

NATIONAL TALENT SEARCH EXAMINATION (NTSE-2016) STAGE -1 CHANDIGARH SAT

Date: 08/11/2015

Max. Marks: 100

SOLUTIONS

Time allowed: 90 mins

- 1. Prokaryotes are the organisms which are characterized by -
 - (1) Well defined nucleus
 - (2) Absence of cell wall
 - (3) Absence of chlorophyll
 - (4) Absence of nuclear envelope, nucleolus and nucleoplasm

Ans. 4

2.

- **Sol.** In prokaryotic organisms, the genetic material is present in the form of nucleoid, which is scattered freely in the cytoplasm.
 - Which of the following is not present in an animal cell?
 - (1) Ribosome (2) Plastids
 - (3) Mitochondria (4) Endoplasmic reticulum

Ans. 2

- **Sol.** Presence of plastids is a characteristic feature of plant cells, in plants plastids are associated with storage of pigments as well as food.
- These are heterotrophic, eukaryotic organism having their cell wall made up of a complex sugar called chitin (1) Algae
 (2) Fungi
 (3) Bryophytes
 (4) Gymnosperms

Ans. 2

- **Sol.** Presence of chitinous cell wall is a characteristic feature of kingdom fungi.
- **4.** Development of muscle cramps during sudden activity is due to accumulation of -
- (1) Lactic acid (2) Lactose (3) Lactogen (4) Lactulose

Ans. 1

- **Sol.** During sudden activity, Anaerobic breakdown of glucose leads to formation of lactic acid.
- 5. Thyroxin regulates which of the following metabolisms in the body -
 - (1) Carbohydrate metabolism (2) Protein metabolism
 - (3) Fat metabolism (4) Carbohydrate, Protein and Fat metabolism

Ans. 4

- **Sol.** Thyroxine hormone is responsible for regulation of basal metabolic rate (BMR) in the body.
- 6. The gap between two neurons is called -
 - (1) Axon (2) Internode (3) Synapse (4) Dendrite

Ans. 3

- **Sol.** A minute gap present at the junction of axon endings of one neuron and dendrites of another neuron is known as synapse.
- 7.Deficiency of Iodine in the body can cause-
(1) Kwashiorkar(2) Marasmus(3) Goitre(4) Rickets

Ans. 3

Sol. Iodine is essential for the synthesis of thyroxine hormone. During deficiency of iodine, synthesis of thyroxine is reduced leading to the enlargement of thyroid gland and the condition is called goitre.

8.	Buds produced in the notches along the leaf margins of Bryophyllum, develop into new plants when they fall on soil. This is a mode of -				
	(1) Sexual reproduction		(2) Asexual reproduc	tion	
	(3) Vegetative reproduction	on	(4) Parthenocarpy		
Ans.	3				
Sol.	When new plants are fo of reproduction is called	ormed from any vegetativ I as vegetative reproducti	e part of the plant i.e. eit ion.	ther roots, stems or leaves, the mode	
9 .	In plants, growth of polle	en tube towards ovule, is a	an example of -		
	(1) Chemotropism	(2) Thigmotropism	(3) Haptotropism	(4) Phototropism	
Ans.	1				
Sol.	Chemotropism is d In plants chemicals secr	efined as the respon reted in micropylar region	nse of living organis nattracts the pollen tube	sm towards certain chemicals. towards the egg cell.	
10.	Which of the following is	not a component of Xyle	em?		
	(1) Vessels	(2) Tracheids	(3) Fibres	(4) Sieve tubes	
Ans.	4			()	
Sol.	Xylem contains four ele component of phloem.	ements namely vessels, tr	acheids, fibres & xylem ;	parenchyma whereas sieve tubes are	
11.	An animal cell shrinks w	hen placed in a concentra	ated sugar solution. Such	a solution, is known as -	
	(1) Hypertonic	(2) Hypotonic	(3) Isotonic	(4) Neurotonic	
Ans.	1				
Sol.	Solution in which conce	ntration of solutes is mor	e than that of solvent is k	nown as hypertonic solution	
12.	Which of the following cell organelle does not possess a double layered covering?				
	(1) Chloroplast	(2) Nucleus	(3) Mitochondria	(4) Vacuole	
Ans.	4				
Sol.	Chloroplast, mitochond	lria & nucleus are double	membranous organelle.		
13.	In plants, translocation of	of food and other substan	ces take place through sie	eve tubes in -	
	(1) Upward direction		(2) Downward directi	on	
	(3) Lateral direction		(4) Both upward and	downward direction	
Ans.	4		• • •		
Sol.	Translocation of food is a	multidirectional process.			
14.	Mendel is popular for po	stulating -			
	(1) Origin of species	(2) Cell theory	(3) Linkage theory	(4) Laws of inheritance	
Ans.	4				
Sol.	Origin of species : Char	les Darwin			
0011	Call theory - Schleiden & Schuern				
	Linkage theory. Morgan				
	Laurage meory. Morgan				
15	Club boom of the second	Cono LINO co			
13.	(1) LINO actor and the	Lonc. ΠNO_3 as -	(9) LINO $ +$ $ -$ 1		
	(1) $\Pi N O_3$ acts as an OXIC	uzing ageni	(2) Π in O_3 acts as a de		
•	(S) INITRO - CELIUIOSE IS FOR	med	(4) The proteins are c	converted into xantho proteins	
Ans.	4				

 $\textbf{Explanation:} Skin becomes yellow in conc. HNO_{3} as the xanthoproteic acid is formed which is yellow in colour.$

- **16.** When two liquids in a mixture differ by their boiling points, which of the following is the best method to separate these liquids?
 - (1) Evaporation (2) Distillation (3) Chromatography (4) Filtration
- Ans. 2

Explanation: A mixture of two liquids can be separated by distillation.

If the difference in their boiling points is more than 25K, simple distillation is done. If the difference in their boiling points is less than 25K, fractional distillation is done.

17. Which of the following is a chemical change?

(1) Melting of ice	(2) Dissolving salt in water
(3) Rusting of iron	(4) Boiling of water into steam

Ans. 3

Rusting of iron is a chemical change as the formation of new substance takes place and it is irreversible. It is shown as follows:

$$2Fe + xH_2O + \frac{3}{2}O_2 \rightarrow Fe_2O_3. xH_2O$$

[Brown flaky substance]

[Rust]

On the contrary, melting of ice, dissolving salt in water, boiling of water into steam are physical changes.

18.	Buckminsterfullerene is an example of carbon	l
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Ans. 3

Allotropy is a phenomenon in which different forms of an element exist with different physical properties and similar chemical properties. The different forms of such element are called allotropes. Diamond, graphite and fullerenes are allotropes of carbon.

19. The gas used in welding and cutting metal is

(1) Ethyne (2) Ethene (3) Ethane (4) Propene

Ans. 1

Sol. Ethyne [Acetylene], $CH \equiv CH$ is used for cutting and welding metals as it burns with air or oxygen producing a high temperature of the order of 3000K.

 $2CH = CH + 5O_2 \rightarrow 4CO_2 + 2H_2O \Delta H = -1300 \text{ kJ/mol}$

20. Which gas is released when a metal reacts with an acid?

(1) Cl_2 (2) O_2 (3) H_2 (4) SO_2

Ans. 3

Sol. When a metal reacts with an acid, hydrogen gas is released. $M + HX \rightarrow MX + H_2^{\uparrow}$

21. Hydrolysis of water is which type of following reactions?

(1) Endothermic (2) Decomposition (3) Both (1) and (2) (4) Combination

Ans. 3

Sol. $2H_2O \xrightarrow{\text{Electric arc}} 2H_2 \uparrow +O_2 \uparrow$

It requires energy to decompose into its constituents, it is an endothermic and decomposition reaction.

22. When a burning splinter is brought near the gas jar containing hydrogen gas a popping sound is observed. It is due to -

(1) exothermic	(2) endothermic
(3) exothermic and endothermic	(4) None of these

Ans. 1

- **Explanation:** When a burning splinter is brought near the gas jar containing hydrogen gas, the gas starts burning with a pop sound. This reaction is an exothermic reaction.
- **23.** Silver chloride turns grey when placed in sun because of the formation of which of the following when placed in sun?
 - (1) Silver metal (2) Carbon dioxide (3) Silver oxide (4) Silver sulphate

Ans. 1

 $2AgCl \xrightarrow{hv} 2Ag \downarrow + Cl_2 \uparrow (Greyish silver)$

24. When copper sulphate solution reacts with iron metal, copper metal is formed. This reaction comes under which of the following category?

(1) Decomposition reaction	(2) Single displacement reaction
(3) Double displacement reaction	(4) Combination reaction

Ans. 2

 $CuSO_4(aq) + Fe(s) \rightarrow FeSO_4(aq) + Cu(s) \downarrow$

It is a single displacement reaction in which more reactive iron metal displaces copper from its aqueous salt solution.

25. When 0.01 Kg of CaCO₃ is decomposed the CO₂ produced occupies a volume at S.T.P -

$(1) 2.2414 dm^3 \qquad (1) 22.414 dm^3$	$(3) 22414 dm^3$	(4) 224014 dm ³
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Ans. 1

$$\begin{array}{c} \text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2 \\ 1 & 1 & 1 \\ 100\text{g} & 56\text{g} & 44\text{g} \end{array}$$

 $0.01 \text{kg of CaCO}_3 = \frac{0.01}{100 \times 10^{-3} \times 100} = \frac{1}{10} \text{mole}$

1 mole of $CaCO_3$ gives 1 mole of CO_2 .

$$\frac{1}{10}$$
 moles $\rightarrow 1 \times \frac{1}{10} = 0.1$ mole of CO₂

At S.T.P., 1 mole of a gas occupies 22.4L or 22.4dm³

0.1 mole of $\mathrm{CO}_2\,\mathrm{occupies}$ = 22.4 \times 0.1 = 2.24 dm^3 .

26. Which of the following method is suitable for preventing an iron frying pan from rusting?

(1) Applying grease	(2) Applying paint
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(3) Applying a coating of zinc (4) AII of the above

Ans. 3

As iron pan is used for cooking purposes, it can only be prevented by applying a coating of zinc.

- 27. Aromatic compounds are given this name because of -
 - (1) Slippery touch they have (2) Bitter taste they have
 - (3) Sour taste they have (4) Smelly they are

Ans. 4

- **Sol.** Aromatic compounds have a characteristic smell. ['AROMA' means smell] that's why aromatic compounds are given this name.
- **28.** Pick the false statement
 - (1) One can calculate uniform acceleration
 - (2) One can calculate non uniform acceleration from velocity-time graph.
 - (3) One can calculate velocity from distance-time graph.
 - (4) One can calculate speed from distance-time graph.

Ans. 3

- 29. Pick the fundamental law of motion -
 - (1) Newton's first law of motion (2) Newton's second law of motion
 - (3) Newton's third law of motion (4) All laws of motion

Ans. 4

- **Sol.** All law of motion are fundamental law.
- **30.** The mass of an object is 10 Kg on earth. So we can say -
 - (1) Its weight on earth is 10 N. (2) Its weight on earth is 1.67 N.
 - (3) Its weight on moon is 10 N. (4) Its mass on moon is 10 Kq.

Ans. 4

- **Sol.** Mass of a matter remain constant.
- **31.** Pick the correct statement -
 - (1) Energy is a physical quantity and work is a mathematical quantity.
 - $\left(2\right)$ Work is a physical quantity and energy is a mathematical quantity.
 - $(3) Both \ energy \ and \ work \ are \ physical \ quantities.$
 - (4) Both energy and work are mathematical quantities.

Ans. 3

- **Sol.** Both are physical quantities
- **32.** A sound wave has a frequency of 2 kHz and wavelength 35 cm. How much distance it will travel in 2 seconds.

(1) 14 m (2) 14 m (3) 140 m (4) 1400 m

32 Ans. 4

Sol. Wave speed = frequency × wave length

$$= 2 \times 10^3 \,\mathrm{Hz} \times \frac{35}{100} \,\mathrm{m}$$

= 700 m/s

Distance travelled in 2 seconds = $700 \text{ m/s} \times 2 \text{ sec} = 1400 \text{ m}$

33. The vibrations are amplified several times in the middle ear to the bones known as -

(1) Anvil (2) Stirrup (3) Hammer (4) All of the above

Ans. 4

Sol. Vibrations are amplified by all the given bones.

- **34.** You are provided with a concave lens having focal length 15 cm. If it diminishes the image by one-third, calculate the distance of image from lens?
- (2) 10 cm (3) 5 m (4) 10 m $(1) 5 \, \text{cm}$

Зv 2

Sol. m
$$\frac{h_i}{h_o} = \frac{\frac{2}{3}h_o}{h_o} = \frac{2}{3} = \frac{v}{u} \Rightarrow u$$

Now $\frac{1}{v} - \frac{1}{v} = \frac{1}{f}$

$$\frac{1}{v} - \frac{2}{3v} = \frac{1}{f} \Rightarrow \frac{3-2}{3v} = \frac{1}{3v} = \frac{1}{f}$$
$$v = \frac{f}{3} = \frac{-15}{3} = -5 \text{ cm}$$

35. At the traffic signals, red light is used for stop due to the reason that it can be seen from a distance. The phenomenon involved is known as -

(1) Reflection	(2) Refraction	(3) Dispersion	(4) Scattering
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Ans. 4

- Sol. Red light scatters least.
- **36.** Alloys are commonly used in electrical heating devices, like electric iron etc. because -
 - (1) Alloys have higher resistivity than that of its constituent metals.
 - (2) Alloys do not burn at higher temperatures.
 - (3) Alloys do not oxidise at higher temperatures.
 - (4) All of above.

Ans. 4

- Sol. Heating device should have high resistivity should not melt or burn, should not oxidise.
- 37. Suppose five resistances, each of 10 ohm, are provided to you. You are free to get the desired value by combining them. The desired value will lie in between -
 - (2) 20 ohm to 40 ohm (3) 12 ohm to 50 ohm (4) 10 ohm to 60 ohm (1) 2 ohm to 50 ohm

Ans. 1

Sol. Minimum resistance of combination is when all are connected parallel.

$$\operatorname{Req.} = \frac{R}{n} = \frac{10}{5} = 2 \operatorname{ohm}$$

Maximum resistance when connected in series.

Reg. = $nR = 5 \times 10 = 50$ ohm.

38. Calculate the electricity bill for 30 days of a house in which a bulb 100 W operates for 6 hours/day, a fan rated 80 W operates for 10 hours/day and a refrigerator rated 400 W operates for 24 hours/day. Assume the cost of energy is Rs. 8.00 per kWh.

(1) Rs. 26.40	(2) Rs. 26(4)00	(3) Rs. 2640.00	Rs. 26400.00
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Ans. 3

Sol. Commercial unit = kwh

 $Total energy consumed = \frac{(100w \times 6hr + 80w \times 10hr + 400w \times 24hr) \times 30}{1000} = \frac{11000}{1000} \times 30 \text{ kwhr}$

= 330 kwh

Bill = total units \times 8 Rs = 330 \times 8 = Rs 2640

39.	The magnetic field inside a current carrying long straight solenoid is						
	(1) Zero		(2) Uniform				
	(3) non uniform		(4) cannot say as the	data is insufficient			
Ans.	2						
Sol.	Magnetic field inside a	straight solenoid is unif	orm along its length.				
40.	Choose the medium mos	Choose the medium most suitable for the core of electromagnets					
	(1) air	(2) wood	(3) soft iron	(4) steel			
Ans.	3						
Sol.	Soft iron inside the coil r is flowing.	nakes the magnetic field	stronger because its becc	ome a magnet itself when the current			
41.	Taille was -						
	(1) Unit of currency in Fra	ance	(2) Tax comprising or	ne tenth of the agriculture			
	(3) Tax on salt and tobac	со	(4) Tax to be paid dir	ectly to the state			
Ans.	(4)						
Sol.	Taille, a tax to be paid di	rectly to the state					
42.	Who advocated the polic	y of abolishing Princely st	tates in free India?				
	(1) Vallabh Bhai Patel		(2) Mahatma Gandhi	i			
	(3) C. Rajagopalachari		(4) Jawahar Lai Nehr	u			
Ans.	(4)						
Sol.	Jawahar Lal Nehru advo	cated the policy of abolish	ing princely states in free	India			
43.	Allegory is -						
	(1) Painting of Germania						
	(2) Expressing an abstract idea through a person or thing						
	(3) To portrary nation as female figures						
	(4) Attributes to liberty						
Ans.	Both (2) & (3)						
Sol.	Allegory- when an abstract An allegorical story has tw	t idea (for instance, greed, vo meanings, one literal a	, envy, freedom, liberty) is nd one symbolic.	expressed through a person or a thing.			
	The female form that ws of sought to give the abstarce nation.	chosen to personify the na t idea of the nation a cond	tion did not stand for any crete form. That is, the fer	particular woman in real life; rather it male figure became an allegory of the			
44.	Who said 'In my state the	e mother is the most impo	ortant citizen'?				
	(1) Mahatma Gandhi	(2) Charles Darwin	(3) Herbert Spencer	(4) Hitler			
Ans.	(4)						
Sol.	In 1933 Hitler said : 'In m	ny state the mother is the	most important citizen.'				
45.	Which of the following novels is not written by Premchand?						
	(1) Godan	(2) Rangbhoomi	(3) Anandmath	(4) Sewasadan			
Ans.	(3)						
Sol.	'Anandmath' is the novel	written by Bankim Chano	dra Chatterji				
46 .	Dhangars are an importa	nt pastoral community of	f -				
	(1) Karnataka	(2) Maharashtra	(3) Andhra Pradesh	(4) Gujarat			
Ans.	(2)						
Sol.	Dhangars were an import	ant pastoral community o	of Maharashtra				
			7				

47. The great bath of the Indus Valley Civilization was discovered in -

(1) Harappa	(2) Lothal	(3) Mohanjodaro	(4) Ropar
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Ans. (3)

- **Sol.** The Great Bath is one of the best-known structures among the ruins of the ancient Indus Valley Civilization at Mohenjo-daro in Sindh, Pakistan.
- 48. Choose the correct chronological order for the following -

a. Jallianwala massacre		b. Rowlatt Act	
c. Poona Pact		d. Lucknow Pact	
(1) a, c, b, d	(2) b, a, d, c	(3) c, b, a, d	(4) d, b, a, c

Ans. (4)

Lucknow Pact was held in 1916, Rowlatt Act came in 1919 was followed by Jallianwala Massacre (13.April.1919) and Poona Pact was held in 1932

- 49. Under the inland Emigration Act of 1859 -
 - (1) Plantation workers were not permitted to leave the tea gardens without permission
 - (2) British government banned the entry of workers in the forests.
 - (2) Workers were brought to work after signing an agreement.
 - (4) Workers left the plantations and headed home

Ans. (1)

- **Sol.** Under the Inland Emigration Act of 1859, plantation workers were not permitted to leave the tea gardens without permission, and in fact they were rarely given such permission
- 50. New International Economic Order (NIEO) means a system that would give G-77 countries -
 - (1) Real control over their natural resources
 - (2) Fairer prices for raw materials
 - (3) Better access for their manufactured goods in developed countries
 - (4) All of the above

Ans. (4)

- **Sol.** NIEO, meant a system that would give them real control over their natural resources, more development assistance, fairer prices for raw materials, and better access for their manufactured goods in developed countries markets
- 51. Read the following statements and select the correct option thereafter -

Statement-1

Among its sporting ancestors hockey can count the Scottish game called shinty, the English and Welsh game called bandy and Irish hurling.

Statement-2

Hockey like many other modern games was invented by the colonial officials in India and soon gained popularity.

- (1) Statement-1 is wrong, Statement-2 is true
- (2) Statement-1 is true, Statement-2 is wrong
- (3) Both Statement-1 and Statement-2 are true
- (4) Both Statement-1 and Statement-2 are wrong

Ans. (3)

Sol. Modern hockey evolved from traditional games once current in Britian. Amongst its sporting ancestors, hockey can count the Scottish game called shinty, the English and Welsh game called bandy and Irish hurling.

Hockey, like many other modern games, was introduced into India by the British army in Colonial times. India was represented in the hockey competition of the Olympic Games for the first time in 1928

- 52. In about the 1660's the farmers in many parts of England began growing turnip and clover because -
 - (1) The spread of railways made it easy to transport the crops to the eastern coast for export
 - $\left(2\right)$ These crops had the capacity to increase the nitrogen content of the soil
 - (3) The farmers earned huge profits by selling these crops
 - (4) None of the above

Ans. (2)

- Sol. Findings showed that Turnip and Clover crops had the capacity to increase the nitrogen content of the soil.
- 53. 'Vande matram' was written by -
 - (1) Muhammad Iqbal(2) Bankim Chandra Chattopadhyay(3) Rabindra Nath Tagore(4) Abanindranath Tagore

Ans. (2)

- Sol. In 1870s, Bankim Chandra Chattopadhyay wrote 'Vande Mataram' as a hymn to the motherland
- 54. Consider the following statements and choose the correct option, given thereafter.

During colonial rule Indian peasants were unwilling to grow opium because -

- a. The crop had to be grown on the best lands.
- b. The cultivation of opium was a difficult process.
- c. The price paid by government to the cultivators for the opium they produced was very low.

d. The crop had no demand in the market.

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

Ans. (3)

- **Sol.** For a variety of reasons, cultivators were unwilling to turn their fields over to poppy. First, the crop had to be grown on the best land. Second, many cultivators owned no land. Third, the cultivation of opium was a difficult process. Finally, the price the government paid to the cultivators for the opium they produced was very low.
- 55. Napalm refers to -
 - (1) a defoliant, a plant killer
 - (2) an organic compound used to thicken gasoline for firebombs
 - (3) Phosphorous bomb
 - (4) None of the above

Ans. (2)

- Sol. An organic compound used to thicken gasoline for firebombs
- 56. The layer of atmosphere that provides ideal condition for flying of jet aeroplane is -

(1) Troposphere (2) Stratosphere (3) Ionosphere (4) Exosphere

Ans. (2)

- **Sol.** The layer of the atmosphere which provides ideal flying conditions for large jet aeroplanes is Stratosphere
- **57.** Maldives Islands are situated to the _____ of Lakshadweep Islands.
- (1) South (2) North (3) East (4) West

Ans. (1)

- **Sol.** Maldives islands are situated to the south of Lakshadweep Islands.
- 58. Tropical Evergreen Forests appear green all the year round because -
 - $\left(1\right)$ It has luxuriant vegetation of all kinds trees, shrubs and creepers.
 - $\left(2\right)$ The trees in these forests do not shed their leaves.
 - (3) The forests receive heavy rainfall.
 - (4) There is no definite time for trees to shed their leaves.

Ans. (4)

Sol. Since the region is warm and wet throughout the year, it has a luxuriant vegetation of all kinds - trees, shrubs and creepers giving it a multilayered structure. There is no definite time for trees to shed their leaves. As such, these forests appear green all the year round

59. Which of the following rivers is not a tributary of Ganga?

(1) The Ghaghra (2) The Kosi (3) The Chambal

(4) The Penganga

Ans. (4)

- Sol. Penganga is the tributary of Godavari
- **60.** Match List-I with List-II and select the correct option.

	List-I	List-II	
(a)	Mawsynram	(i)	Tropical Cyclones
(b)	Assam	(ii)	Houses on stilts
(c)	Andhra Pradesh	(iii)	Stalagmite and stalactite caves
(d)	West Bengal	(iv)	Kaal Baisakhi

(1) A-ii, B-iii, C-i, D-iv (2) A-i, B-ii, C-iii, D-iv (3) A-iii, B-ii, C-i, D-iv (4) A-iii, B-iv, C-ii, D-i

Ans. (3)

- **Sol.** Stalagmite and Stalactite caves are found in Mawsynram. House on stilts are found in Assam. Tropical Cyclone affect Andhra Pradesh. Kaal Baisakhi affects West Bengal
- **61.** If a person wants to visit the national parks in Sariska, Corbett and Sunderban, to which one of the following states he need not go in this connection?
 - (1) Rajasthan (2) Kerala (3) West Bengal (4) Uttaranchal

Ans. (2)

- Sol. Sariska is in Rajasthan. Corbet is in Uttaranchal. Sunderban is in West Bengal
- **62.** Which of the following statements is incorrect?

Factors responsible for location of jute mills in the Hugli basin are -

- (1) Proximity of the jute producing areas (2) Port facilities for the export of jute goods
- (3) Heavy demand of jute goods (4) Good network of railways, roadways and waterways

Ans. (3)

- **Sol.** Factors responsible for their location in the Hugli basin are : proximity of the jute producing areas, inexpensive water transport, supported by a good network of railways, roadways and waterway to facilitate movement of raw material to the mills, abundant water for processing raw jute, cheap labour from West Bengal and adjoining states of Bihar, Orissa and Uttar Pradesh. Kolkata as a large urban center provides banking, insurance and port facilities for export of jute goods
- 63. The red soils develop a reddish colour due to
 - (1) Deforestation and overgrazing
 - (2) The presence of Potash and magnesium
 - (3) Diffusion of iron in crystalline and metamorphic rocks
 - (4) Formation from the lava flows

Ans. (3)

- Sol. The red soil develops a reddish colour due to diffusion of iro in crystalline and metamorphic rocks
- **64.** Which one of the following pairs is incorrect?
 - (1) Black Buck Endangered species
 - (2) Blue Sheep Vulnerable species
 - (3) Himalayan Yew Endangered species
 - (4) Mahua Endangered species

Ans. (3)

Sol. Himalayan yew is a part of endangered species

65. The river thai makes Sivasamudram waterfall -

(3) The Narmada (4) The Godavari

Ans. (2)

Sol. The river Kaveri makes the second biggest waterfall in India, known as Sivasamudaram

(2) The Krishna

- 66. Particulate matter in the air can be reduced by -
 - (1) Fitting smoke stacks to factories with electrostatic precipitators
 - (2) Fabric filters, scrubbers and inertial scrubbers
 - (3) Using oil or gas instead of coal
 - (4) All of the above

(1) The Kaveri

Ans. (4)

- **Sol.** Particulate matter in the air can be reduced by fitting smoke stacks to factories with electrostatic precipitators, fabric filters, scrubbers and inertial separators. Smoke can be reduced by using oil or gas instead of coal in factories.
- **67.** Identify the right pairs from the following and choose the right option, given thereafter.

	Place	Sources of energy	
(a)	Nagarcoil	(i)	Nuclear
(b)	Tarapur	(ii)	Hydro electricity
(c)	Damodar Vally	(iii)	Wind
(d)	Madhapur	(iv)	Solar

(1) A-ii, B-i, C-iv, D-iii

(3) A-iv, B-iii, C-ii, D-i

(2) A-iii, B-i, C-ii, D-iv (4) A-iii, B-iv, C-ii, D-i

Ans. (2)

- **Sol.** Nagarcoil is related to wind farms. Tarapur is for Nuclear. Damodar Valley is for Hydro Electricity and Madhapur is for Solar energy.
- **68.** Which of the following Himalayan Peaks are not in India ?

(1) Nanda Devi	(2) Kamet
(3) Namcha Barwa	(4) Gurla Mandhata

Ans. (4)

- **Sol.** Gurla Mandhata is in Nepal. Mt. Everest is also known as Gurla Mandhata in Nepal
- **69.** Which of the following statement about Indian railways is not correct?
 - (1) The Indian Railways is the largest public sector undertaking in the country.
 - (2) The Indian Railways is reorganised into 14 zones.
 - (3) The Indian Railways network runs on multiple gauge operations.
 - (4) The Indian Railways have been a great integrating force for more than 150 years.

Ans. (2)

- Sol. Indian Railways is geographically organized into 17 zones
- **70.** Assertion (A) : Indian farmers should diversify their cropping pattern from cereals to high value crops. Reason (R) : This will increase incomes and reduce environmental degradation simultaneously.
 - (1) A is true and R is false
 - (2) Both A and R are true
 - (3) Both A and R are true but R is not the correct explanation of A.
 - (4) Both A and R are true and R is the correct explanation of A.

Ans. (4)

Sol. Indian farmers should deversify their cropping pattern from cereals to high value crops, it will increase incomes and reduce environmental degradation simultaneously.

- 71. Five permanent members of United Nations Security Council are -
 - (1) United States, Russia, U.K., Germany, China.
 - (2) United States, Russia, U.K., France, China
 - (3) United States, China, U.K., Japan, Russia
 - (4) United States, China, India, Frances, Russia

Ans. (2)

- Sol. Five permanent members: China, France, Russian Federation, the United Kingdom, and the United States
- 72. Right to equality implies -
 - (1) Equal opportunities in matters relating to employment
 - (2) Equal opportunities to achieve whatever one is capable of
 - (3) Abolition of social discrimination
 - (4) All of the above

Ans. (4)

- **Sol.** Right to Equality refers to the equality in the eyes of law, discarding any unfairness on grounds of caste, race, religion, place of birth sex. It also includes equality of prospects in matters of employment, abolition of untouchability and abolition of titles.
- **73.** Which language is spoken next to Hindi in terms of number of people in India?

(1) Bengali	(2) Marathi	(3) Tamil	(4) Telugu
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Ans. (1)
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- Sol. Proportion of Bengali speakers (%) 8.11, Marathi 6.99, Tamil 5.91, Telugu 7.19
- **74.** Which of the following is not a function of the Election Commission in India?
 - (1) Implementing Code of Conduct (2) Reservation of seats
 - (3) Free and fair elections (4) Appointing Chief Electoral Officers

Ans. (2)

- Sol. Reservation of seats is the right of Parliament
- **75.** Consider the following statements on the meaning of communal politics, identify the correct statements from the options given thereafter.
 - Communal politics is based on the belief that -
 - a. One religion is superior to that of others
 - b. People belonging to different religions can not live together happily as equal citizens
 - c. Followers of a particular religion constitute one community
 - d. State power can not be used to establish the domination of one religious group over others

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

Ans. (1)

- **Sol.** Communal Ploitics says that State power should be used to establish the domination of one religious group over others
- 76. In recent years Infant Mortality rate has reduced because of -
 - (1) Protection of children from infection (2) Better mother and child care
 - (3) Increase in the health care facilities (4) All of the above

Ans. (4)

Sol. All of the given reasons has reduced the Infiant Mortality Rate - Protection of children from infection, better mother and child care, increase in the health care facilities

- 77. 'Antyodaya Anna Yojna' scheme was launched for the upliftment of -(1) Industrial workers (2) Farmers (3) Labourers
- Ans. (4)
- Sol. Antyodaya Anna Yojana (AAY) is an Indian government sponsored scheme for ten million of the poorest families. It was launched by NDA government in 25 December 2000. It is on the look out for the 'poorest of the poor' by providing them 35 kilograms of rice and wheat at Rs.3 & Rs.2 per kg respectively.
- **78.** Consider the following statements and identify the correct response from the options given thereafter. Statement-1 - The most serious economic problems of India are poverty and unemployment.

Statement- II - There is a strong link between economic growth and poverty reduction.

- (1) Statement-I is false, Statement-II is true
- (2) Statement-I is true, Statement-II is false
- (3) Both Statement-I and Statement-II are true but Statement-II is not the correct explanation of Statement-I
- (4) Both Statement-I and Statement-II are true and Statement-II is the correct explantation of Statement-I

Ans. (4)

- Sol. Both statements are true and Statement II is the correct explanation of Statement I
- 79. The quality of education in a country does not depend upon -
 - (1) Growth rate (2) Literacy rate
 - (3) Health status (4) Acquisition of skill by people

Ans. (1)

- **Sol.** The quality of education in a country does not depend upon its growth rate
- **80**. Globalisation has led to improvement in living conditions -
 - (1) of all the people
 - (2) of people in the developed countries
 - (3) of workers in the developing countries
 - (4) None of the above
- Ans. (2)
- **Sol.** Globalisation has led to improvement in living conditions of people in the developed countries
- **81.** The factorisation of

2p(a-b) + 3q(5a-5b) + 4r(2b-2a) yields

	(1) $(b-a) (2p + 15q - 8r)$	(2) $(a - b)(2p - 15q - 8r)$
	(3) $(b-a)(2p-15q+8r)$	(4) $(a - b)(2p - 15q + 8r)$
1 .	NA	

So

2 p (a - b) + 3q (5a - 5b) + 4r (2b - 2a) = (a - b) (2p + 15q - 8r)

82 The sides of a triangle are 11 m, 60 m and 61 m. The altitude of the smallest side is -

(1) 11 m (2) 66 m (3) 60 m (4) 50 m

Ans. 3

Sol. $\angle B = 90$



(4) Rural poor

83. If $x = \frac{(\sqrt{3}+1)}{2}$, then the value of $4x^3 + 2x^2 - 8x + 7$ is (1) 8 (2) 10 (3) 15 (4) 14 **Ans. 2**

Sol.
$$x = \frac{\sqrt{3}+1}{2} \Rightarrow 2x = \sqrt{3}+1$$

 $2x - 1 \quad \sqrt{3}$ $4x^{2} - 4x + 1 = 3$ $4x^{2} - 4x - 2 = 0$ $2x^{2} - 2x - 1 = 0$

$$\begin{array}{r} 2x & 3 \\ 2x^2 - 2x - 1 \overline{\smash{\big)}} \overline{4x^3 + 2x^2 - 8x} & 7 \\ \underline{4x^3 - 4x^2 - 2x} \\ 6x^2 - 6x & 7 \\ \underline{6x^2 - 6x - 3} \\ 10 \end{array}$$

- **84.** The volume (in cm³) of the largest right circular cone that can be cut off from a cube of edge 4.2 cm is -
- (1) 9.7 (2) 77.6 (3) 58.2 (4) 19.4 Ans. 4 Sol. $V = \frac{1}{3} \times \frac{22}{7} \times \left(\frac{4.2}{2}\right)^2 \times 4.2$ $= \frac{1}{3} \times \frac{22}{7} \times 2.1 \times 2.1 \times 4.2 = 19.4$

85. In a given fig., if $AD = 7\sqrt{3}$; $\angle B=30^\circ$, $\angle ADC = 90^\circ$, and $\angle C = 60^\circ$, then BC equals to -



(1) 14 m (2) 27 m (3) 29 m (4) 28 mAns. 4 Sol. $\triangle ADC \sim \triangle BAC$ $\frac{AD}{AB} = \frac{AC}{BC}$ $BC = \frac{AC.AB}{AD}$...(i) $In \, \Delta ADC,$

$$\sin 60^{\circ} = \frac{AD}{AC}$$

$$\frac{\sqrt{3}}{2} = \frac{7\sqrt{3}}{AC}$$

$$AC = 14$$

$$In \Delta ADB,$$

$$\sin 30^{\circ} = \frac{AD}{AB}$$

$$\frac{1}{2} = \frac{7\sqrt{3}}{AB}$$

$$AB = 14\sqrt{3}$$
Putting value of AB and AC in (i), we get.
$$BC = \frac{AC.AB}{AD}$$



(1)
$$\frac{\tan \alpha \cdot \tan \beta}{\tan \beta + \tan \alpha}$$
 (2) $\frac{\cot \alpha \cdot \tan \beta}{\cot \beta + \cot \alpha}$ (3) $\frac{\tan \alpha \cdot \tan \beta}{\tan \beta - \tan \alpha}$ (4) $\frac{\cot \alpha \cdot \tan \beta}{\cot \beta - \cot \alpha}$
Ans. 1
Sol. $\tan \alpha = \frac{h}{x}$
 $x = \frac{h}{\tan \alpha}$ (1)
 $\tan \beta = \frac{h}{1-x} \Rightarrow 1-x = \frac{h}{\tan \beta} \Rightarrow 1-\frac{h}{\tan \beta} = x$ (2)
 $\frac{h}{\tan \alpha} = 1-\frac{h}{\tan \beta}$
 $h\left[\frac{1}{\tan \alpha} + \frac{1}{\tan \beta}\right] = 1$
 $h = \frac{\tan \alpha \tan \beta}{\tan \beta + \tan \alpha}$



87. The value of
$$(1 + \cot\theta - \csc\theta) \cdot (1 + \tan\theta + \sec\theta)$$
 is -
 $(1) -2$ (2) 3 (3) 2 (4) 1
Ans. 3
Sol. $(1 + \cot\theta - \csc\theta) (1 + \tan\theta + \sec\theta)$
 $= 1 + \tan\theta + \sec\theta + \cot\theta + 1 + \csc\theta - \csc\theta - \sec\theta - \frac{1}{\sin\theta\cos\theta}$
 $2 + \frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta} - \frac{1}{\sin\theta\cos\theta} = 2$
88. If the pth term of an AP is q and the qth term is p, then the nth term is -
(1) p + q - n (2) p + q + n (3) p - q - n (4) q - p - n
Ans. 1
Sol. $a_p = q = a + (p - 1)d$
 $a_q = p = a + (q - 1)d$
 $a = q + p - 1$
 $\therefore a_n = (q + p - 1) + (n - 1)(-1)$
 $= q + p - n$

1.4

89. The area of the shaded portion where ABCD is a square of side 14 cm is -





90 .	If the distance between	ne distance between the points $(4, p)$ and $(1, 0)$ is 5, then the value of p is -			
	(1) 4	$(2) \pm 4$	(3) –4	(4) 0	
Ans.	2	_			
Sol.	(4, p) 5 (1	1, 0)			
	$9 + (p)^2 = 25$				
	$p = \pm 4$				
91.	The probability of guessi	ing the correct answer to a cer	rtain test question is x/12	. If the probability of not guessing the	
	correct answer is $2/3$, the	en x is equal to -	-		
	(1) 2	(2) 3	(3) 4	(4) 6	
Ans.	3				
	X X	x 2			
Sol.	$P(E) = \frac{1}{12}, P(E') = 1 - \frac{1}{12}$	$\frac{1}{2} = \frac{1}{3}$			
		-			
	$1 - \frac{2}{3} = \frac{x}{12} \Rightarrow \frac{1}{3} = \frac{x}{12} \Rightarrow$	x = 4			
92.	Students of a class are m	nade to stand in rows. If one	student is extra in a row,	there would be two rows less. If one	
	student is less in a row th	here would be three rows mo	ore. The number of stude	ents in the class are -	
	(1) 70	(2) 50	(3) 60	(4) 80	
Ans.	3				
Sol.	Let number of rows eq	ual to x	students per row \rightarrow y	,	
	\therefore Total students = xy				
	(y + 1)(x - 2) = xy				
	x - 2y = 2	(1)			
	(y - 1)(x + 3) = xy				
	3y - x - 3 = 0				
	-x + 3y = 3	(2)			
	from (1) and (2),				
	y = 5				
	$\therefore x = 2 + 10 = 12$				
00	Students = 60		1 / 1 1 /1		
93.	In a flight of 600 Km an	aeroplane was slowed down	1 due to a bad weather. 1 by 30 minutes then th	If the average speed for the trip was e duration of flight is	
	(1) 1 hr	(2) 2 hrs	(3) 3 hrs	(4) 4 hrs	
Ans.	1		(0) 0 1110	(1) 1110	
Sol.	I et speed = x km/hr	time = $v hr$			
	distance = $xv = 600$				
	(1)				
	$(x-200)\left(y+\frac{1}{2}\right) = 60$	00			
	$xy + \frac{1}{2}x - 200y - 100 =$	= 600			
	x - 400 y - 200 = 0				
	$\frac{600}{10} - 400y = 200$				
	$y = 400 u^2 - 200 v + 60$	00 - 0			
	$-400y^2 - 200y + 60$	00 = 0			
	2y + y - 3 = 0 $2y^2 + 3y - 3y - 2 = 0$				
	2y + 3y - 2y - 3 = 0 (y = 1) (2y + 2) 0 \Rightarrow	u = 1 hr			
	$(y-1)(2y+3) = 0 \Longrightarrow y$	y = 1 III			

94. A bag contains five red balls and some blue balls. If the probability of drawing the blue ball is double that of red ball, then the number of blue balls in the bag is -(1) 19(2)20(3)15(4)25Ans. (NA) **Sol.** Given, no. of red balls = 5Let, no. of blue balls = x $P(Blue) = \frac{x}{x+5}$, $P(Red) = \frac{5}{x+5}$ $\frac{x}{x+5} = 2\left(\frac{5}{x+5}\right)$ x = 10**95.** If $x = 2 + 2^{1/3} + 2^{2/3}$ then $x^3 - 6x^2 + 6x = \dots$ (1)2(3)4(4)3(2)1Ans. (1) **Sol.** $x = 2 + 2^{1/3} + 2^{2/3}$ $x - 2 = 2^{1/3} + 2^{2/3}$ On cubing both sides, we get $x^{3} - 8 - 6x (x - 2) = 2 + 2^{2} + 3.2 (x - 2)$ $x^3 - 8 - 6x^2 + 12x = 6 + 6x - 12$ $x^3 - 6x^2 + 6x - 8 = -6$ $x^3 - 6x^2 + 6x = 2$ 96. In a triangle ABC, OB and OC are the bisectors of \angle ABC and \angle ACB respectively. Then \angle BOC is equal to -(1) $90^{\circ} - \angle A/2$ (2) 90° – ∠A (3) 90° + $\angle A/2$ (4) $180^{\circ} - \angle A/2$ Ans. 3 **Sol.** $\angle BOC = 180 - (\angle 1 + \angle 2)$ $= 180 - \frac{1}{2}(\angle B + \angle C)$ $=180-\frac{1}{2}(180^{\circ}-\angle A)$ $= 90^{\circ} + 1/2 \angle A$ **97.** If $\frac{a^{n-1}}{a^n} \frac{b^{n-1}}{b^n}$ is the arithmetic mean between a and b, then the value of n is -(2)1(3) - 1(4)2(1)0Ans. 1 **Sol.** $\frac{a^{n+1}+b^{n+1}}{a^n+b^n} = \frac{a+b}{2}$ $2a^{n}$ $2b^{n}$ a^{n} ba^{n} ab^{n} b^{n} $a^{n-1} - a^n b - ab^n b^{n-1} 0$ $a^n - b^n = 0$ or a - b = 0 $\left(\frac{a}{b}\right)^n = \left(\frac{a}{b}\right)^0$ n = 0

18

98. ABC is a right angled triangle, having the right angle at B, such that BC = 6 cm and AB = 8 cm. Then the radius of incircle is equal to -

Ą

(1) 4 cm (2) 3 cm (3) 2 cm (4) 1 cm

Ans. 3

Sol. AB = 8, BC = 6

OYBX is a square

$$\therefore \operatorname{ar}(ABC) = \frac{1}{2} \times 8 \times 6 = 24$$

$$X \xrightarrow[B]{} Y \xrightarrow[C]{} C$$

ar(ABC) = ar(OAB) + ar(OBC) + ar(OCA)

$$=\frac{1}{2}(8+6+10)r=12r$$

$$\therefore 12 r = 24 \Rightarrow r = 2$$

99. If the altitude of an equilateral triangle is x cm, then the area is equal to -

(1) $x^2 cm^2$ (2) $(\sqrt{3} x^2/2) cm^2$ (3) $(x^2/\sqrt{3}) cm^2$ (4) $(x^2/2) cm^2$

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Ans. 3
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Sol.
$$\frac{\sqrt{3}}{2}a = x$$



a =
$$\frac{2x}{\sqrt{3}}$$
, Area = $\frac{\sqrt{3}}{4} \times \frac{4x^2}{3} = \frac{x^2\sqrt{3}}{3} = \frac{x^2}{\sqrt{3}}$

100. If (x - 4) is a factor of $5x^3 - 7x^2 - ax - 28$ then the value of a is -

Sol. x - 4 is factor of $5x^3 - 7x^2 - ax - 28$ $5(4)^3 - 7(4)^2 - a(4) - 28 = 0$ $5 \times 64 - 7 \times 16 - 4a - 28 = 0$ 320 - 112 - 4a - 28 = 0 320 - 140 = 4a $\Rightarrow a = \frac{180}{4} = 45$