UPSC – Civil Services Exam – 2020

Preliminary – Solved Original Question Paper - I

GENERAL STUDIES

Time Allowed : 2 Hrs.
No. of Questions : 100
Held on: 4.10.2020
Maximum Marks : 200

1. What are the advantages of fertigation in agriculture ?

1. Controlling the alkalinity of irrigation water is possible
2. Efficient application of Rock Phosphate and all other phosphatic fertilizers is possible.
3. Increased availability of nutrients to plants is possible.
4. Reduction in the leaching of chemicals nutrients is possible

Select the correct answer using the code given below:

A) 1,2 and 3 only **B)** 1,2 and 4 only
C) 1,3 and 4 only **D)** 2,3 and 4 only

Explanation : **Ans : (C)**

Fertigation, a practice of conjunctive application of fertilizers and water to crop plants is an inevitable component of modern day scientific agriculture.

Soluble fertilizers like urea, potash and a wide variety of fertilizer mixtures available in the market could be well mixed with irrigation water, filtered and then passed through the irrigation unit. In the normal sense, it refers to the conjunctive application of chemical fertilizers and water. However in the present situation of increasing demand for organic products and an inclination to organic farming practices, the scope for "organic fertigation" is very large.

Though, the failure of monsoon has been influencing the growth and cultivation of a large number of agriculture produce, fertigation – a combination of drip irrigation and application of fertilizers, is being adopted. The limited supply of irrigation water has ensured not only economy in water but avoided leaching of nutrients and problems caused by weeds. Drip irrigation, through uniform and direct application of water at root zones, has eliminated the problem.

Advantages

- ✦ In fertigation, controlling the alkalinity of irrigation water is possible.
- ✦ Increased nutrient absorption by plants
- ✦ Reduced leaching of chemicals into the water supply.

Disadvantages

Phosphate rode cannot be used as fertilizer because it is insoluble but it can be used to make fertilizers. Efficient application of Rock Phosphate is impossible. Solid residues are more in Rock Phosphate and all other phosphatic fertilizers. The best filtering mechanism is required to screen out the solid residues. Otherwise, they could clog the drippers and sprinkler heads thereby making irrigation system inefficient.

2. Consider the following minerals:

1. Bentonite
2. Chromite
3. Kyanite
4. Sillimanite

In India, which of the above is/are officially designed as major minerals ?

A) 1 and 2 only **B)** 4 only
C) 1 and 3 only **D)** 2,3 and 4 only

Explanation : **Ans : (D)**

Major minerals are those specified in the first schedule appended in the mines and minerals (Development and Regulation) Act, 1957. The power to frame policy and legislation relating to minor minerals is entirely delegated to the state governments.

The major minerals cover fuel minerals consisting of coal, lignite, petroleum & natural gas and other major minerals (ie.) metallic minerals including atomic minerals and non-metallic minerals.

Some examples of major minerals are ; Bauxite, Chromite, Copper ore, Iron ore, Dolomite, Kyanite, Magnesite, Sillimanite and Vermiculite etc.

Minor minerals consist of materials such as marble, slate, Bentonite, Dunite, Gypsum, Kaolin, Felsite and Feldspar etc.

3. With reference to Ocean Mean Temperature (OMT), which of the following statements is/are correct?

1. OMT is measured up to a depth of 26°C isotherm which is 129 meters in the south-western Indian Ocean during January - March.
2. OMT collected during January - March can be used in assessing whether the amount of rainfall in monsoon will be less or more than a certain long-term mean.

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

Explanation : **Ans : (B)**

Sea Surface Temperature (SST) is routinely used for predicting whether the total amount of rainfall that India receives during the monsoon season will be less or more than the long term mean of 887.5 mm. Now, scientists from Pune's Indian Institute of Tropical Meterology (IITM) find that Ocean Mean Temperature (OMT) that has better ability to predict this than the sea surface temperature. Compared with SST which has 60% success rate of predicting the Indian Summer Monsoon, OMT has 80% success rate.

The SST is restricted to a few millimetres of the top ocean layer and is largely influenced by ocean layer and strong winds, evaporation, or thick clouds. In contrast, OMT,

which is measured up to a depth of 20°C isotherm, is more stable and consistent, and the spatial spread is also less. The 26°C isotherm is seen at depths varying from 50-100 metres. During January - March, the mean 26°C isotherm depth in the Southwestern Indian Ocean is 59 metres.

The researchers analysed 25 year OMT data from 1993 to 2017. They found unlike that SST, OMT was able to correctly predict 20 out of 25 years (80% success rate) whether the amount of rainfall during the summer monsoon was more or less than the long-term mean.

The reason why OMT performs better than SST is because OMT better represents the upper ocean thermal energy conditions. And the variations in the upper ocean thermal energy conditions are mainly responsible for the summer monsoon.

4. With reference to chemical fertilizers in India consider the following statements:

1. At present, the retail price of chemical fertilizers is market-driven and not administered by the Government

2. Ammonia, which is an input of urea, is produced from natural gas.

3. Sulphur, which is a raw material for phosphoric acid fertilizer, is a by-product of oil refineries.

Which of the statements given above is/are correct?

A) 1 only **B)** 2 and 3 only

C) 2 only **D)** 1, 2 and 3

Explanation : **Ans : (B)**

Fertilizer as an industry is under the control of the Union Government being in the First Schedule of the IDR (Industries Development and Regulation) Act, 1951. Urea dominates the sector. It is the most produced (86%), the most consumed (74%), and the most imported (52%). India produces about 80 percent of its urea needs.

And the fertilizer industry has the capacity to indigenously meet 50 percent of the country's phosphatic fertilizers. But India still depends heavily on imports for the raw ingredients for its phosphatic and potassium fertilizers.

Fertilizer Policy in India and Government Interventions :

Major focus of the fertilizer policy has been on primary (macro) nutrients.

- ✦ Since independence, the Government of India (GOI) has been regulating the sale, price and quality of fertilizers. GOI has declared fertilizers as an essential commodity. GOI issued the Fertilizer Control Order (FCO) under the Essential Commodities Act, 1957. No subsidy was paid on fertilizers till 1977 except potash for which subsidy was paid only for a year in 1977.
- ✦ Retention Pricing Scheme (RPS) : Introduced for nitrogenous fertilizers in 1977. Later, it was extended to phosphatic and potassic fertilizers. In this, difference between retention price and the statutorily notified sale price was paid as a subsidy to each manufacturing unit. This was the beginning of the "product-based subsidy" regime. Under the Nutrient Based Subsidy (NDS) Policy (2010), the government announces every year a fixed rate of subsidy on each nutrient of fertilizers, namely Nitrogen (N), Phosphate (P), Potash (K) and Sulphur (S). Hence, Statement I is incorrect.

Ammonia, which is an input of urea, is produced from natural gas.

Sulphur, which is a raw material for phosphoric acid fertilizer, is a by-product of oil refineries.

Statement II and III are correct

5. With reference to India's Desert National Park, which of the following statements are correct ?

1. It is spread over two districts.

2. There is no human habitation inside the Park

3. It is one of the natural habitats of Great Indian Bustard

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

Explanation : **Ans : (C)**

The Desert National Park (DNP) covers an area of 3162 km^2 of which 1900 km^2 is in Jaisalmer district and remaining 1262 km^2 is in Barmer district of Rajasthan state. The area falls in the extreme hot and arid region of very low rainfall zone of the country. DNP was gazetted in the year 1980.

The vegetation of the major part of the arid region of the Thar falls under Thorn forest type. Khejri Prosopis cineraria is commonly found, which is revered and protected by the local communities especially the 'Bishnois'.

Many more endemic and endangered mammal, bird and reptile species are found in DNP.

More than 100 bird species have been listed from DNP including a good population of the **Great Indian Bustard and is also a home for migrant Houbara Bustard.**

The Thar desert is the most thickly populated desert in the world with an average density of 83 persons/km^2. However, the human population within the DNP is low (4-5 persons per km^2). There are 73 villages and also settlements (or) Dhanis existing within the park. Three communities have inhabited this area for hundreds of years and with their rich culture and tradition they are an integral part of this ecosystem. Desert National Park, Rajasthan is included in the UNESCO's tentative world heritage list.

6. Siachen Glacier is situated to the

A) East of Aksai Chin **B)** East of Leh

C) North of Gilgit **D)** North of Nubra valley

Explanation : **Ans : (D)**

The Siachen Glacier is located in the eastern Karakoram range in the Himalayan mountains, just northeast of the point NJ9842 where the Line of Control between India and Pakistan ends. At 76 km long, it is the longest glacier in the Karakoram and second-longest in the world's non-polar areas. Siachen Glacier lies to the north of the Nubra valley. The Sasser Pass and the famous Karakoram pass lies to the northwest of the valley and connect Nubra with Uyghur region of China.

7. With reference to the history of India, consider the following pairs :

Famous place		Present State
1. Bhilsa	-	Madhya Pradesh
2. Dwarasamudra	-	Maharashtra
3. Girinager	-	Gujarat
4. Sthanesvara	-	Uttar Pradesh

Which of the pair given above are correctly matched?

A) 1 and 3 only **B)** 1 and 4 only
C) 2 and 3 only **D)** 2 and 4 only

Explanation : **Ans : (A)**

Bhilsa (Vidisha) : Vidisha (formerly known as Bhilsa in ancient times) is a city in the state of Madhya Pradesh. Vidisha became an important trade centre in the 5th and 6th centuries BCE, under the Shungas, Nagas, Satavahanas, and Guptas, and was mentioned in the Pali scriptures. The Emperor Ashoka was the governor of Vidisha during his father's lifetime. His Buddhist Empress Vidisha Devi who was also his first wife was brought up in Vidisha. It finds mention in Kalidasa's Meghdoot. The ruins of Vidisha were inspected by Alexander Cunningham in 1874–1875.

Dwarasamudra : "Dwarasamudra" capital city of Hoysala dynasty who ruled the Karnataka area of South India between 10 and 14th centuries. Initially its capital was Bellur and later it was moved to Halebidu (Dwarasamudra).

Girinagar : Mount Girnar, also known as Girinagar or Revatak Pravata, is a group of mountains in the Junagadh District of Gujarat, India. Girnar is one of the five major 'tirthas' attributed to the 'panch kalyanakas' of various 'Jain tirthankaras'. Different Jain Tirthankaras and monks have in the past visited and practised severe penance at the peaks of Girnar.

Sthaneshwar : The ancient Sthaneshwar Mahadev temple, dedicated to Lord Shiva is situated in Thaneswar, in the Kurukshetra district of Haryana. This temple is more than 5000 years old. Pandavas along with Lord Krishna visited this temple to worship Lord Shiva to seek his blessings for their victory in the war of Mahabharata.

8. Consider the following statements :

1. 36% of India's districts are classified as "overexploited" or "critical" by the Central Ground Water Authority (CGWA).
2. CGWA was formed under the Environment (Production) Act.
3. India has the largest area under groundwater irrigation in the world.

Which of the statements given above is/are correct?

A) 1 only **B)** 2 and 3 only
C) 2 only **D)** 1 and 3 only

Explanation : **Ans : (B)**

Central Ground Water Board (CGWB), a subordinate office of the Ministry of Water Resources, Government of India, is the National Apex Agency entrusted with the responsibilities of providing scientific inputs for management, exploration, monitoring, assessment, augmentation and regulation of ground water resources of the country. Central Ground Water Board was established in 1970 by renaming the Exploratory Tube wells Organization under the Ministry of Agriculture, Government of India. In 1972, it was merged with the Ground Water Wing of the Geological Survey of India.

Central Ground Water Authority (CGWA) was constituted under sub-section (3) of Section 3 of the Environment (Protection) Act, 1986 for the purposes of regulation and control of ground water development and management in the country. The Authority is engaged in various activities related to regulation of ground water development to ensure its long-term sustainability.

Ground water extraction in India primarily for irrigation in agricultural activities, accounts for 90% of the annual groundwater extraction and remaining 10% of extraction is for drinking & domestic as well as industrial uses. India is the largest user of groundwater in the world.

Out of the total 6584 assessment units, 1034 have been categorized as 'Over-exploited', 253 as 'Critical', 681 as 'Semi-Critical' and 4520 as 'Safe'. The remaining 96 assessment units have been classified as 'Saline' due to non-availability of fresh groundwater due to salinity problems.

9. Consider the following statements :

1. Jet streams occur in the Northern Hemisphere only.
2. Only some cyclones develop an eye.
3. The temperature inside the eye of a cyclone is nearly 10°C lesser than that of the surroundings.

Which of the statements given above is/are correct?

A) 1 only **B)** 2 and 3 only
C) 2 only **D)** 1 and 3 only

Explanation : **Ans : (C)**

The term cyclone is a Greek word meaning **"coil of a snake".** Cyclones are centres of low pressure where, winds from the surrounding high pressure area converge towards the centre in a spiral form. Due to the rotation of the earth, the cyclonic winds in the northern hemisphere move in anticlock wise direction, whereas they move in clockwise direction in the southern hemisphere.

Cyclones are classified into three types. They are: Tropical Cyclones, Temperate Cyclones, Extra Tropical Cyclones.

Tropical Cyclones

They are formed due to the differential heating of land and sea near the inter tropical convergence zone (ITCZ).

Different Names of Tropical Cyclones :

Cyclone Name	Ocean
Cyclones	Indian Ocean
Typhoons	Western Pacific Ocean
Hurricanes	Atlantic and eastern Pacific Ocean
Baguious	Phillipines
Willy Willy	Australia

Tropical cyclones often cause heavy destruction and become weak after reaching the landmasses.

Origin of Tropical Cyclone

- Tropical cyclones have certain mechanism for their formation.
- A source of warm, moist air derived from tropical oceans with sea surface temperature normally near to or in excess of 27°C.
- Wind near the ocean surface is blowing from different directions converging and causing air to rise and storm clouds to form.
- Winds which do not vary greatly with height are known as **low wind shear**.
- This allows the storm clouds to rise vertically to high level;
- Coriolis force is induced by the rotation of the Earth.
- The mechanisms of formation vary across the world, but once a cluster of storm clouds starts to rotate, it becomes a tropical depression.
- If it continues to develop it becomes a tropical storm, and later a cyclone / super cyclone.

Characteristics of the Tropical Cyclone

- **The centre of the cyclone where the wind system converges and vertically rises is called as Eye.**
- It is a Calm region with no rainfall and experiences **highest temperature and lowest pressure within the cyclonic system.**
- Cyclone wall is made up of Cumulo Nimbus clouds with no visibility, higher wind velocity and heavy rain fall with lightning and thunder.
- Tropical cyclones mostly move along the direction of trade wind system. So they travel from east to west and make land fall on the eastern coast of the continents.
- **Landfall :** The condition at which the eye of the tropical cyclone crosses the land is called **'Land fall'** of the cyclone.

Jet Streams

- Jet streams are high altitude westerly wind system that blows at a height of 6 to 14 km, with very high speed up to 450 km/h in wavy **form at both hemispheres.**
- Although the jet streams flow at higher altitude they also influence the surface weather pattern of the Earth.

Major impacts of Jet streams

- **Creation of Polar vortex :** Polar westerly jet stream will carry cold polar air masses towards temperate region which creates severe cold waves in North America and Eurasia during winter.
- **Sudden burst of South west monsoon :** Sudden withdrawal of polar westerly jet stream from Indian sub continent to northern part of Pamir, leads to sudden burst of South west monsoon into Indian Sub continent.
- **Late and early monsoon in South Asia :** Rate of withdrawl of polar westerly jet stream decides the onset of south west monsoon. Slower and faster rate of withdrawl leads to late and early onset of south west monsoon.
- **Intensity of monsoon rainfall :** The arrival of tropical easterly jet stream influences the intensity of south west monsoon. This leads to increasing intensity of rainfall during south west monsoon.
- **Bringing rainfall to India by western disturbances :** Polar westerly jet stream carries rainy clouds from cyclones formed over Mediterranean Sea during winter towards India. These clouds pile up on the Himalayas and result in rainfall over the states of Punjab and Haryana. This assists in the cultivation of wheat in India.
- **Development of super cyclone :** The condition at which the speed of the jet stream is transferred to tropical cyclone may lead to development of super cyclone.

10. Among the following Tiger Reserves, which one has the largest area under "Critical Tiger Habitat"?

A) Corbett
B) Ranthambore
C) Nagarjunsagar-Srisailam
D) Sunderbans

Explanation : **Ans : (C)**

Nagarjunsagar-Srisailam Tiger Reserve is the largest tiger reserve in India. The reserve spreads over five districts of Kurnool, Prakasam, Guntur, Nalgonda and Mahbubnagar. The total area of the tiger reserve is 3296.31 km^2. The core area of this reserve is 2595.72 km^2.

Tiger reserve	Total area	Critical Tiger Habitat
Corbett (Uttarakhand)	1288.31 km^2	821.99 km^2
Rathambore (Rajasthan)	1411.291 km^2	1113.364 km^2
Sunderbans (West Bengal)	2584.89 km^2	1699.62 km^2

11. If a particular plant species is placed under Schedule VI of The Wildlife Production Act, 1972, what is the implication ?

A) A licence is required to cultivate that plant.
B) Such a plant cannot be cultivated under any circumstances.
C) It is a Genetically Modified crop plant.
D) Such a plant is invasive and harmful to the ecosystem

Explanation : **Ans : (A)**

Schedule I of WPA - 1972 lists animals which are given the highest level of protection, depending on the level of threat to extinction. However, the list is not based on their ability to survive in the wild or the extent of endemism. Thus, both statements (B) and (C) are wrong. Tiger is a schedule I animal. So if tortoise is declared protected under schedule I, it will get the same level of protection as tiger.

Wildlife Protection Act, 1972 (with Amendment Acts of 2003 and 2006) :

- The act provides for the protection of wild animals, birds and plants and matters connected with them, with a view to ensure the ecological and environmental security of India.