayapura-Durga (modern Ajaigarh), Kalanjara (modern Kalinjar), and their later capital Mahotsava-Nagara (modern Mahoba). In the first quarter of the 9th century CE, the dynasty was founded by Nannuka, who was the ruler of a small kingdom and established his capital at Kharjjuravahaka (Khajuraho).

- Nannuka (c.831–845 CE) Was the founder king of Chandellas.
- Vakpati (c. 845–865 CE) According to the Chandella inscriptions, Nannuka's successor Vakpati defeated several enemies.
- Jayashakti and Vijayashakti (c. 865–885 CE) Vakpati's sons Jayashakti (Jeja) and Vijayashakti (Vija) consolidated the Chandella power. According to a Mahoba

inscription, the Chandella territory was named "Jejakabhukti" after Jayashakti.

So, **Pair 2 is incorrectly**

matched: Jayashakti also belonged to Chandela Dynasty

Pair 3 is correctly matched:

The Pratihara dynasty:

The Pratiharas were also known as the Gurjara-Pratiharas, as they originated from the Gurjaras who were primarily pastoralists and fighters. Important kings:

- Nagabhata II (c. 800–833 CE): Nagabhata II was succeeded by his son Ramabhadra, who ruled briefly, and was succeeded by his son Mihira Bhoja.
- Bhoja I / Mihir Bhoja (c.836–885 CE): Grandson of Nagabhata II, who had a long reign of over 46 years and proved to be the most successful and popular ruler of Pratiharas.

So, **Pair 4 is incorrectly matched:** Bhoja was king from the Pratihara Dynasty.

93. Which one of the following statements about Sangam literature in ancient South India is correct ?

(a) Sangam poems are devoid of any reference to material culture.

(b) The social classification of Varna was known to Sangam poets.

(c) Sangam poems have no references to warrior ethic.

(d) Sangam literature refers to magical forces as irrational.



Correct Option: (b)

Explanation:

Sangam Literature has references to material culture and war tactics and ethics. The varna system was not practiced but it was known.

94. “Yogavasistha” was translated into Persian by Nizamuddin Panipati during the reign of:

(a) Akbar

(b) Humayun

(c) Shahjahan

(d) Aurangzeb

Correct Option: (a)

Explanation:

YogaVasistha was translated into Persian multiple times throughout the Mughal Dynasty, as commanded by Akbar, Jahangir, and Dara Shikoh. Nizam al-Din Panipati completed one of these translations, known as the Jug-Basisth, in the late sixteenth century AD.

95. The world’s second tallest statue in sitting pose of Ramanuja was inaugurated by the Prime Minister of India at Hyderabad recently. Which one of the following statements correctly represents the, teachings of Ramanuja?

(a) The best means of salvation is devotion.

(b) Vedas are eternal, self-existent and wholly authoritative.

(c) Logical arguments were essential means for the highest bliss.

(d) Salvation was to be obtained through meditation.

Correct Option: (a)

Explanation:

Ramanuja

He was born in Tamil Nadu in the eleventh century. He was deeply influenced by the Alvars. **He firmly believed that intense devotion to Vishnu was the best means to attain salvation.** He propounded the doctrine of Vishishtadvaita.

Vishishtadvaita is formed by the two words: vishisht meaning qualified and advaita meaning oneness of the individual soul and the Supreme God. In other words it means qualified oneness wherein the soul, even when united with the Supreme God, remained distinct.

The new strand of bhakti that developed in north India subsequently was greatly inspired by Ramanujam's doctrine.

96. The Prime Minister recently inaugurated the new Circuit House near Somnath Temple at Veraval. Which of the following statements are correct regarding Somnath Temple ?

1. Somnath Temple is one of the Jyotirlinga shrines.
2. A description of Somnath Temple was given by Al-Biruni.
3. Pran Pratishtha of Somnath Temple (installation of the present day temple) was done by President S. Radhakrishnan.

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



Correct Option: (a)

Explanation:

Somnath Temple at Somnath, Gujrat is one of the most sacred pilgrimage sites for Hindus and is believed to be first among the twelve Jyotirlinga shrines of Shiva.

Ancient Indian traditions maintain a close relationship of Somnath with release of Chandra (Moon God) from the curse of his father-in-law Daksha Prajapati. Moon was married to Twenty-Seven daughters of Daksha. However, he favoured Rohini and neglected other queens. The aggrieved Daksha cursed Moon and the Moon lost power of light. With the advice of Prajapita Brahma, Moon arrived at the Prabhas Teerth and worshipped Bhagvan Shiva. Pleased with the great penance and devotion of Moon, Bhagvan Shiva blessed him and relieved him from the curse of darkness. Pauranic traditions maintain that Moon had built a golden temple, followed by a silver temple by Ravana, Bhagvan Shree Krishna is believed to have built Somnath temple with Sandalwood.

The later sources of history account for several desecrations by Muslims invaders during eleventh to eighteen century A.D. The temple was rebuilt every time with the reconstructive spirit of the people. The modern temple was reconstructed with the resolve of Sardar Patel who visited the ruins of Somnath temple on November 13 1947. Then President of India, Dr. Rajendra Prasad, did the Pran-Pratistha at the existing temple on 11 May 1951.

So statement 3 is incorrect.

97. Which one of the following statements best describes the role of B cells and T cells in the human body ?

(a) They protect the body from environmental allergens.

(b) They alleviate the body's pain and inflammation.

(c) They act as immunosuppressants in the body.

(d) They protect the body from the diseases caused by pathogens.

Correct Option: (d)

Explanation:

pTreg cells generation is influenced by a specific type of TCR signaling, and costimulation, and through cooperation with other signals, such as TGF- β , IL-2, and ATRA. These conditions suggest that pTreg cell differentiation could be restricted to precise locations such as mucosal surfaces where they may regulate immune responses to harmless antigens such as commensal microbiota and prevent allergic inflammation. Supporting these ideas, *“studies using Rag-1-deficient T-B monoclonal mice sufficient or deficient in FOXP3 demonstrated that TCR transgenic pTreg cells were sufficient to establish mucosal tolerance and control allergic inflammation induced by the model antigen recognized by the TCR”*

98. Consider the following statements:

1. Other than those made by humans, nanoparticles do not exist in nature.
2. Nanoparticles of some metallic oxides are used in the manufacture of some cosmetics.
3. Nanoparticles of some commercial products which enter the environment are unsafe for humans.

Which of the statements given above is/are correct?



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

(d) 2 and 3

Correct Option: (d)

Explanation:

Statement 1 is incorrect: Natural nanoparticles are formed from magma spewing volcanoes; others are formed by forces such as of oceanic breakers, tides, river currents, etc.

Statement 2 and 3 are correct: Among the metal oxide NPs present in cosmetic products, **amorphous silica (SiO₂), zinc oxide (ZnO) and particularly titanium dioxide (TiO₂)** are the most frequent. The thing that makes nanoparticles so interesting for applications is that materials in nanosize have properties (optical, chemical, magnetic, biological, electrical, and mechanical) that are completely different from the properties of the same material in bulk. These new properties may cause a problem if nanoparticles are unintentionally released – very few of these particles exist in nature and we as humans have not been exposed to them throughout evolution. Therefore, we cannot be sure that our body has developed defense mechanisms to deal with them.

An important consideration in the deposition of particles in the respiratory system is the lung-lining fluid (a complex mixture of lipids and surfactant proteins) since any depositing material quickly becomes coated in these surfactant proteins and lipids. Such a coating gives the deposited particle its ‘biological identity’ This so-called protein corona, which is likely to play a role in the way particles interact with lung cells such as alveolar macrophages.

Several studies on workers exposed to carbon nanotubes have shown a significant increase of biomarkers of fibrosis. The organization for cancer research (IARC) of the World Health Organization (WHO) have classified one type of carbon nanotubes (Mitsui 7) as potentially carcinogenic in humans [IARC 111].

99. Consider the following statements:

DNA Barcoding can be a tool to :

1. assess the age of a plant or animal.
2. distinguish among species that look alike.
3. identify undesirable animal or plant materials in processed foods.

Which of the statements given above is/are correct?

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

(d) 2 and 3

Correct Option: (d)

Explanation:

Statement 1 is incorrect: To measure the age of plant and animal remains from the more recent past, scientists use a radioactive isotope of carbon, called carbon-14, as their clock. As carbon-14 decays, with a half-life of about 5,730 years, it becomes nitrogen-14. Using this clock, they have dated bones, campfires and other objects as old as 60,000 years, and in some cases even older.

Statement 2 and 3 is correct: DNA barcoding uses specific regions of DNA in order to identify species. Initiatives are taking place around the world to generate DNA barcodes for all groups of living



organisms and to make these data publically available in order to help understand, conserve, and utilize the world's biodiversity. For land plants the core DNA barcode markers are two sections of coding regions within the chloroplast, part of the genes, *rbcL* and *matK*. In order to create high quality databases, each plant that is DNA barcoded needs to have a herbarium voucher that accompanies the *rbcL* and *matK* DNA sequences. The quality of the DNA sequences, the primers used, and trace files should also be accessible to users of the data. Multiple individuals should be DNA barcoded for each species in order to check for errors and allow for intraspecific variation. The world's herbaria provide a rich resource of already preserved and identified material and these can be used for DNA barcoding as well as by collecting fresh samples from the wild. These protocols describe the whole DNA barcoding process, from the collection of plant material from the wild or from the herbarium, how to extract and amplify the DNA, and how to check the quality of the data after sequencing.

100. Consider the following

1. Carbon monoxide
2. Nitrogen oxide
3. Ozone
4. Sulphur dioxide

Excess of which of the above in the environment is/are cause(s) of acid rain?

(a) 1, 2 and 3

(b) 2 and 4 only

(c) 4 only

(d) 1, 3 and 4

Correct Option: (b)

Explanation:

Acid rain results when sulfur dioxide (SO₂) and nitrogen oxides (NO_x) are emitted into the atmosphere and transported by wind and air currents. The SO₂ and NO_x react with water, oxygen and other chemicals to form sulfuric and nitric acids. These then mix with water and other materials before falling to the ground.

While a small portion of the SO₂ and NO_x that cause acid rain is from natural sources such as volcanoes, most of it comes from the burning of fossil fuels. The major sources of SO₂ and NO_x in the atmosphere are:

- Burning of fossil fuels to generate electricity. Two thirds of SO₂ and one fourth of NO_x in the atmosphere come from electric power generators.
- Vehicles and heavy equipment.
- Manufacturing, oil refineries and other industries.

Winds can blow SO₂ and NO_x over long distances and across borders making acid rain a problem for everyone and not just those who live close to these sources.

