

Test Date	26/09/2025
Test Time	9:00 AM - 12:00 PM
Subject	PGT Physics

Section : **Mental Ability and Reasoning Ability**

Q.1 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans
- ☒ 1. SW - TX
 - ☒ 2. LP - MQ
 - ☒ 3. IM - JO
 - ☒ 4. GK - HL

Q.2 This question is based on the following words.

(Left) FLY NOD FIG FOX (Right)

How many letters are there between the first letter of the second word from the right and the second letter of the first word from the left, in the English alphabetical order?

- Ans
- ☒ 1. 5
 - ☒ 2. 18
 - ☒ 3. 9
 - ☒ 4. 12

Q.3 This question consists of a statement followed by two arguments I and II. Read the statement and the arguments carefully and select the most appropriate answer from the given options.

Statement:

All schools should implement mandatory physical education classes to improve students' overall health and fitness.

Arguments:

I. Academic curriculum should prioritise subjects like mathematics and science over physical education.

II. Physical education classes help reduce the risk of childhood obesity and promote healthy habits.

- Ans
- ☒ 1. I weakens while II strengthens the statement.
 - ☒ 2. Both I and II weaken the statement.
 - ☒ 3. Both I and II strengthen the statement.
 - ☒ 4. II weakens while I strengthens the statement.

Q.4 Which of the given letter-clusters should replace # and % so that the pattern and relationship followed between the letter-cluster pair on the left side of :: is the same as that on the right side of :: ?

: TRP :: FDB : %

- Ans
- ☒ 1. # = RRP , % = HFD
 - ☒ 2. # = RPM , % = GEC
 - ☒ 3. # = RPN , % = HFD
 - ☒ 4. # = RPN , % = HEE

Q.5 This question is based on the five, three-digit numbers given below.

(Left) 771 911 138 123 834 (Right)

(Example- 697 – First digit = 6, second digit = 9 and third digit = 7)

(NOTE - All operations to be done from left to right.)

What will be the resultant, if the third digit of the highest number is added to the first digit of the lowest number?

- Ans**
-  1. 6
 -  2. 5
 -  3. 3
 -  4. 2

Q.6 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

KIL 17 IGJ 22 GEH 27 ECF 32 ?

- Ans**
-  1. CHN 36
 -  2. CBC 37
 -  3. CAD 37
 -  4. CZC 36

Q.7 Dhruv starts from point A and drives 8 km towards the West. He then takes a left turn and drives 6 km. He takes a final left turn and drives 3 km and stops at point B. Jamil starts from point P, which is 9 km to the east of Point A, and drives 7 km towards the East. He then takes a right turn and drives 6 km. He takes a final left turn and drives 11 km and stops at Point Q. What is the shortest distance between Point Q and Point B? (All turns are 90 degree turns only, unless specified.)

- Ans**
-  1. 30 km
 -  2. 33 km
 -  3. 32 km
 -  4. 31 km

Q.8 Select the set in which the numbers are related in the same way as are the numbers of the following sets.
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

(13, 4, 15)

(18, 9, 25)

- Ans**
-  1. (20, 11, 15)
 -  2. (17, 26, 59)
 -  3. (15, 6, 19)
 -  4. (12, 3, 15)

Q.9 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

All crows are lamps.

All crows are peacocks.

All onions are peacocks.

Conclusions:

(I) All onions are lamps.

(II) Some peacocks are lamps.

- Ans**
-  1. Both conclusions (I) and (II) follow
 -  2. Neither conclusion (I) nor (II) follows
 -  3. Only conclusion (II) follows
 -  4. Only conclusion (I) follows

Q.10 Below are given two sets of numbers. In each set of numbers, certain mathematical operation(s) on the first number results in the second number. Similarly, certain mathematical operation(s) on the second number results in the third number and so on. Which of the given options follows the same set of operations as in the given sets? (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

4 – 8 – 16 – 21 ; 3 – 6 – 12 – 17

- Ans
-  1. 2 – 4 – 8 – 12
 -  2. 6 – 12 – 24 – 29
 -  3. 5 – 10 – 30 – 35
 -  4. 1 – 2 – 4 – 14

Q.11 If 'A' stands for '+', 'B' stands for '–', 'C' stands for '÷' and 'D' stands for '×', what will come in place of the question mark (?) in the following equation?

14 D 2 A 56 B 26 C 13 = ?

- Ans
-  1. 47
 -  2. 102
 -  3. 82
 -  4. 107

Q.12 In a certain code language,
A ÷ B means 'A is the father of B',
A ¥ B means 'A is the wife of B',
A + B means 'A is the brother of B', and
A = B means 'A is the daughter of B'.

Based on the above, which of the following means that K is the brother's wife of S?

- Ans
-  1. K ¥ I + L = O ÷ S
 -  2. K ¥ I ÷ L + O = S
 -  3. K ¥ I = L + O ÷ S
 -  4. K ¥ I = L ÷ O + S

Q.13 In a certain code language,
'took some hits' is coded as 'zo iq qy',
'took all place' is coded as 'ca xn zo', and
'some place there' is coded as 'iq rk xn'.
(All the codes are two-letter codes only.)

What is the code for 'hits all'?

- Ans
-  1. iq xn
 -  2. ca zo
 -  3. qy rk
 -  4. ca qy

Q.14 In the following series, only one letter-cluster is incorrect. Select the INCORRECT letter-cluster.

UDK VFJ WHI XJH YLG LYH

- Ans
-  1. LYH
 -  2. XJH
 -  3. YLG
 -  4. WHI

Q.15 Each of P, Q, R, S, T, U, and V has an exam on a different day of a week, starting from Monday and ending on Sunday of the same week.
U has an exam on Friday. Only two people have an exam between U and R. Q has an exam immediately before V and S has an exam immediately after T. Only two people have an exam between P and V.
How many people have an exam between P and T?

- Ans**
-  1. 2
 -  2. 4
 -  3. 3
 -  4. 1

Q.16 Eight people are sitting in two parallel rows containing 4 people each, in such a way that there is equal distance between adjacent persons.
In row 1 – H, A, R and D are seated and all of them are facing south.
In row 2 – K, L, M and N are seated and all of them are facing north.
Thus, each person faces another person from the other row.

Only R sits to the left of H. Only N sits to the left of K. Only one person sits between K and M. Only one person sits between R and D. Which of the following represents both people facing each other?

- Ans**
-  1. D and M
 -  2. R and M
 -  3. A and L
 -  4. H and N

Q.17 What should come in place of the question mark (?) in the given series?

29, 32, 37, 44, 53, ?

- Ans**
-  1. 64
 -  2. 63
 -  3. 65
 -  4. 62

Q.18 Each of U, V, W, X, P, Q, and R has an exam on a different day of a week, starting from Monday and ending on Sunday of the same week.
Only three people have exam between W and U. U has exam on the last day of the week.
Only one person has exam between Q and P. V has exam immediately the day before R.
X doesn't have exam on Friday.
How many people have exam after X?

- Ans**
-  1. One
 -  2. Five
 -  3. Three
 -  4. Six

Q.19 What will come in the place of the question mark (?) in the following equation, if '+' and '-' are interchanged and '×' and '÷' are interchanged?

$$7 \div 5 + 18 \times 6 - 21 = ? + 4$$

- Ans**
-  1. 53
 -  2. 65
 -  3. 57
 -  4. 61

Q.20 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
-  1. GI - KO
 -  2. HJ - FH
 -  3. NP - LN
 -  4. LN - JL

Section : **General Awareness**

Q.1 Who among the following foreign travellers of the Mughal period stated that both Agra and Fatehpur Sikri were bigger cities than London?

- Ans**
- ☒ 1. Ralph Fitch
 - ☐ 2. Francois Bernier
 - ☐ 3. Francisco Pelsaert
 - ☐ 4. Anthony Monserrate

Q.2 Which country announced the closure of its consulate in Shenyang in December 2024?

- Ans**
- ☐ 1. Canada
 - ☒ 2. Australia
 - ☐ 3. The United Kingdom
 - ☐ 4. The United States of America

Q.3 Who moved the main resolution on non-cooperation in the annual session of the Congress in Nagpur in 1920?

- Ans**
- ☐ 1. Subhash C Bose
 - ☒ 2. C R Das
 - ☐ 3. Rajendra Prasad
 - ☐ 4. Jawaharlal Nehru

Q.4 Which is the largest (highest capacity) nuclear plant in India?

- Ans**
- ☒ 1. Kudankulam
 - ☐ 2. Mundra
 - ☐ 3. Vindhyachal
 - ☐ 4. Muppandal

Q.5 In 2025, which of the following institutes collaborated to launch personalised and real-time climate advisory services for farmers by leveraging Artificial Intelligence (AI) and Machine Learning (ML)?

- Ans**
- ☐ 1. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and G. B. Pant University of Agriculture and Technology
 - ☐ 2. The Indian Institute of Tropical Meteorology (IITM) and India Meteorological Department (IMD)
 - ☐ 3. The International Livestock Research Institute (ILRI) and the Center of Excellence in AI for Agriculture (IIT Ropar)
 - ☒ 4. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the Indian Council of Agricultural Research (ICAR)

Q.6 Which of the following cities is home to the famous Sun Temple, a UNESCO World Heritage Site?

- Ans**
- ☐ 1. Jaipur
 - ☒ 2. Konark
 - ☐ 3. Agra
 - ☐ 4. Hampi

Q.7 Which Article of the Indian Constitution states that 'this Constitution may be called the Constitution of India'?

- Ans**
- ☐ 1. Article 441
 - ☐ 2. Article 1
 - ☐ 3. Article 1 B
 - ☒ 4. Article 393

Q.8 The Gandamak treaty was signed in 1879 between which of the following parties?

- Ans**
- ☒ 1. The British and Yaqub Khan
 - ☐ 2. The British and Sher Ali
 - ☐ 3. The British and Abdurrahman
 - ☐ 4. The British and Habbullah

Q.9 Which of the following acidic functional groups is present in picric acid?

- Ans**
- ☒ 1. hydroxyl (-OH)
 - ☐ 2. carboxylic acid (-COOH)
 - ☐ 3. phosphoric acid (-PO₄H₂)
 - ☐ 4. sulfonic acid (-SO₃H)

Q.10 What is India's rank in the Environmental Performance Index (EPI) 2024, released by the Yale Center for Environmental Law and Policy?

- Ans**
- ☐ 1. 146
 - ☐ 2. 156
 - ☒ 3. 176
 - ☐ 4. 166

Q.11 In July 2025, which of the following states launched the Mukh Mantri Sehat Yojna to provide cashless medical treatment worth ₹10 lakh to the residents of the state?

- Ans**
- ☐ 1. Chhattisgarh
 - ☐ 2. Sikkim
 - ☐ 3. Assam
 - ☒ 4. Punjab

Q.12 Which sector is the backbone of the Indian economy?

- Ans**
- ☐ 1. Information Technology
 - ☒ 2. Agriculture
 - ☐ 3. Manufacturing
 - ☐ 4. Services

Q.13 Which of the following term defines an association between national security and the availability of natural resources for energy consumption?

- Ans**
- ☐ 1. Foreign Security
 - ☒ 2. Energy Security
 - ☐ 3. Mineral Security
 - ☐ 4. Forest Security

Q.14 Which of the following statements regarding jurisdiction of Subordinate Courts in India is INCORRECT?

- Ans**
- ☒ 1. The organisational structure and jurisdiction of these courts are laid down by the Union Government and they are the same in every state.
 - ☐ 2. There are three tiers of civil and criminal courts below the High Court.
 - ☐ 3. The district judge is the highest judicial authority in the district.
 - ☐ 4. The district judge exercises both judicial and administrative powers.

Q.15 Which of the following law states that 'two systems in thermal equilibrium with a third system separately are in thermal equilibrium with each other'?

- Ans**
- ☐ 1. Fourier's law
 - ☒ 2. The zeroth law of thermodynamics
 - ☐ 3. The first law of thermodynamics
 - ☐ 4. Joule's First law

Q.16 In which of the following years was the Family Courts Act introduced in India to promote conciliation in family and marriage-related disputes?

- Ans**
- ☐ 1. 1989
 - ☐ 2. 1975
 - ☒ 3. 1984
 - ☐ 4. 1992

Q.17 Who won the 2025 United Nations Population Award for her work in promoting gender equality and preventing sex-selective abortions?

- Ans**
- ☒ 1. Kiran Bedi
 - ☒ 2. Varsha Deshpande
 - ☒ 3. Mira Kulkarni
 - ☒ 4. Aruna Roy

Q.18 Which of the following statements related to Fundamental Rights as per the Constitution of India is/are correct?

Article 17 abolishes untouchability and forbids its practice in any form.
The concept of equality before law is taken from the British Constitution.
Article 15 prohibits discrimination against any citizen on grounds of religion, race, caste, sex, or place of birth.

- Ans**
- ☒ 1. Only 2 and 3
 - ☒ 2. All 1, 2 and 3
 - ☒ 3. Only 3
 - ☒ 4. Only 1 and 2

Q.19 Which among the following is NOT a characteristic of peninsular rivers of India?

- Ans**
- ☒ 1. The Peninsular drainage system is older than the Himalayan.
 - ☒ 2. Most of the major peninsular rivers except Narmada and Tapi flow from west to east.
 - ☒ 3. Most of the major peninsular rivers except Narmada and Tapi flow from east to west.
 - ☒ 4. The Mahanadi rises near Sihawa in Raipur district of Chhattisgarh.

Q.20 _____ means fixing the maximum size of land which could be owned by an individual, with the purpose of reducing the concentration of land ownership in a few hands.

- Ans**
- ☒ 1. Unification of land
 - ☒ 2. Land ceiling
 - ☒ 3. Land redistribution
 - ☒ 4. Land consolidation

Section : Numerical Aptitude and Data Interpretation

Q.1 Two engines of trains that are 50 km apart start towards each other at speeds of 41 km/hr and 19 km/hr respectively. After how much time will they meet each other? (Assume the length of the engine is negligible)

- Ans**
- ☒ 1. 50 minutes
 - ☒ 2. 49 minutes
 - ☒ 3. 55 minutes
 - ☒ 4. 46 minutes

Q.2 During a sale, Raghav bought a notebook marked for ₹25 at 24% discount and a pen marked for ₹100 at 85% discount. How much (in ₹) did he save due to this sale?

- Ans**
- ☒ 1. 91
 - ☒ 2. 88
 - ☒ 3. 92
 - ☒ 4. 89

Q.3 If the radius of the base of a right circular cylinder is decreased by 20% and its height is increased by 129%, then what is the percentage increase (rounded off to the nearest integer) in its volume?

- Ans**
- ☒ 1. 77%
 - ☒ 2. 36%
 - ☒ 3. 53%
 - ☒ 4. 47%

Q.4 A started a business with a capital of ₹4,33,000. After 4 months, B joined him with a certain amount of capital. At the end of a year of A's starting the business, the profit was shared in the ratio 5 : 2. How much (in ₹) did B invest?

- Ans**
- ☒ 1. 2,59,800
 - ☐ 2. 2,64,100
 - ☐ 3. 2,59,300
 - ☐ 4. 2,74,800

Q.5 Two pipes can fill a tank in 39 hours and 42 hours, respectively. The time (in hours) required to fill the tank, when both pipes are opened simultaneously, is:

- Ans**
- ☐ 1. $\frac{181}{12}$
 - ☐ 2. $\frac{183}{10}$
 - ☐ 3. $\frac{184}{11}$
 - ☒ 4. $\frac{182}{9}$

Q.6 Namit's average earning per month in the first three months of a year was ₹74,808. In April, his earning was 50% more than the average earning in the first three months. If his average earning per month for the whole year is ₹90,191, then what will be Namit's average earning (in ₹) per month from May to December?

- Ans**
- ☐ 1. 93,204
 - ☐ 2. 93,209
 - ☒ 3. 93,207
 - ☐ 4. 93,202

Q.7 Virat invested ₹39,375 at 16% p.a. for 1 year at compound interest, compounded half-yearly. The amount received by him is:

- Ans**
- ☒ 1. ₹45,927
 - ☐ 2. ₹45,031
 - ☐ 3. ₹46,133
 - ☐ 4. ₹46,883

Q.8 If A's salary is 73% more than B's salary, then by what percentage is B's salary less than A's salary (rounded off to two decimal places)?

- Ans**
- ☐ 1. 45.32%
 - ☐ 2. 46.08%
 - ☐ 3. 41.26%
 - ☒ 4. 42.20%

Q.9 The average of the marks of 18 students in a class is 36. If the marks of each student are doubled, find the new average.

- Ans**
- ☒ 1. 72
 - ☐ 2. 36
 - ☐ 3. 18
 - ☐ 4. 39

Q.10 The number of non-square numbers between 285^2 and 286^2 is:

- Ans**
- ☐ 1. 561
 - ☒ 2. 570
 - ☐ 3. 562
 - ☐ 4. 569

Q.11 The volume (in m³) of a cube, each of whose edge is 26 m, is:

- Ans
- ☐ 1. 17668
 - ☐ 2. 17631
 - ☐ 3. 17717
 - ☒ 4. 17576

Q.12 The ratio of the number of girls to the number of boys participating in sports events in a school is 1 : 5. If the number of girls is 261, determine the number of boys participating in these sports.

- Ans
- ☐ 1. 1335
 - ☐ 2. 1325
 - ☐ 3. 1280
 - ☒ 4. 1305

Q.13 Simplify: $\frac{1}{\frac{7}{8} + \frac{4}{6}} \div \frac{9}{19}$

- Ans
- ☐ 1. $\frac{141}{101}$
 - ☐ 2. $\frac{152}{101}$
 - ☒ 3. $\frac{152}{111}$
 - ☐ 4. $\frac{141}{111}$

Q.14 Akshay purchased 10 kg of rice at the rate of ₹38 per kg and 38 kg of rice at ₹45 per kg. He sold the whole mixture at the rate of ₹42.5 per kg. Find his loss (in ₹).

- Ans
- ☐ 1. 45
 - ☐ 2. 58
 - ☐ 3. 55
 - ☒ 4. 50

Q.15 Kalpana and Sudha got 714 and 840 marks, respectively, in the same examination. If Kalpana scored 51% marks, then what is the percentage of marks scored by Sudha?

- Ans
- ☐ 1. 59%
 - ☒ 2. 60%
 - ☐ 3. 58%
 - ☐ 4. 61%

Q.16 A can complete a piece of work in 25 days and B can complete the same work in 15 days. If they work on alternate days, starting with B on the first day, then in how many days will the work be finished?

- Ans
- ☐ 1. 18
 - ☒ 2. $18\frac{3}{5}$
 - ☐ 3. 19
 - ☐ 4. $19\frac{3}{5}$

Q.17 On a certain sum, the simple interest for 12 years at 10% per annum is ₹450. Find the sum (in ₹).

- Ans
- ☐ 1. 378
 - ☐ 2. 372
 - ☐ 3. 374
 - ☒ 4. 375

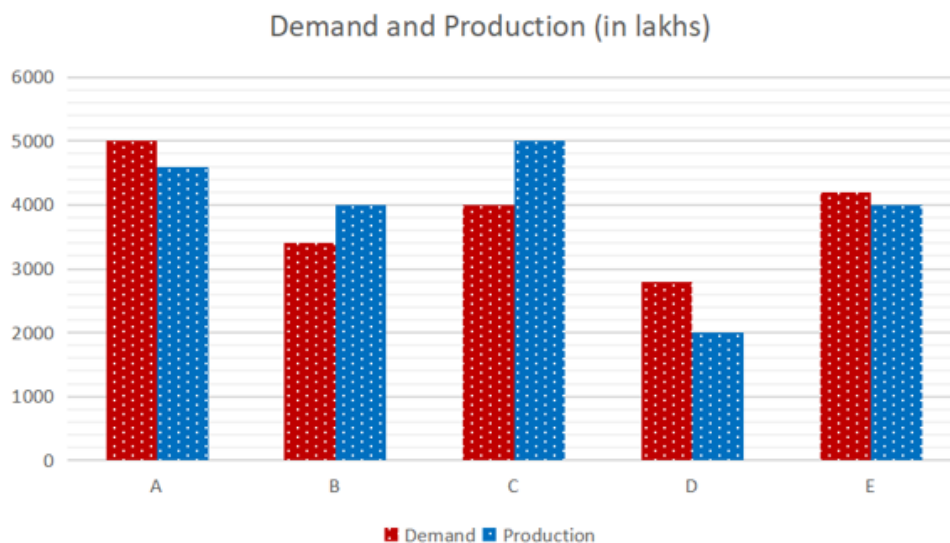
Q.18 One-third of a journey is covered at a speed of 73 km/hr, the next one-third of the journey is covered at a speed of 37 km/hr, and the remaining journey is covered at a speed of 8 km/hr. The average speed (in km/hr, rounded off to 1 decimal place) for the entire journey is:

- Ans
- ☒ 1. 18.1
 - ☐ 2. 20.2
 - ☐ 3. 16.2
 - ☐ 4. 19.6

Q.19 A shopkeeper allows a discount of 40% on his articles and still makes a profit of 20%. What would be the cost price for the shopkeeper, for an article whose marked price is ₹9,600?

- Ans
- ☐ 1. ₹5,600
 - ☐ 2. ₹4,600
 - ☒ 3. ₹4,800
 - ☐ 4. ₹5,000

Q.20 The following graph represents the demand and production of certain products for five companies. Study the given graph and answer the question that follows.



Find the ratio of companies with more demand than production to those with more production than demand.

- Ans
- ☐ 1. 2 : 3
 - ☒ 2. 3 : 2
 - ☐ 3. 2 : 5
 - ☐ 4. 5 : 2

Section : English Language and Comprehension

Q.1 Select the most appropriate synonym for the underlined word based on the context of the conversation.

A: The methodology section was rigorous, adhering to every protocol.

B: That's why the findings are so well respected.

- Ans
- ☒ 1. Meticulous
 - ☐ 2. Intuitive
 - ☐ 3. Lax
 - ☐ 4. Superficial

Q.2 Select the most appropriate option to fill in the blank.

The workers have managed to finish the construction ahead of time, _____?

- Ans**
- ☒ 1. didn't they
 - ☒ 2. haven't they
 - ☒ 3. have they
 - ☒ 4. won't they

Q.3 Select the most appropriate word that can substitute the underlined word in the given passage.

The philanthropist's munificence inspired others to give. She donated millions to charitable causes, changing countless lives. Her selflessness left a lasting legacy.

- Ans**
- ☒ 1. slowness
 - ☒ 2. frugality
 - ☒ 3. parsimony
 - ☒ 4. benevolence

Q.4 Select the most appropriate option to fill in the blank.

She hadn't prepared the presentation slides in advance, _____?

- Ans**
- ☒ 1. had she
 - ☒ 2. didn't she
 - ☒ 3. hadn't she
 - ☒ 4. does she

Q.5 Select the most appropriate verb to fill in the blank.

The research team _____ a new approach to data analysis that could revolutionise the way large datasets are processed in the field of artificial intelligence.

- Ans**
- ☒ 1. contrived
 - ☒ 2. neglected
 - ☒ 3. initiated
 - ☒ 4. mitigated

Q.6 Select the most appropriate preposition to fill in the blank.

The discussion will focus _____ the impact of climate change on coastal communities.

- Ans**
- ☒ 1. on
 - ☒ 2. at
 - ☒ 3. with
 - ☒ 4. in

Q.7 Select the most appropriate option to fill in the blank.

Ritika _____ Raju were colleagues for a long time.

- Ans**
- ☒ 1. or
 - ☒ 2. yet
 - ☒ 3. and
 - ☒ 4. but

Q.8 Read the paragraph given below and identify the INCORRECTLY spelt word.

In an attempt to improve productivity, the company implemented several strategik changes, but their impact was far less significant than originally anticipated. While initial responses were optimistic, long-term performance metrics showed minimal improvement. Some employees even reported confusion and reduced morale due to the abrupt transition.

- Ans**
- ☒ 1. strategik
 - ☒ 2. significant
 - ☒ 3. implemented
 - ☒ 4. productivity

Q.9 Select the most appropriate option to substitute the underlined segment in the given sentence.

Her breathtaking performance left an unforgettable and lasting mark on everyone in attendance, captivating the audience so completely that her exceptional talent would be cherished and remembered for many years to come, with the impact of her artistry resonating well beyond the evening and ensuring her legacy in their minds.

- Ans**
- ☐ 1. inedible
 - ☐ 2. indivisible
 - ☐ 3. infeasible
 - ☒ 4. indelible

Q.10 Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the correct order to form a meaningful and coherent paragraph.

1. The importance of learning multiple languages cannot be overstated.
2. Research has shown that multilingualism enhances cognitive abilities.
3. Additionally, it opens doors to global opportunities and cultural exchange.
4. For these reasons, schools are increasingly emphasising language learning.

- Ans**
- ☐ 1. 1, 3, 2, 4
 - ☐ 2. 1, 2, 4, 3
 - ☐ 3. 2, 1, 4, 3
 - ☒ 4. 1, 2, 3, 4

Q.11 Select the most appropriate idiom that can substitute the underlined segment in the given sentence.

The new employee felt very nervous and awkward on his first day.

- Ans**
- ☐ 1. like breaking the ice
 - ☐ 2. like hitting the sack
 - ☒ 3. like a fish out of water
 - ☐ 4. like spilling the beans

Q.12 Sentences of a paragraph are given below in jumbled order. Arrange the sentences in the correct order to form a meaningful and coherent paragraph.

- A. Its empire was in decline, and the roles of men and women were starting to change.
- B. Britain was going through a time of change in the early twentieth century.
- C. This heroic image of Scott remained until a biography that destroyed the myth was published in the 1970s.
- D. Scott became a national hero who once again made Britain feel 'great'.

- Ans**
- ☐ 1. DABC
 - ☐ 2. ABCD
 - ☒ 3. BADC
 - ☐ 4. CDBA

Q.13 Select the most appropriate ANTONYM for the underlined word based on the context of the conversation.

- A: His narrative is tedious—monotonous and painfully drawn out.
B: Even compelling ideas got lost in the delivery.

- Ans**
- ☐ 1. Objective
 - ☐ 2. Credible
 - ☒ 3. Engaging
 - ☐ 4. Eloquent

Q.14 Replace the underlined segment in the paragraph with the correct idiom from the options given below.

The students were asked to work in a team, but they were apprehensive in the beginning. They were of the view that individual scores would suffer, and the group leader would get the credit for the success. But soon they realised that through teamwork, they could learn from each other, grow stronger together, and that every difficult or unpleasant situation has some advantage. Though each one had to adjust with others in the team they could work by collaborating.

- Ans**
- ☒ 1. every cloud has a silver lining
 - ☐ 2. luck of the draw
 - ☐ 3. born under a bad sign
 - ☐ 4. down on one's luck

Q.15 Identify and rectify the INCORRECTLY spelt word in the given paragraph.

Although the athlete suffered a severe injury, her perseverance, mental strength, and structured rehabilitation plan helped her recover and return to competition with even greater tenacity and commitment.

- Ans**
- ☐ 1. perseverance
 - ☐ 2. committment
 - ☒ 3. rehabilitation
 - ☐ 4. tenasity

Comprehension:

Read the given passage carefully and answer the questions that follow.

The Industrial Revolution marked a turning point in human history, bringing unparalleled advancements in technology and productivity. Societies transitioned from agrarian economies to industrial powerhouses, leading to significant improvements in living standards. However, this progress came at a cost. Urbanisation led to overcrowded cities and unsanitary living conditions, while the reliance on fossil fuels accelerated environmental degradation. The dichotomy of progress persists today, as technological innovations continue to enhance human life while posing ethical and environmental challenges.

For instance, the advent of artificial intelligence has revolutionised industries, enabling automation and reducing labour costs. Yet, it has also raised concerns about job displacement and privacy violations. Similarly, medical advancements have eradicated diseases, but they often remain inaccessible to marginalised populations due to economic disparities.

This paradoxical relationship between progress and its consequences urges societies to reflect on the nature of development. Progress cannot merely be measured in terms of GDP or technological prowess; it must also account for sustainability and inclusivity.

As the world advances further into the 21st Century, striking a balance between innovation and ethical responsibility becomes imperative. Only by adopting a holistic approach to progress can humanity ensure a future that is both prosperous and equitable.

SubQuestion No : 16

Q.16 What is the most appropriate title for the passage?

- Ans**
- ☐ 1. The Industrial Revolution: A Turning Point
 - ☐ 2. Technological Innovation and Ethics
 - ☐ 3. Sustainability in the 21st Century
 - ☒ 4. The Paradox of Progress

Comprehension:

Read the given passage carefully and answer the questions that follow.

The Industrial Revolution marked a turning point in human history, bringing unparalleled advancements in technology and productivity. Societies transitioned from agrarian economies to industrial powerhouses, leading to significant improvements in living standards. However, this progress came at a cost. Urbanisation led to overcrowded cities and unsanitary living conditions, while the reliance on fossil fuels accelerated environmental degradation. The dichotomy of progress persists today, as technological innovations continue to enhance human life while posing ethical and environmental challenges.

For instance, the advent of artificial intelligence has revolutionised industries, enabling automation and reducing labour costs. Yet, it has also raised concerns about job displacement and privacy violations. Similarly, medical advancements have eradicated diseases, but they often remain inaccessible to marginalised populations due to economic disparities.

This paradoxical relationship between progress and its consequences urges societies to reflect on the nature of development. Progress cannot merely be measured in terms of GDP or technological prowess; it must also account for sustainability and inclusivity. As the world advances further into the 21st C entury, striking a balance between innovation and ethical responsibility becomes imperative. Only by adopting a holistic approach to progress can humanity ensure a future that is both prosperous and equitable.

SubQuestion No : 17

Q.17 What is the central theme of the passage?

- Ans**
-  1. The role of artificial intelligence in industries
 -  2. The importance of economic development
 -  3. Urbanisation and its challenges
 -  4. The dual impact of progress on humanity

Comprehension:

Read the given passage carefully and answer the questions that follow.

The Industrial Revolution marked a turning point in human history, bringing unparalleled advancements in technology and productivity. Societies transitioned from agrarian economies to industrial powerhouses, leading to significant improvements in living standards. However, this progress came at a cost. Urbanisation led to overcrowded cities and unsanitary living conditions, while the reliance on fossil fuels accelerated environmental degradation. The dichotomy of progress persists today, as technological innovations continue to enhance human life while posing ethical and environmental challenges.

For instance, the advent of artificial intelligence has revolutionised industries, enabling automation and reducing labour costs. Yet, it has also raised concerns about job displacement and privacy violations. Similarly, medical advancements have eradicated diseases, but they often remain inaccessible to marginalised populations due to economic disparities.

This paradoxical relationship between progress and its consequences urges societies to reflect on the nature of development. Progress cannot merely be measured in terms of GDP or technological prowess; it must also account for sustainability and inclusivity. As the world advances further into the 21st C entury, striking a balance between innovation and ethical responsibility becomes imperative. Only by adopting a holistic approach to progress can humanity ensure a future that is both prosperous and equitable.

SubQuestion No : 18

Q.18 Which fact is mentioned in the passage?

- Ans**
-  1. The Industrial Revolution improved living standards.
 -  2. Artificial intelligence has no ethical concerns.
 -  3. Economic disparities have been eliminated.
 -  4. GDP is the sole measure of progress.

Comprehension:

Read the given passage carefully and answer the questions that follow.

The Industrial Revolution marked a turning point in human history, bringing unparalleled advancements in technology and productivity. Societies transitioned from agrarian economies to industrial powerhouses, leading to significant improvements in living standards. However, this progress came at a cost. Urbanisation led to overcrowded cities and unsanitary living conditions, while the reliance on fossil fuels accelerated environmental degradation. The dichotomy of progress persists today, as technological innovations continue to enhance human life while posing ethical and environmental challenges.

For instance, the advent of artificial intelligence has revolutionised industries, enabling automation and reducing labour costs. Yet, it has also raised concerns about job displacement and privacy violations. Similarly, medical advancements have eradicated diseases, but they often remain inaccessible to marginalised populations due to economic disparities.

This paradoxical relationship between progress and its consequences urges societies to reflect on the nature of development. Progress cannot merely be measured in terms of GDP or technological prowess; it must also account for sustainability and inclusivity.

As the world advances further into the 21st Century, striking a balance between innovation and ethical responsibility becomes imperative. Only by adopting a holistic approach to progress can humanity ensure a future that is both prosperous and equitable.

SubQuestion No : 19

Q.19 What inference can be drawn from the passage?

- Ans
-  1. Artificial intelligence is the only driver of future progress.
 -  2. Technological advancements rarely pose challenges.
 -  3. Urbanisation is entirely beneficial for societies.
 -  4. Ethical considerations are essential for sustainable progress.

Comprehension:

Read the given passage carefully and answer the questions that follow.

The Industrial Revolution marked a turning point in human history, bringing unparalleled advancements in technology and productivity. Societies transitioned from agrarian economies to industrial powerhouses, leading to significant improvements in living standards. However, this progress came at a cost. Urbanisation led to overcrowded cities and unsanitary living conditions, while the reliance on fossil fuels accelerated environmental degradation. The dichotomy of progress persists today, as technological innovations continue to enhance human life while posing ethical and environmental challenges.

For instance, the advent of artificial intelligence has revolutionised industries, enabling automation and reducing labour costs. Yet, it has also raised concerns about job displacement and privacy violations. Similarly, medical advancements have eradicated diseases, but they often remain inaccessible to marginalised populations due to economic disparities.

This paradoxical relationship between progress and its consequences urges societies to reflect on the nature of development. Progress cannot merely be measured in terms of GDP or technological prowess; it must also account for sustainability and inclusivity.

As the world advances further into the 21st Century, striking a balance between innovation and ethical responsibility becomes imperative. Only by adopting a holistic approach to progress can humanity ensure a future that is both prosperous and equitable.

SubQuestion No : 20

Q.20 What is the tone of the passage?

- Ans
-  1. Optimistic
 -  2. Sarcastic
 -  3. Neutral
 -  4. Cautionary

Section : Hindi Language and Comprehension

Q.1 वर्तनी की दृष्टि से दिए गए वाक्य के किस अंश में त्रुटि है?
सन् 1893 में विवेकानंद विश्वधर्म संसद में सम्मिलित होने के लिए शिकागो गये।

- Ans
-  1. लिए शिकागो गये।
 -  2. सम्मिलित होने के
 -  3. सन् 1893 में विवेकानंद
 -  4. विश्वधर्म संसद में

Q.2 वाक्य-विन्यास की दृष्टि से दिये गये वाक्य का शुद्ध रूप पहचानें—
कृष्णविषयक काव्य का प्राचुर्य बारहवीं शताब्दी के बाद मिलता है देखने को ।

- Ans
- ☒ 1. कृष्णविषयक काव्य का प्राचुर्य शताब्दी बारहवीं के बाद देखने को मिलता है ।
 - ☒ 2. काव्य का कृष्णविषयक प्राचुर्य बारहवीं शताब्दी के बाद देखने को मिलता है ।
 - ☒ 3. प्राचुर्य कृष्णविषयक काव्य का बारहवीं शताब्दी के बाद देखने को मिलता है ।
 - ☒ 4. कृष्णविषयक काव्य का प्राचुर्य बारहवीं शताब्दी के बाद देखने को मिलता है ।

Q.3 सर्वोचित क्रिया शब्द से दिए गए वाक्य का रिक्त स्थान पूर्ण करें--
सगुण भक्ति में लीलावतार को आराध्य स्वीकार है ।

- Ans
- ☒ 1. जाना गया
 - ☒ 2. माना गया
 - ☒ 3. किया गया
 - ☒ 4. लिया गया

Q.4 वाक्य-विन्यास की दृष्टि से दिये गये वाक्य का शुद्ध रूप पहचानें—

मध्ययुग में कृष्णभक्ति का प्रचार ब्रजमण्डल में बड़े उत्साह के हुआ साथ ।

- Ans
- ☒ 1. मध्ययुग में कृष्णभक्ति का प्रचार ब्रजमण्डल में बड़े उत्साह के साथ हुआ ।
 - ☒ 2. प्रचार मध्ययुग में कृष्णभक्ति का ब्रजमण्डल में बड़े उत्साह के साथ हुआ ।
 - ☒ 3. मध्ययुग में कृष्णभक्ति का प्रचार बड़े उत्साह के साथ हुआ ब्रजमण्डल में ।
 - ☒ 4. मध्ययुग में प्रचार ब्रजमण्डल में बड़े उत्साह के साथ हुआ कृष्णभक्ति का ।

Q.5 'समुद्र मंथन' मुहावरे का अर्थ निम्न में से है--

- Ans
- ☒ 1. कठिन परिश्रम
 - ☒ 2. देवताओं का कार्य
 - ☒ 3. धार्मिक आयोजन
 - ☒ 4. मुश्किल कार्य

Q.6 सर्वोचित क्रिया शब्द से दिए गए वाक्य का रिक्त स्थान पूर्ण करें--
किसी बच्चे को ईश्वर की अराधना करने से कम नहीं है ।

- Ans
- ☒ 1. रुलाना
 - ☒ 2. बहलाना
 - ☒ 3. हँसाना
 - ☒ 4. हँसवाना

Q.7 दिए गए वाक्यांश के लिए निम्न में से एक शब्द होगा—
'एक बार कही बात को दोहराते रहना'

- Ans
- ☒ 1. पिष्टोदक
 - ☒ 2. अनुवाद
 - ☒ 3. पिष्टक
 - ☒ 4. पिष्टपेषण

Q.8 निम्न में से कौन-सा मुहावरा अपने अर्थ से असुमेलित है?

- Ans
- ☒ 1. हाथ मारना -- सफाई से चोरी
 - ☒ 2. हाथ धोना -- सफाई करना
 - ☒ 3. हवा हो जाना -- भाग जाना
 - ☒ 4. हाथ उठाना -- मारने को तैयार होना

Q.9 दिए गए वाक्यांश के लिए निम्न में से एक शब्द होगा—
'जिसका निषेध किया गया है'

- Ans
- ☒ 1. निष्कृत
 - ☒ 2. निषिद्ध
 - ☒ 3. निर्वीज
 - ☒ 4. निशीथ

Q.10 सर्वोचित क्रिया शब्द से दिए गए वाक्य का रिक्त स्थान पूर्ण करें--
बड़ों से उनका अनुभव जानना जीने का आधार ।

- Ans
- ☒ 1. बनता है
 - ☐ 2. सकता है
 - ☐ 3. सिखाता है
 - ☐ 4. दिखाता है

Q.11 सर्वोचित क्रिया-विशेषण शब्द से दिए गए वाक्य का रिक्त स्थान पूर्ण करें--
..... निकल चलो वर्ना गाड़ी छूट जायेगी ।

- Ans
- ☐ 1. स्वतः
 - ☐ 2. प्रत्युत
 - ☐ 3. अलबत्ता
 - ☒ 4. फटाफट

Q.12 निम्नलिखित वाक्य को उचित कारक द्वारा पूर्ण करें ।
नारियल ___ पानी निकाल कर गिलास___ डाल दो ।

- Ans
- ☐ 1. ने,की
 - ☒ 2. से,में
 - ☐ 3. का,से
 - ☐ 4. द्वारा,का

Q.13 निम्नलिखित वाक्य में रेखांकित शब्द का विलोम बताएँ ।
पुराने समय में राज्य का राजा ही सारे निर्णय लेता था ।

- Ans
- ☐ 1. नेता
 - ☐ 2. व्यग्र
 - ☒ 3. रंक
 - ☐ 4. अंक

Q.14 दिए गए वाक्य में रेखांकित शब्द का विलोम बताएँ ।
हिमालय को देखो, कितना विराट है ।

- Ans
- ☐ 1. विशाल
 - ☐ 2. विस्तृत
 - ☒ 3. क्षुद्र
 - ☐ 4. सुनसान

Q.15 निम्नलिखित वाक्य में वर्तनी की त्रुटियाँ पहचानें और शुद्ध वाक्य लिखें ।
ये बढई कम पैसों मे बाहुत मूशकत करवाता हैं ।

- Ans
- ☐ 1. यह बड़ई कम पैसों में बहुत मशक्कात करवाता हैं ।
 - ☒ 2. यह बड़ई कम पैसों में बहुत मशक्कत करवाता है ।
 - ☐ 3. येह बाड़ई कम पैसो में बोहोत मोशकत कारवाता है ।
 - ☐ 4. यह बड़ाई कम पेसो में बहुत मशक्कत करावाता हैं ।

Comprehension:

दिए गए गद्यांश के आधार पर निम्नांकित प्रश्नों के उत्तर दीजिए--

स्वच्छंदतावाद की प्रमुख विशेषताओं में हैं -- वन का महत्व, प्रकृति-पर्यवेक्षण, प्रेम का स्वच्छंद भंगिमाओं में चित्रण और बैलैड या कथा-गीत का प्रयोग, और काव्यभाषा के रूप में खड़ी बोली की स्वीकृति । श्रीधर पाठक के प्रकृति-काव्य में यदि जीवन से लगाव की ओर संकेत है तो वहीं ऐहिकता का भाव भी फूटता दिखाई देता है । प्रकृति को यहाँ रीतिकाल जैसी उद्दीपन की भूमिका से मुक्त किया गया । उत्तर रीतिकाल के घटिया काव्य में नारी को महज भोग्य उपकरण मान लिया गया था । छायावाद ने नारी को इस निष्क्रिय- शिथिल रूप में चित्रित करने का विरोध किया । कुछ वैसे ही स्वच्छंदतावाद ने अग्रणी स्थिति में प्रकृति को निष्क्रिय सजावट के तौर पर नहीं देखा, उसे अपने में जीवन का एक सजीव पक्ष मान कर चित्रित किया । श्रीधर पाठक उन विरल रचनाकारों में हैं, जिनकी प्रशंसा में हिंदी साहित्य के सबसे बड़े संपादक महावीरप्रसाद द्विवेदी तथा सबसे बड़े आलोचक रामचंद्र शुक्ल ने कविताएँ लिखी थीं । श्रीधर पाठक के बाद स्वच्छंदतावादी धारा में मुकुटधर पांडेय, लोचनप्रसाद पांडेय तथा रूपनारायण पांडेय काव्य-रचना कर रहे थे । रामनरेश त्रिपाठी में जहाँ स्वच्छंदतावाद का सहज उल्लास है, वहीं भाषा का अनुशासन भी पूरा है । 'मिलन', 'पथिक' तथा 'स्वप्न' शीर्षक कवि के तीन खंड-काव्य छायावाद-पूर्व कविता की उल्लेखनीय उपलब्धियाँ हैं । वे मूलतः कवि हैं, ग्राम-गीतों के संकलन का आरंभिक कार्य उन्होंने किया, 'कविता-कौमुदी' नाम से कई जिल्लों में हिंदी, उर्दू, बंगला आदि काव्य-धाराओं का आलोचनात्मक सामग्री के साथ संकलन-संपादन किया ।

SubQuestion No : 16

Q.16 निम्न में से स्वच्छंदतावाद की विशेषता कौन-सी नहीं है?

- Ans
- ☐ 1. प्रकृति पर्यवेक्षण
 - ☒ 2. खड़ी बोली हिंदी की अस्वीकृति
 - ☐ 3. कथा-गीत का प्रयोग
 - ☐ 4. प्रेम का उन्मुक्त चित्रण

Comprehension:

दिए गए गद्यांश के आधार पर निम्नांकित प्रश्नों के उत्तर दीजिए--

स्वच्छंदतावाद की प्रमुख विशेषताओं में हैं -- वन का महत्व, प्रकृति-पर्यवेक्षण, प्रेम का स्वच्छंद भंगिमाओं में चित्रण और बैलैड या कथा-गीत का प्रयोग, और काव्यभाषा के रूप में खड़ी बोली की स्वीकृति । श्रीधर पाठक के प्रकृति-काव्य में यदि जीवन से लगाव की ओर संकेत है तो वहीं ऐहिकता का भाव भी फूटता दिखाई देता है । प्रकृति को यहाँ रीतिकाल जैसी उद्दीपन की भूमिका से मुक्त किया गया । उत्तर रीतिकाल के घटिया काव्य में नारी को महज भोग्य उपकरण मान लिया गया था । छायावाद ने नारी को इस निष्क्रिय- शिथिल रूप में चित्रित करने का विरोध किया । कुछ वैसे ही स्वच्छंदतावाद ने अग्रणी स्थिति में प्रकृति को निष्क्रिय सजावट के तौर पर नहीं देखा, उसे अपने में जीवन का एक सजीव पक्ष मान कर चित्रित किया । श्रीधर पाठक उन विरल रचनाकारों में हैं, जिनकी प्रशंसा में हिंदी साहित्य के सबसे बड़े संपादक महावीरप्रसाद द्विवेदी तथा सबसे बड़े आलोचक रामचंद्र शुक्ल ने कविताएँ लिखी थीं । श्रीधर पाठक के बाद स्वच्छंदतावादी धारा में मुकुटधर पांडेय, लोचनप्रसाद पांडेय तथा रूपनारायण पांडेय काव्य-रचना कर रहे थे । रामनरेश त्रिपाठी में जहाँ स्वच्छंदतावाद का सहज उल्लास है, वहीं भाषा का अनुशासन भी पूरा है । 'मिलन', 'पथिक' तथा 'स्वप्न' शीर्षक कवि के तीन खंड-काव्य छायावाद-पूर्व कविता की उल्लेखनीय उपलब्धियाँ हैं । वे मूलतः कवि हैं, ग्राम-गीतों के संकलन का आरंभिक कार्य उन्होंने किया, 'कविता-कौमुदी' नाम से कई जिल्लों में हिंदी, उर्दू, बंगला आदि काव्य-धाराओं का आलोचनात्मक सामग्री के साथ संकलन-संपादन किया ।

SubQuestion No : 17

Q.17 'कविता कौमुदी' निम्न में से किसकी कृति है--

- Ans
- ☒ 1. लोचनप्रसाद पांडेय
 - ☒ 2. रूपनारायण पांडेय
 - ☒ 3. मुकुटधर पांडेय
 - ☒ 4. रामनरेश त्रिपाठी

Comprehension:

दिए गए गद्यांश के आधार पर निम्नांकित प्रश्नों के उत्तर दीजिए--

स्वच्छंदतावाद की प्रमुख विशेषताओं में हैं -- वन का महत्व, प्रकृति-पर्यवेक्षण, प्रेम का स्वच्छंद भंगिमाओं में चित्रण और बैलैड या कथा-गीत का प्रयोग, और काव्यभाषा के रूप में खड़ी बोली की स्वीकृति । श्रीधर पाठक के प्रकृति-काव्य में यदि जीवन से लगाव की ओर संकेत है तो वहीं ऐहिकता का भाव भी फूटता दिखाई देता है । प्रकृति को यहाँ रीतिकाल जैसी उद्दीपन की भूमिका से मुक्त किया गया । उत्तर रीतिकाल के घटिया काव्य में नारी को महज भोग्य उपकरण मान लिया गया था । छायावाद ने नारी को इस निष्क्रिय- शिथिल रूप में चित्रित करने का विरोध किया । कुछ वैसे ही स्वच्छंदतावाद ने अग्रणी स्थिति में प्रकृति को निष्क्रिय सजावट के तौर पर नहीं देखा, उसे अपने में जीवन का एक सजीव पक्ष मान कर चित्रित किया । श्रीधर पाठक उन विरल रचनाकारों में हैं, जिनकी प्रशंसा में हिंदी साहित्य के सबसे बड़े संपादक महावीरप्रसाद द्विवेदी तथा सबसे बड़े आलोचक रामचंद्र शुक्ल ने कविताएँ लिखी थीं । श्रीधर पाठक के बाद स्वच्छंदतावादी धारा में मुकुटधर पांडेय, लोचनप्रसाद पांडेय तथा रूपनारायण पांडेय काव्य-रचना कर रहे थे । रामनरेश त्रिपाठी में जहाँ स्वच्छंदतावाद का सहज उल्लास है, वहीं भाषा का अनुशासन भी पूरा है । 'मिलन', 'पथिक' तथा 'स्वप्न' शीर्षक कवि के तीन खंड-काव्य छायावाद-पूर्व कविता की उल्लेखनीय उपलब्धियाँ हैं । वे मूलतः कवि हैं, ग्राम-गीतों के संकलन का आरंभिक कार्य उन्होंने किया, 'कविता-कौमुदी' नाम से कई जिल्लों में हिंदी, उर्दू, बंगला आदि काव्य-धाराओं का आलोचनात्मक सामग्री के साथ संकलन-संपादन किया ।

SubQuestion No : 18

Q.18 स्वच्छंदतावाद के प्रकृति काव्य की विशेषता निम्न में से कौन-सी नहीं है?

- Ans
- ☒ 1. जीवन से लगाव की ओर संकेत
 - ☒ 2. ऐहिकता के भाव का प्रकटन
 - ☒ 3. वनों के महत्व का आकलन
 - ☒ 4. प्रकृति का उद्दीपक रूप में वर्णन

Comprehension:

दिए गए गद्यांश के आधार पर निम्नांकित प्रश्नों के उत्तर दीजिए--

स्वच्छंदतावाद की प्रमुख विशेषताओं में हैं -- वन का महत्व, प्रकृति-पर्यवेक्षण, प्रेम का स्वच्छंद भंगिमाओं में चित्रण और बैलैड या कथा-गीत का प्रयोग, और काव्यभाषा के रूप में खड़ी बोली की स्वीकृति । श्रीधर पाठक के प्रकृति-काव्य में यदि जीवन से लगाव की ओर संकेत है तो वहीं ऐहिकता का भाव भी फूटता दिखाई देता है । प्रकृति को यहाँ रीतिकाल जैसी उद्दीपन की भूमिका से मुक्त किया गया । उत्तर रीतिकाल के घटिया काव्य में नारी को महज भोग्य उपकरण मान लिया गया था । छायावाद ने नारी को इस निष्क्रिय- शिथिल रूप में चित्रित करने का विरोध किया । कुछ वैसे ही स्वच्छंदतावाद ने अग्रणी स्थिति में प्रकृति को निष्क्रिय सजावट के तौर पर नहीं देखा, उसे अपने में जीवन का एक सजीव पक्ष मान कर चित्रित किया । श्रीधर पाठक उन विरल रचनाकारों में हैं, जिनकी प्रशंसा में हिंदी साहित्य के सबसे बड़े संपादक महावीरप्रसाद द्विवेदी तथा सबसे बड़े आलोचक रामचंद्र शुक्ल ने कविताएँ लिखी थीं । श्रीधर पाठक के बाद स्वच्छंदतावादी धारा में मुकुटधर पांडेय, लोचनप्रसाद पांडेय तथा रूपनारायण पांडेय काव्य-रचना कर रहे थे । रामनरेश त्रिपाठी में जहाँ स्वच्छंदतावाद का सहज उल्लास है, वहीं भाषा का अनुशासन भी पूरा है । 'मिलन', 'पथिक' तथा 'स्वप्न' शीर्षक कवि के तीन खंड-काव्य छायावाद-पूर्व कविता की उल्लेखनीय उपलब्धियाँ हैं । वे मूलतः कवि हैं, ग्राम-गीतों के संकलन का आरंभिक कार्य उन्होंने किया, 'कविता-कौमुदी' नाम से कई जिल्लों में हिंदी, उर्दू, बंगला आदि काव्य-धाराओं का आलोचनात्मक सामग्री के साथ संकलन-संपादन किया ।

SubQuestion No : 19

Q.19 रामचंद्र शुक्ल तथा महावीर प्रसाद द्विवेदी ने निम्न में से किस साहित्यकार की प्रशंसा की है?

- Ans
- ☒ 1. रामनरेश त्रिपाठी
 - ☒ 2. मुकुटधर पांडेय
 - ☒ 3. कबीर
 - ☒ 4. श्रीधर पाठक

Comprehension:

दिए गए गद्यांश के आधार पर निम्नांकित प्रश्नों के उत्तर दीजिए--

स्वच्छंदतावाद की प्रमुख विशेषताओं में हैं -- वन का महत्व, प्रकृति-पर्यवेक्षण, प्रेम का स्वच्छंद भंगिमाओं में चित्रण और बैलैड या कथा-गीत का प्रयोग, और काव्यभाषा के रूप में खड़ी बोली की स्वीकृति । श्रीधर पाठक के प्रकृति-काव्य में यदि जीवन से लगाव की ओर संकेत है तो वहीं ऐहिकता का भाव भी फूटता दिखाई देता है । प्रकृति को यहाँ रीतिकाल जैसी उद्दीपन की भूमिका से मुक्त किया गया । उत्तर रीतिकाल के घटिया काव्य में नारी को महज भोग्य उपकरण मान लिया गया था । छायावाद ने नारी को इस निष्क्रिय- शिथिल रूप में चित्रित करने का विरोध किया । कुछ वैसे ही स्वच्छंदतावाद ने अग्रणी स्थिति में प्रकृति को निष्क्रिय सजावट के तौर पर नहीं देखा, उसे अपने में जीवन का एक सजीव पक्ष मान कर चित्रित किया । श्रीधर पाठक उन विरल रचनाकारों में हैं, जिनकी प्रशंसा में हिंदी साहित्य के सबसे बड़े संपादक महावीरप्रसाद द्विवेदी तथा सबसे बड़े आलोचक रामचंद्र शुक्ल ने कविताएँ लिखी थीं । श्रीधर पाठक के बाद स्वच्छंदतावादी धारा में मुकुटधर पांडेय, लोचनप्रसाद पांडेय तथा रूपनारायण पांडेय काव्य-रचना कर रहे थे । रामनरेश त्रिपाठी में जहाँ स्वच्छंदतावाद का सहज उल्लास है, वहीं भाषा का अनुशासन भी पूरा है । 'मिलन', 'पथिक' तथा 'स्वप्न' शीर्षक कवि के तीन खंड-काव्य छायावाद-पूर्व कविता की उल्लेखनीय उपलब्धियाँ हैं । वे मूलतः कवि हैं, ग्राम-गीतों के संकलन का आरंभिक कार्य उन्होंने किया, 'कविता-कौमुदी' नाम से कई जिलों में हिंदी, उर्दू, बंगला आदि काव्य-धाराओं का आलोचनात्मक सामग्री के साथ संकलन-संपादन किया ।

SubQuestion No : 20

Q.20 गद्यांश के लिए उपयुक्त शीर्षक चुनें--

- Ans
- ☒ 1. स्वच्छंदतावादी काव्यधारा
 - ☐ 2. स्वच्छंदतावाद और रीतिकाल
 - ☐ 3. स्वच्छंदतावाद और छायावाद
 - ☐ 4. स्वच्छंदतावाद और आलोचना

Section : Discipline1

Q.1 Two cells with EMFs of 2 V and 6 V, internal resistances of 2 Ω and 4 Ω , respectively, are connected in parallel. What is the equivalent EMF (E_{eq}) of this combination?

- Ans
- ☐ 1. 4.0 V
 - ☐ 2. 0.33 V
 - ☒ 3. 3.33 V
 - ☐ 4. 1.5 V

Q.2 If two resistors of different resistances are connected in parallel, which of the following statements is true?

- Ans
- ☒ 1. The equivalent resistance is smaller than either of the two resistances.
 - ☐ 2. The equivalent resistance cannot be determined.
 - ☐ 3. The equivalent resistance is zero.
 - ☐ 4. The equivalent resistance is greater than either of the two resistances.

Q.3 Ohm's law in terms of resistivity (ρ) is expressed as _____.

(Here, E = electric field, j = current density, V = potential difference, I = current in the conductor)

- Ans
- ☒ 1. $E = \rho j$
 - ☐ 2. $I = \rho V$
 - ☐ 3. $V = \rho I$
 - ☐ 4. $j = \rho E$

Q.4 In AC circuits, when phasors are represented using sine functions, the instantaneous values of voltage and current are given by the _____.

- Ans
- ☐ 1. magnitude
 - ☒ 2. projections on vertical axis
 - ☐ 3. projections on horizontal axis
 - ☐ 4. tangent to circle

Q.5 If two cells of emf 2 V and 4 V and of internal resistances $1\ \Omega$ and $2\ \Omega$, respectively, are connected in parallel, then the equivalent emf (in V) is given by:

- Ans
- ☐ 1. $\frac{2}{3}$
 - ☐ 2. $\frac{1}{3}$
 - ☐ 3. $\frac{4}{3}$
 - ☒ 4. $\frac{8}{3}$

Q.6 Which of the following is the application of gamma rays?

- Ans
- ☐ 1. Used in LASIK eye surgery
 - ☐ 2. Used in lamps to kill germs in water purifiers
 - ☐ 3. Used as a diagnostic tool in medicine
 - ☒ 4. Used in medicine to destroy cancer cells

Q.7 Which of the following is the correct reason for using the 'laminated' cores in transformers?

- Ans
- ☐ 1. To reduce the resistance of the windings
 - ☐ 2. To reduce the Hysteresis loss
 - ☒ 3. To reduce the Eddy current loss
 - ☐ 4. To reduce the flux leakage

Q.8 In which of the following cases is the wattless (non-power-consuming) current in an AC circuit the greatest?

- Ans
- ☐ 1. When a resistor and inductor are connected in parallel
 - ☐ 2. When the circuit consists of a resistor alone
 - ☐ 3. When a resistor and capacitor are connected in series
 - ☒ 4. When the circuit contains only a capacitor or only an inductor

Q.9 Under which condition is Ohm's law applicable?

- Ans
- ☐ 1. Electrolytes undergoing chemical change
 - ☐ 2. All types of conductors in every condition
 - ☐ 3. Semiconductors operating at elevated temperatures
 - ☒ 4. Metallic conductors when temperature remains constant

Q.10 In a metallic conductor at constant temperature, the electric current is proportional to _____.

- Ans
- ☐ 1. resistance of the conductor
 - ☒ 2. voltage across the conductor
 - ☐ 3. reciprocal of applied voltage
 - ☐ 4. square of resistance

Q.11 A carbon resistor is marked with the colour bands: Red, Black, Brown and Gold. What is the resistance value (with tolerance) of this resistor?

- Ans
- ☐ 1. $20\ \Omega \pm 20\%$
 - ☒ 2. $200\ \Omega \pm 5\%$
 - ☐ 3. $20\ \Omega \pm 5\%$
 - ☐ 4. $200\ \Omega \pm 20\%$

Q.12 In a series LCR circuit driven at resonance, the voltages across the inductor and capacitor are _____.

- Ans
- ☐ 1. different in magnitude and in same phase
 - ☐ 2. equal in magnitude and in same phase
 - ☐ 3. both zero
 - ☒ 4. equal in magnitude and in opposite phase

Q.13 Microwaves are absorbed most effectively by:

- Ans
- ☒ 1. water molecules
 - ☐ 2. glass strongly
 - ☐ 3. metals completely
 - ☐ 4. vacuum only

Q.14 Which of the following statements correctly describes the total energy stored in the Ideal LC circuit?

- Ans
- ☐ 1. It constantly decreases due to the oscillation.
 - ☐ 2. It remains constant and is always stored in the magnetic field of the inductor.
 - ☐ 3. It remains constant and is always stored in the electric field of the capacitor.
 - ☒ 4. It remains constant and oscillates between the capacitor's electric field and the inductor's magnetic field.

Q.15 Under which condition is the emf of a cell equal to the potential difference between its two electrodes?

- Ans
- ☐ 1. When the cell has an internal resistance
 - ☒ 2. When the cell is connected in an open circuit
 - ☐ 3. The emf of a cell is always equal to the potential difference between the two electrodes
 - ☐ 4. When the cell is connected in a closed circuit

Q.16 The electrical conductivity (σ) of a metal depends on the number of electrons per unit volume (n) and the mean collision time (τ). Which of the following correctly represents this dependence?

- Ans
- ☐ 1. $\sigma \propto 1/n$ and $\sigma \propto \tau$
 - ☐ 2. $\sigma \propto 1/n$ and $\sigma \propto 1/\tau$
 - ☐ 3. $\sigma \propto n$ and $\sigma \propto 1/\tau$
 - ☒ 4. $\sigma \propto n$ and $\sigma \propto \tau$

Q.17 How much electric current flows through a conductor if 24 coulombs of charge are transferred in 3 seconds?

- Ans
- ☐ 1. 48 A
 - ☐ 2. 72 A
 - ☐ 3. 12 A
 - ☒ 4. 8 A

Q.18 On what factors does the EMF of a cell depend?

- Ans
- ☐ 1. The size of the cell
 - ☒ 2. Both the nature of electrodes and electrolyte
 - ☐ 3. The nature of electrodes only
 - ☐ 4. The nature of electrolyte only

Q.19 According to Faraday's law of electromagnetic induction, in which of the following situations will no EMF be induced in a coil?

- Ans
- ☐ 1. When the magnet is pushed into the coil
 - ☐ 2. When the magnet is moving toward the coil
 - ☐ 3. When the magnet is moving away from the coil
 - ☒ 4. When the magnet is held stationary near the coil

Q.20 If two non-identical cells with EMFs E_1 , E_2 and internal resistances r_1 , r_2 are connected in parallel, what is the expression for equivalent EMF (E_{eq})?

- Ans
- ☐ 1. $E_{eq} = (E_1 + E_2)/2$
 - ☐ 2. $E_{eq} = (E_1 r_1 + E_2 r_2) / (r_1 + r_2)$
 - ☒ 3. $E_{eq} = (E_1 r_2 + E_2 r_1) / (r_1 + r_2)$
 - ☐ 4. $E_{eq} = E_1/r_1 + E_2/r_2$

Q.1 In an ideal transformer, the number of turns in the secondary coil is three times the turns in the primary coil. If the voltage applied across the primary is 80 V, what will be the voltage across the secondary coil?

- Ans**
- ☐ 1. $\frac{80}{3}$ V
 - ☒ 2. 240 V
 - ☐ 3. 80 V
 - ☐ 4. 100 V

Q.2 In the input characteristic curve of a common-emitter transistor, what happens to the base current as the base-emitter voltage is steadily increased?

- Ans**
- ☐ 1. It becomes negligible regardless of the applied voltage.
 - ☐ 2. It stays nearly unchanged.
 - ☒ 3. It rises rapidly in a nonlinear (exponential) manner.
 - ☐ 4. It drops sharply toward zero.

Q.3 In the electromagnetic spectrum, visible light falls in between which of the following types of radiation?

- Ans**
- ☒ 1. Between infrared radiation and ultraviolet radiation
 - ☐ 2. Between radio waves and infrared radiation
 - ☐ 3. Between ultraviolet radiation and gamma rays
 - ☐ 4. Between microwaves and radio waves

Q.4 Which of the following regions of the output characteristics of a CE transistor is used for amplification?

- Ans**
- ☐ 1. Saturation region
 - ☐ 2. Cut-off region
 - ☒ 3. Active region
 - ☐ 4. Breakdown region

Q.5 When a P-N junction is formed, which current balances the diffusion current?

- Ans**
- ☐ 1. Recombination current
 - ☐ 2. Hole current
 - ☒ 3. Drift current
 - ☐ 4. Electron current

Q.6 Which of the following does NOT affect the magnitude of motional EMF?

- Ans**
- ☐ 1. Length of the conductor and velocity of motion
 - ☐ 2. Strength of the magnetic field
 - ☐ 3. Length of the conductor only
 - ☒ 4. Resistance of the conductor

Q.7 The minimum speed required for an object to escape from the earth is given by (symbols have their usual meanings):

- Ans**
- ☐ 1. $\sqrt{\frac{2GM_E}{R_E^2}}$
 - ☐ 2. $\sqrt{\frac{2GM_E^2}{R_E}}$
 - ☒ 3. $\sqrt{\frac{2GM_E}{R_E}}$
 - ☐ 4. $\sqrt{\frac{GM_E}{R_E}}$

Q.8 Which of the following series circuits produces oscillations and gives maximum current at angular frequency ω ? (Given: L = Inductor, C = Capacitor, R = Resistor)

- Ans
- ☒ 1. LC; $\omega = 1/\sqrt{LC}$
 - ☐ 2. RC; $\omega = 1/\sqrt{RC}$
 - ☐ 3. LR; $\omega = 1/\sqrt{LR}$
 - ☐ 4. LCR; $\omega = \sqrt{LC}$

Q.9 In the electromagnetic spectrum, radio waves are most commonly generated by which of the following processes?

- Ans
- ☐ 1. Emissions from ionised atmospheric gases
 - ☐ 2. Random motion of atoms due to heat
 - ☒ 3. Alternating currents in tuned electrical circuits
 - ☐ 4. Fusion reactions occurring inside stars

Q.10 Consider a satellite in a circular orbit of a distance $(R_E + h)$ from the centre of the earth, where R_E = radius of the earth. If m is the mass of the satellite and M is the mass of the earth, then which of the following is the correct formula for orbital speed (V) of the satellite?

- Ans
- ☐ 1. $V = \sqrt{\frac{GmM}{(R_E + h)}}$
 - ☐ 2. $V = \sqrt{\frac{2GM}{(R_E + h)}}$
 - ☐ 3. $V = \sqrt{\frac{Gm}{(R_E + h)}}$
 - ☒ 4. $V = \sqrt{\frac{GM}{(R_E + h)}}$

Q.11 The magnetic energy (V_B) stored in an inductance coil when a current (I) is flowing through it is _____.

- Ans
- ☐ 1. $V_B \propto 1/I$
 - ☐ 2. $V_B \propto 1/I^2$
 - ☐ 3. $V_B \propto I$
 - ☒ 4. $V_B \propto I^2$

Q.12 Which of the following technologies typically makes use of microwave radiation?

- Ans
- ☐ 1. Capturing images with visible-light cameras
 - ☐ 2. Germicidal treatment using ultraviolet light
 - ☒ 3. Wireless communication in cellular networks
 - ☐ 4. X-ray imaging for medical diagnostics

Q.13 The formula for self-inductance of a long solenoid of length l , cross-sectional area A , and number of turns N is _____.

- Ans
- ☐ 1. $L = \mu_0 N^2 A l$
 - ☐ 2. $L = \frac{\mu_0 N A}{l^2}$
 - ☐ 3. $L = \frac{\mu_0 A}{N l}$
 - ☒ 4. $L = \frac{\mu_0 N^2 A}{l}$

Q.14 Which of the following best describes the process of transistor action?

- Ans**
- ☒ 1. Transfer of current from emitter region to collector region
 - ☐ 2. Amplification caused by movement of minority carriers
 - ☐ 3. Complete prevention of current through both junctions
 - ☐ 4. Conversion of direct current into alternating current

Q.15 To create a p-type extrinsic semiconductor from germanium, which of the following elements should be added as a dopant?

- Ans**
- ☐ 1. Arsenic
 - ☒ 2. Gallium
 - ☐ 3. Nitrogen
 - ☐ 4. Bismuth

Q.16 From Maxwell's equations, which of the following established the relationship between the magnitude of the electric and magnetic fields in an electromagnetic wave?

- Ans**
- ☐ 1. $B_0 = E_0 c^2$
 - ☐ 2. $E_0 = B_0 / c$
 - ☐ 3. $B_0 = E_0 / c^2$
 - ☒ 4. $B_0 = E_0 / c$

Q.17 Which of the following best distinguishes gamma rays from X-rays?

- Ans**
- ☐ 1. Both have the same origin but different frequencies.
 - ☒ 2. Gamma rays originate from nuclear transitions, whereas X-rays originate from electronic transitions.
 - ☐ 3. X-rays have shorter wavelengths than gamma rays.
 - ☐ 4. X-rays are always more penetrating than gamma rays.

Q.18 The current in a coil increases uniformly from 2 A to 6 A over a time span of 1 second. If the coil has a self-inductance of 3 H, what will be the magnitude of the induced EMF during this interval?

- Ans**
- ☐ 1. 22 V
 - ☐ 2. 11 V
 - ☐ 3. 8 V
 - ☒ 4. 12 V

Q.19 In the circuit diagram of a full-wave bridge rectifier, the load resistor is connected across:

- Ans**
- ☐ 1. transformer primary coil
 - ☐ 2. AC input supply
 - ☒ 3. the diagonal of the diode bridge
 - ☐ 4. one diode

Q.20 Which of the following colours of visible rays is scattered most in the atmosphere?

- Ans**
- ☐ 1. Indigo
 - ☐ 2. Green
 - ☒ 3. Blue
 - ☐ 4. Red

Section : Discipline3

Q.1 In an oscillator circuit, what is the primary function performed by the transistor?

- Ans**
- ☐ 1. Maintains a constant output voltage
 - ☒ 2. Boosts the signal to maintain continuous oscillation
 - ☐ 3. Converts AC to DC
 - ☐ 4. Removes unwanted frequency components

Q.2 The electric dipole moment is defined as:

- Ans**
- ☒ 1. product of charge and distance between charges
 - ☐ 2. charge multiplied by square of the separation
 - ☐ 3. charge divided by distance between charges
 - ☐ 4. ratio of potential energy to electric field

Q.3 Which of the following is NOT a valid state of a transistor working as a switch with base-biased in CE configuration?

- Ans**
- ☒ 1. Breakdown state
 - ☐ 2. Saturation state
 - ☐ 3. Cut off state
 - ☐ 4. Active state

Q.4 A planet has mass M and radius R. If both mass and radius are doubled, then the escape speed will:

- Ans**
- ☒ 1. remain the same
 - ☐ 2. decrease by a factor of 2
 - ☐ 3. increase by a factor of $(2)^{1/2}$
 - ☐ 4. increase by a factor of 2

Q.5 If the reverse bias voltage exceeds the breakdown limit of a diode, then:

- Ans**
- ☐ 1. the diode stops working as a transistor
 - ☐ 2. the diode works as an amplifier
 - ☒ 3. a very large reverse current flows
 - ☐ 4. the diode blocks all current

Q.6 If Earth suddenly shrinks to half its present radius without changing its mass, the value of 'g' on its surface will be:

- Ans**
- ☒ 1. four times the present value
 - ☐ 2. half the present value
 - ☐ 3. same as before
 - ☐ 4. twice the present value

Q.7 A 2 microfarad capacitor is connected across a 100-volt battery. How much energy is stored in the capacitor?

- Ans**
- ☒ 1. 0.01 joules
 - ☐ 2. 0.02 joules
 - ☐ 3. 0.2 joules
 - ☐ 4. 0.1 joules

Q.8 The direction of the electric field due to a positive point charge is:

- Ans**
- ☐ 1. radially inward
 - ☐ 2. tangential to the equipotential surface
 - ☐ 3. circular around the charge
 - ☒ 4. radially outward

Q.9 Which of the following is correct for electric field lines?

- Ans**
- ☒ 1. Normal to the equipotential surface at every point
 - ☐ 2. Parallel to the equipotential surface at every point
 - ☐ 3. They form closed loops
 - ☐ 4. They start at negative charges and end at positive charges

Q.10 The electric field at distance r from an infinite line charge with linear charge density (λ) is _____.

Ans

☐ 1. $E = \frac{\lambda}{\pi\epsilon_0 r^2}$

☒ 2. $E = \frac{\lambda}{2\pi r\epsilon_0}$

☐ 3. $E = \frac{\lambda}{2\pi\epsilon_0 r^2}$

☐ 4. $E = \frac{\lambda}{4\pi r\epsilon_0}$

Q.11 The point on the I-V characteristic where the zener diode enters breakdown region is called _____.

Ans

☐ 1. cut-in voltage

☐ 2. reverse saturation voltage

☒ 3. knee point voltage

☐ 4. drift voltage

Q.12 If the electric field in a region is uniform, the variation of electric potential with distance is _____.

Ans

☐ 1. quadratic

☐ 2. exponential

☒ 3. linear

☐ 4. constant

Q.13 Which of the following statements is true regarding the behaviour of a dielectric, in the absence of any external electric field?

Ans

☒ 1. Net dipole moment of the dielectric is zero

☐ 2. The dielectric is polarised

☐ 3. Net dipole moment of the dielectric is positive

☐ 4. Net dipole moment of the dielectric is negative

Q.14 What will be the value of capacitance of a parallel plate capacitor, having values $A = 1 \text{ m}^2$ and $d = 1 \text{ mm}$, where $\epsilon_0 = 8.85 \times 10^{-12} \text{ F/m}$ (permittivity of free space)?

Ans

☐ 1. $8.85 \times 10^{-15} \text{ F}$

☐ 2. $8.85 \times 10^{-15} \text{ C}$

☒ 3. $8.85 \times 10^{-9} \text{ F}$

☐ 4. $8.85 \times 10^{-9} \text{ C}$

Q.15 If a uniformly charged surface has a total charge Q and surface area A , then surface charge density is _____.

Ans

☐ 1. $\sigma = \frac{Q}{A^2}$

☐ 2. $\sigma = \frac{A}{Q}$

☐ 3. $\sigma = Q \cdot A$

☒ 4. $\sigma = \frac{Q}{A}$

Q.16 Two equipotential surfaces are labelled 20 V and 30 V, and are separated by 2 cm. What is the electric field strength in the space between them?

Ans

☐ 1. 300 V/m

☒ 2. 500 V/m

☐ 3. 1200 V/m

☐ 4. 600 V/m

Q.17 A point charge of $+6\text{ }\mu\text{C}$ is placed in space. What is the electric potential at a distance of 3 m from the charge? (Consider: Coulomb's constant $k = 9 \times 10^9 \text{ N.m}^2/\text{C}^2$)

- Ans
- ☐ 1. 24,000 V
 - ☐ 2. 12,000 V
 - ☐ 3. 15,000 V
 - ☒ 4. 18,000 V

Q.18 A particular Zener diode is rated to operate in reverse breakdown at 6 volts and can safely dissipate up to 0.3 watts of power. What is the highest reverse current it can handle without exceeding this power limit?

- Ans
- ☒ 1. 0.05 A
 - ☐ 2. 0.18 A
 - ☐ 3. 0.2 A
 - ☐ 4. 1.8 A

Q.19 An electric dipole is formed by two charges of $\pm 2\text{ }\mu\text{C}$ separated by 5 mm. What is the magnitude of the electric field at a point on the axial line, located 2 m from the centre of the dipole? (Consider: Coulomb's constant $k = 9 \times 10^9 \text{ N.m}^2/\text{C}^2$)

- Ans
- ☐ 1. 45 N/C
 - ☐ 2. 4.5 N/C
 - ☒ 3. 22.5 N/C
 - ☐ 4. 2.25 N/C

Q.20 What should be the minimum energy gap between valence band and conduction band for a material to be the perfect insulator?

- Ans
- ☒ 1. band gap $E_g > 3\text{ eV}$
 - ☐ 2. band gap $E_g > 7.4\text{ eV}$
 - ☐ 3. band gap $E_g = 0\text{ eV}$
 - ☐ 4. band gap $E_g < 3\text{ eV}$

Section : Discipline4

Q.1 Which of the following is NOT a kinematic equation for uniformly accelerated motion?

- Ans
- ☐ 1. $x = x_0 + v_0 t + \frac{1}{2} a t^2$
 - ☒ 2. $v = x_0 + v_0 t + \frac{1}{2} a t^2$
 - ☐ 3. $v = v_0 + a t$
 - ☐ 4. $v^2 = v_0^2 + 2a (x - x_0)$

Q.2 Which of the following statements about the motion of a body is/are correct?

Statement A: An object moving at a constant speed in a straight line may still have acceleration.

Statement B: An object can have zero velocity at an instant but still possess non-zero acceleration.

- Ans
- ☒ 1. Only Statement B is correct
 - ☐ 2. Both Statements A and B are correct
 - ☐ 3. Only Statement A is correct
 - ☐ 4. Neither Statement A nor B is correct

Q.3 Consider a car moving in a circular path with constant speed. Which of the following correctly describes the forces acting on the car?

- Ans
- ☒ 1. Normal reaction (N)- Weight of the car(mg)=0 and frictional force(f)= centripetal force
 - ☐ 2. Weight of the car(mg)+ $\frac{1}{2}$ Normal reaction (N)=0 and Frictional force(f) + centripetal force=0
 - ☐ 3. Weight of the car(mg) + centripetal force=0 and Frictional force(f) + Normal reaction (N)=0
 - ☐ 4. Weight of the car(mg) + Normal reaction (N) + Frictional force(f)=0

- Q.4 Two particles are moving with velocities given by $\vec{v}_1 = 3\hat{i} + 4\hat{j} \text{ m/s}$ and $\vec{v}_2 = a\hat{i} + b\hat{j} \text{ m/s}$.
If both particles have the same velocity, what is the magnitude of the vector sum $\vec{v}_1 + \vec{v}_2$?
- Ans ☐ 1. 14 m/s
☐ 2. 5 m/s
☐ 3. 7 m/s
☒ 4. 10 m/s

- Q.5 For a car of mass m moving at constant speed v in a horizontal circular path of radius r , the net force F on the car is:
- Ans ☐ 1. Zero
☐ 2. mg downward
☐ 3. $\frac{m v^2}{r}$ directed away from the centre
☒ 4. $\frac{m v^2}{r}$ directed towards the centre

- Q.6 As per the Aristotle's fallacy concerning motion, what is required to keep an object moving at a uniform velocity?
- Ans ☐ 1. The force applied must be greater than the mass of the object.
☒ 2. An external force is required to keep a body in motion.
☐ 3. A continuous external force is required to counteract the opposing force of gravity.
☐ 4. No external force is required, as the object's natural state is uniform in motion.

- Q.7 When a man is 6 m away from the door of a train standing on platform, the train just starts to move with an acceleration of 3 m/s^2 . The man starts to run and catch the train after 4 s. The man runs with an acceleration (in m/s^2) of:
- Ans ☐ 1. 4.5
☐ 2. 3
☒ 3. 3.75
☐ 4. 4

- Q.8 Which of the following is NOT true about multiplication of a vector by a real number?
- Ans ☒ 1. It produces a scalar quantity.
☐ 2. The result is always a vector.
☐ 3. Its direction can change depending on the sign of the number.
☐ 4. Its magnitude is scaled by the real number.

- Q.9 Newton's second law of motion is mathematically derived using the relation between:
- Ans ☐ 1. mass and acceleration only
☐ 2. impulse and displacement
☒ 3. rate of change of momentum and force
☐ 4. force and displacement

- Q.10 Which of the following is the magnitude of the resultant (R) of two concurrent vectors (A and B) with an angle θ between them?
- Ans ☒ 1. $R = \sqrt{A^2 + B^2 + 2 AB \cos \theta}$
☐ 2. $R = \sqrt{A^2 + B^2 - 2 AB \sin \theta}$
☐ 3. $R = \sqrt{A^2 + B^2 + 2 AB \sin \theta}$
☐ 4. $R = \sqrt{A^2 + B^2 - 2 AB \cos \theta}$

Q.11 Which of the following best describes uniform motion?

- Ans
- ☐ 1. Motion with equal velocity in unequal intervals of time
 - ☐ 2. Motion with varying acceleration
 - ☒ 3. Motion with equal displacement in equal intervals of time
 - ☐ 4. Motion that covers unequal distances in equal intervals of time

Q.12 If the position vector of a particle at time t is $\vec{r}(t) = (t^2 - 2t)\hat{i} + (3t)\hat{j}$, the displacement between $t=1$ and $t=3$ is _____.

- Ans
- ☐ 1. $6\hat{i} + 6\hat{j}$
 - ☒ 2. $4\hat{i} + 6\hat{j}$
 - ☐ 3. $2\hat{i} + 3\hat{j}$
 - ☐ 4. $6\hat{i} + 9\hat{j}$

Q.13 A vector is given by $\vec{A} = 3\hat{i} + 4\hat{j}$. Which of the following correctly represents the unit vector in the direction of $\vec{A}$?

- Ans
- ☐ 1. $3\hat{i} + 4\hat{j}$
 - ☐ 2. $\frac{4}{5}\hat{i} + \frac{3}{5}\hat{j}$
 - ☒ 3. $\frac{3}{5}\hat{i} + \frac{4}{5}\hat{j}$
 - ☐ 4. $5\hat{k}$

Q.14 If a player in volleyball game exerts a force of 1000 N on the volleyball for 0.5 s, the impulse experienced by the ball is _____.

- Ans
- ☐ 1. 1000 N s
 - ☐ 2. -1000 N
 - ☒ 3. 500 N s
 - ☐ 4. 2000 N/s

Q.15 What will be the maximum acceleration of the train in which a person standing on its floor will remain stationary? (The co-efficient of static friction between the person and the train's floor is 0.15, and the value of $g = 10 \text{ m/s}^2$.)

- Ans
- ☒ 1. 1.5 m/s^2
 - ☐ 2. 0.015 m/s^2
 - ☐ 3. 15 m/s^2
 - ☐ 4. 0.15 m/s^2

Q.16 Which of the following statements is correct for the triangle law of vector addition?

- Ans
- ☐ 1. It is applicable only when vectors are parallel.
 - ☒ 2. It can be applied to any two vectors irrespective of direction.
 - ☐ 3. It is not applicable to displacement vectors.
 - ☐ 4. It is a special case of the parallelogram law.

Q.17 A car is moving in a circle of radius R on a flat horizontal road with coefficient of static friction μ_s . The force required for circular motion is provided by _____ and the maximum speed of the car is proportional to _____.

- Ans
- ☐ 1. gravitational force; $\sqrt{R}$
 - ☐ 2. frictional force; $\mu_s R$
 - ☐ 3. gravitational force; R
 - ☒ 4. frictional force; $\sqrt{\mu_s R}$

Q.18 A vehicle moves 5 km north, then reverses and travels 3 km south, all along a straight line. What is the path length during the entire trip?

- Ans**
- ☐ 1. 5 km
 - ☐ 2. 2 km
 - ☐ 3. 3 km
 - ☒ 4. 8 km

Q.19 _____ quantities follow parallelogram law of addition due to their _____ dependence.

- Ans**
- ☐ 1. Scalar; magnitude
 - ☒ 2. Vector; direction
 - ☐ 3. Scalar; direction
 - ☐ 4. Vector; magnitude

Q.20 Why are ball bearings used between moving parts?

- Ans**
- ☐ 1. They prevent motion completely.
 - ☐ 2. They increase the weight of the machine.
 - ☐ 3. They generate more heat.
 - ☒ 4. They convert sliding friction into rolling friction.

Section : **Discipline5**

Q.1 Three particles with masses 1 kg, 1 kg and 2 kg are placed at coordinates (0, 0, 0), (0, 2, 0), and (0, 4, 0), respectively. What is the y-coordinate of their centre of mass?

- Ans**
- ☐ 1. 1.5 m
 - ☐ 2. 3 m
 - ☐ 3. 2 m
 - ☒ 4. 2.5 m

Q.2 A square wire loop of side 0.3 m carries a current of 5 A. What is the magnetic dipole moment of the loop?

- Ans**
- ☐ 1. $0.25 \text{ A} \cdot \text{m}^2$
 - ☒ 2. $0.45 \text{ A} \cdot \text{m}^2$
 - ☐ 3. $0.90 \text{ A} \cdot \text{m}^2$
 - ☐ 4. $0.75 \text{ A} \cdot \text{m}^2$

Q.3 Magnetic susceptibility of a material is a measure of which property?

- Ans**
- ☒ 1. How strongly it reacts to an external magnetic field
 - ☐ 2. How well it allows electric current to pass
 - ☐ 3. How much gravitational force it produces
 - ☐ 4. How much it resists the flow of electric charge

Q.4 A material with a narrow hysteresis loop is most suitable for:

- Ans**
- ☐ 1. permanent magnets
 - ☐ 2. magnetic recording media
 - ☒ 3. transformer cores
 - ☐ 4. electromagnets requiring high field strength

Q.5 A magnetic needle is placed in a uniform magnetic field, making an angle with the direction of the field. Which of the following does the magnetic needle experience?

- Ans**
- ☒ 1. Only torque and no net force
 - ☐ 2. Torque and a net force
 - ☐ 3. No torque and no net force
 - ☐ 4. Only force but no torque

Q.6 A uniform magnetic field of magnitude 0.36 T passes through a closed spherical surface. What is the total magnetic flux through the surface?

- Ans**
- ☐ 1. 0.9 Weber
 - ☐ 2. 0.36 Weber
 - ☐ 3. 0.18 Weber
 - ☒ 4. 0 Weber

Q.7 In the context of the photoelectric effect, if the intensity of incident light is increased while keeping its frequency above the threshold, which of the following changes is observed?

- Ans**
- ☒ 1. More electrons are emitted from the metal surface per second.
 - ☐ 2. The threshold frequency of the material is reduced.
 - ☐ 3. The maximum kinetic energy of the emitted electrons increases.
 - ☐ 4. The work function of the metal decreases.

Q.8 An electron of charge ($-e$) and mass (m_e) enters a region with cross uniform fields. $\vec{E} = E \hat{j}$, and $\vec{B} = B \hat{k}$; $\vec{v} = v_x \hat{i}$. Which of the following statements describe the trajectory of the electron in the field?

- Ans**
- ☒ 1. **Straight line motion along the x – axis if $v_x = \frac{E}{B}$.**
 - ☐ 2. **Cycloidal trajectory in the xy – plane for all the values of v_x .**
 - ☐ 3. **Uniform circular motion in the xy – plane.**
 - ☐ 4. **Helical motion around the z – axis.**

Q.9 Which phenomenon observed by Heinrich Hertz provided experimental evidence for the emission of electrons when light falls on a metal surface?

- Ans**
- ☐ 1. Emission under a strong electric field
 - ☒ 2. Emission caused by incident light (photoelectric effect)
 - ☐ 3. Emission due to collision with other particles
 - ☐ 4. Emission of electrons due to heating

Q.10 Two particles, each with a mass of 2 kg, are located at points (2, 0) and (0, 2) in the XY-plane. What is the distance of their common centre of mass from the origin?

- Ans**
- ☐ 1. 1 m
 - ☐ 2. $2\sqrt{2}$ m
 - ☐ 3. 2 m
 - ☒ 4. $\sqrt{2}$ m

Q.11 The slope of the stopping potential vs frequency graph is useful for determining:

- Ans**
- ☐ 1. the electron mass
 - ☐ 2. the threshold frequency
 - ☒ 3. Planck's constant
 - ☐ 4. the work function of the material

Q.12 Which of the following statements is correct about the magnetic intensity of the Earth?

- Ans**
- ☐ 1. The magnetic intensity is zero at poles.
 - ☐ 2. The magnetic intensity is independent of the location on Earth.
 - ☐ 3. The magnetic intensity is maximum at the equator.
 - ☒ 4. The magnetic intensity varies with latitude.

Q.13 The wave number of a spectral line corresponds to:

- Ans**
- ☐ 1. the angular momentum of electron
 - ☐ 2. the velocity of emitted photon
 - ☒ 3. the inverse of wavelength of the spectral line
 - ☐ 4. the energy difference between two levels

Q.14 In the expression for the torque on a current-carrying loop, $\tau = IBAsin\theta$, what does the angle θ represent?

- Ans**
- ☒ 1. Angle between the adjacent sides of the loop
 - ☒ 2. Angle between the magnetic moment of the loop and the magnetic field
 - ☒ 3. Angle between the normal to the plane of the loop and the magnetic field
 - ☒ 4. Angle between the direction of current and the magnetic field

Q.15 Which of the following statements about the photoelectric effect is correct?

- Ans**
- ☒ 1. Electrons are emitted only if light is monochromatic.
 - ☒ 2. Electrons are emitted only if light frequency exceeds a threshold.
 - ☒ 3. Electrons are emitted only if light intensity exceeds a threshold.
 - ☒ 4. Electrons are emitted regardless of light frequency.

Q.16 According to Ampere's circuital law, the line integral of the magnetic field around a closed path is directly related to which of the following?

- Ans**
- ☒ 1. Potential difference across the loop
 - ☒ 2. Net current passing through the enclosed loop
 - ☒ 3. Amount of charge per unit volume
 - ☒ 4. Strength of the electric field

Q.17 On doubling both the length and width of a rectangular loop (keeping current and magnetic field same), the torque 'T' at a given angle θ becomes:

- Ans**
- ☒ 1. 2τ
 - ☒ 2. τ
 - ☒ 3. 4τ
 - ☒ 4. 8τ

Q.18 _____ were used in the Geiger-Marsden experiment to study the nature of the atomic nucleus.

- Ans**
- ☒ 1. Alpha particles
 - ☒ 2. γ -rays
 - ☒ 3. Beta particles
 - ☒ 4. Gold particles

Q.19 In a uniform magnetic field, if a particle moves at an angle (θ) with the field, the radius of the circular motion depends on:

- Ans**
- ☒ 1. the field direction only
 - ☒ 2. the component of velocity perpendicular to the field
 - ☒ 3. the total velocity
 - ☒ 4. the component of velocity parallel to the field

Q.20 Which of the following is NOT the correct use of cyclotron?

- Ans**
- ☒ 1. Used in medical imaging as a diagnostic tool
 - ☒ 2. Used in radiation therapy
 - ☒ 3. Studying the atmospheric cyclones
 - ☒ 4. Used to bombard atomic nuclei

Section : **Discipline6**

Q.1 A point on the edge of a rotating circular disk travels a distance of 3 m along the circumference in 2 seconds. If the radius of the disk is 0.6 m, what is the angular displacement covered during this time?

- Ans**
- ☒ 1. 1.2 rad
 - ☒ 2. 5 rad
 - ☒ 3. 10 rad
 - ☒ 4. 3.6 rad

Q.2 If the angular acceleration of a rotating body is zero, then the:

- Ans**
- ☐ 1. torque is infinite
 - ☐ 2. angular velocity is zero
 - ☐ 3. moment of inertia is zero
 - ☒ 4. angular velocity is constant

Q.3 The reddish appearance of the Sun just before sunset is mainly due to:

- Ans**
- ☐ 1. reflection of light from dust
 - ☒ 2. scattering of shorter wavelengths, leaving red light to reach the eye
 - ☐ 3. refraction of light by the atmosphere
 - ☐ 4. dispersion of light

Q.4 A convex mirror has a focal length of 25 cm. An object is placed 75 cm in front of the mirror. The position of the image is:

- Ans**
- ☐ 1. 25 cm behind the mirror
 - ☐ 2. 12.5 cm behind the mirror
 - ☒ 3. 18.75 cm behind the mirror
 - ☐ 4. 37.5 cm in front of the mirror

Q.5 If the angle of prism (A) = 60° and the angle of minimum deviation (D_m) = 70° , then the refractive index of the prism is approximately _____.
(Given that $\sin(65^\circ) \approx 0.906$)

- Ans**
- ☐ 1. 1.2
 - ☐ 2. 1.5
 - ☐ 3. 1.6
 - ☒ 4. 1.8

Q.6 The number of nuclei $N(t)$ remaining in a radioactive sample at time t is given in terms of the initial number of nuclei N_0 and the decay constant λ by:

- Ans**
- ☐ 1. $N(t) = N_0 (1 + \lambda t)$
 - ☐ 2. $N(t) = N_0 (1 - \lambda t)$
 - ☒ 3. $N(t) = N_0 e^{-\lambda t}$
 - ☐ 4. $N(t) = N_0 e^{\lambda t}$

Q.7 Why does the photocurrent in a photoelectric experiment reach saturation?

- Ans**
- ☐ 1. Electrons lose energy in transit.
 - ☐ 2. Light intensity becomes maximum.
 - ☐ 3. Stopping potential is reached.
 - ☒ 4. All electrons emitted are collected at the anode.

Q.8 In a hydrogen atom, the radius of the first Bohr orbit is approximately $0.5 \text{ \AA}$. Based on Bohr's model, what would be the radius of the third orbit?

- Ans**
- ☐ 1. $1.0 \text{ \AA}$
 - ☐ 2. $2.5 \text{ \AA}$
 - ☒ 3. $4.5 \text{ \AA}$
 - ☐ 4. $1.5 \text{ \AA}$

Q.9 When rays parallel to principal axis of a concave mirror get reflected:

- Ans**
- ☐ 1. they converge at a point not on the principal axis known as the centre of curvature
 - ☐ 2. they converge at a point not on the principal axis known as the focal point
 - ☐ 3. they converge at a point on the principal axis known as the centre of curvature
 - ☒ 4. they converge at a point on the principal axis known as the focal point

Q.10 A diver jumps off a springboard with his body straight and arms stretched out. When he pulls his arms and legs inward, his spin rate _____.

- Ans**
- ☐ 1. decreases
 - ☐ 2. becomes zero
 - ☐ 3. remains the same
 - ☒ 4. increases

Q.11 A solid block, assumed to be a rigid body, moves along a frictionless horizontal surface. Considering the block as rigid, which of the following statements best explains its translational motion?

- Ans**
- ☐ 1. Each particle of the block moves with different velocities but the same acceleration.
 - ☐ 2. The translational motion of the block depends only on external torque and not on external force.
 - ☒ 3. Each particle of the block moves with the same velocity at a given instant, and the motion can be represented by the motion of its centre of mass.
 - ☐ 4. The block remains at rest and does not translate at all.

Q.12 The ratio of De-Broglie wavelengths of two particles of equal mass having kinetic energies K and 4K is _____.

- Ans**
- ☒ 1. 2 : 1
 - ☐ 2. 1 : 4
 - ☐ 3. 1 : 2
 - ☐ 4. 4 : 1

Q.13 Which of the following statements is true in case of stopping potential for a given photosensitive material?

- Ans**
- ☐ 1. The stopping potential increases exponentially with the frequency of the incident radiation.
 - ☐ 2. The stopping potential is independent of the frequency of the incident radiation.
 - ☒ 3. The stopping potential increases linearly with the frequency of the incident radiation.
 - ☐ 4. The stopping potential increases linearly with the intensity of the incident radiation.

Q.14 The energy required to completely split the nucleus A_ZX into its constituent protons and neutrons is:

- Ans**
- ☐ 1. $[Z m({}_1^1H) + N m(n)]c^2$,
where $m({}_1^1H)$ is the proton mass, $m(n)$ is neutron mass and N is the number of neutron
- ☐ 2. less than the binding energy of the nucleus
 - ☐ 3. $m({}_Z^AX) c^2$, where $m({}_Z^AX)$ is the mass of the nucleus
 - ☒ 4. equal to or greater than the binding energy of the nucleus

Q.15 Which of the following is a common practical use of Polaroid filters?

- Ans**
- ☐ 1. Determining the wavelength of light
 - ☒ 2. Minimising reflected glare in sunglasses
 - ☐ 3. Amplifying the brightness of light
 - ☐ 4. Producing laser light

Q.16 Which of the following conditions is NOT applicable for total internal reflection?

- Ans**
- ☐ 1. No transmission of light takes place.
 - ☒ 2. The angle of incidence should be less than the critical angle.
 - ☐ 3. Light should travel from denser to rarer medium.
 - ☐ 4. The angle of incidence should be equal to or greater than the critical angle.

Q.17 If the torque acting on a body is zero, then according to the equation of rotational motion, the:

- Ans**
- ☐ 1. angular velocity is zero
 - ☒ 2. angular momentum is conserved
 - ☐ 3. moment of inertia decreases
 - ☐ 4. angular acceleration is infinite

Q.18 According to the De-Broglie concept of matter waves, which of the following entities can exhibit wave-like behaviour?

- Ans**
- ☒ 1. All particles that are moving
 - ☐ 2. Only particles of light such as photons
 - ☐ 3. Only electrons in motion
 - ☐ 4. Only electrons that are at rest

Q.19 According to Bohr's theory, the frequency of the emitted photon is determined by:

- Ans**
- ☐ 1. the difference of kinetic energies of initial and final orbits
 - ☐ 2. the difference of angular momenta of initial and final orbits
 - ☒ 3. the difference of total energies of initial and final orbits divided by Planck's constant
 - ☐ 4. the sum of energies of initial and final orbits divided by Planck's constant

Q.20 If two equal masses are placed at two points equidistant from the origin, then the centre of mass lies:

- Ans**
- ☐ 1. midway but shifted towards the heavier mass
 - ☐ 2. at infinity
 - ☒ 3. at the origin
 - ☐ 4. at one of the masses

Section : **Discipline7**

Q.1 For a particle in a transverse progressive wave, the displacement is:

- Ans**
- ☒ 1. perpendicular to the direction of wave propagation
 - ☐ 2. parallel to the direction of wave propagation
 - ☐ 3. along the wavefront
 - ☐ 4. zero

Q.2 Under which condition does a simple pendulum experience resonance?

- Ans**
- ☐ 1. When the swinging motion has the smallest amplitude
 - ☒ 2. When the frequency of external force matches the pendulum's natural frequency
 - ☐ 3. When the opposing (damping) force is strongest
 - ☐ 4. When the length of the pendulum is increased

Q.3 The displacement (x) of a particle executing simple harmonic motion is given by $x(t) = a\sin(\frac{\pi}{4}t) + b\cos(\frac{\pi}{4}t)$ (in m), where $a = 3$ m and $b = 5$ m. The amplitude (in m) and phase constant (in rad) is given by _____, respectively.

- Ans**
- ☐ 1. $\sqrt{34}$ and $\tan^{-1}(\frac{3}{5})$
 - ☐ 2. 5 and $\tan^{-1}(\frac{5}{4})$
 - ☐ 3. 4 and $\tan^{-1}(\frac{4}{5})$
 - ☒ 4. $\sqrt{34}$ and $\tan^{-1}(\frac{5}{3})$

Q.4 Which of the following increases the resolving power of a compound microscope?

- Ans**
- ☐ 1. Reducing the numerical aperture
 - ☒ 2. Using light of shorter wavelength
 - ☐ 3. Increasing the focal length of the objective
 - ☐ 4. Increasing the wavelength of the light used

Q.5 A thin prism of refracting angle (A) 10° is made up of a material whose refractive indices for red and violet lights are 1.52 and 1.58, respectively. What is the angular dispersion (δ_m) produced by the prism?

- Ans**
- ☒ 1. 31.0°
 - ☒ 2. 0.6°
 - ☒ 3. 10.39°
 - ☒ 4. 15.2°

Q.6 A longitudinal wave propagates in a medium along the Z-axis. The particles of the medium vibrate:

- Ans**
- ☒ 1. along the X-axis
 - ☒ 2. along the Y-axis
 - ☒ 3. along the Z-axis
 - ☒ 4. in the X-Y plane

Q.7 The speed of a travelling wave on a string depends mainly on which of the following factors?

- Ans**
- ☒ 1. Properties of the medium such as tension and mass distribution
 - ☒ 2. Amplitude of vibration
 - ☒ 3. Length of the string
 - ☒ 4. Frequency of the source producing the wave

Q.8 The half-life of a given radioactive sample is 0.693 days. The time required for 60% of the nuclei to decay is _____ days.

- Ans**
- ☒ 1. $\ln(0.6)$
 - ☒ 2. $\ln\left(\frac{1}{0.6}\right)$
 - ☒ 3. $\ln\left(\frac{1}{0.4}\right)$
 - ☒ 4. $\ln(4)$

Q.9 If the velocity of a sound wave passing through the oxygen and hydrogen medium at the standard temperature and pressure (STP) is v_O and v_H , respectively, then which of the following is true?

- Ans**
- ☒ 1. $v_O = 2v_H$
 - ☒ 2. $v_O = 4v_H$
 - ☒ 3. $v_H = v_O$
 - ☒ 4. $v_H = 4v_O$

Q.10 Monochromatic light produces a diffraction pattern through a slit of width 0.45 mm. If the first minimum is observed at an angle of 0.001 rad, what is the wavelength of the light?

- Ans**
- ☒ 1. 675 nm
 - ☒ 2. 900 nm
 - ☒ 3. 450 nm
 - ☒ 4. 225 nm

Q.11 A sound-emitting object remains at rest, producing waves at a frequency of 360 Hz. If a listener moves away from the source at 60 m/s, and the speed of sound in air is 300 m/s, then what frequency is perceived by the moving listener?

- Ans**
- ☒ 1. 500 Hz
 - ☒ 2. 288 Hz
 - ☒ 3. 600 Hz
 - ☒ 4. 720 Hz

Q.12 Without Laplace's correction, the speed of sound in a liquid is underestimated because:

- Ans**
- ☒ 1. liquid compresses isothermally in reality
 - ☒ 2. surface tension is neglected
 - ☒ 3. liquid compresses adiabatically in reality
 - ☒ 4. liquid expands adiabatically in reality

Q.13 Which of the following devices uses total internal reflection?

- Ans
- ☐ 1. Magnifying glass
 - ☐ 2. Telescope
 - ☒ 3. Endoscope
 - ☐ 4. Microscope

Q.14 Two tuning forks emit sound at 250 Hz and 253 Hz, respectively. When sounded together, how many beats will be heard in 2 seconds?

- Ans
- ☐ 1. 12
 - ☐ 2. 3
 - ☒ 3. 6
 - ☐ 4. 2

Q.15 How is the maximum kinetic energy ($K_{\max}$) of a particle executing simple harmonic motion dependent on the amplitude a ?

- Ans
- ☐ 1. $K_{\max} \propto a$
 - ☐ 2. $K_{\max} \propto a^4$
 - ☐ 3. $K_{\max} \propto a^3$
 - ☒ 4. $K_{\max} \propto a^2$

Q.16 Which conservation law led to the postulation of the neutrino in beta decay?

- Ans
- ☐ 1. Conservation of charge
 - ☐ 2. Conservation of mass
 - ☐ 3. Conservation of momentum only
 - ☒ 4. Conservation of angular momentum and energy

Q.17 Accommodation of distinct vision by the human eye is achieved by:

- Ans
- ☐ 1. increasing the intensity of the light
 - ☐ 2. changing the wavelength that eye sees
 - ☒ 3. changing the focal length of the eye's lens
 - ☐ 4. not closing the eyelids for a long duration

Q.18 If the phase difference between two interfering waves is an odd multiple of π , then the interference observed is:

- Ans
- ☐ 1. constructive
 - ☐ 2. stationary
 - ☐ 3. resonant
 - ☒ 4. destructive

Q.19 In a displacement-time graph, representing simple harmonic motion, how long does it take for the object to move from its maximum displacement to the mean (zero) position?

- Ans
- ☐ 1. One-eighth of the time period
 - ☒ 2. One-fourth of the time period
 - ☐ 3. Half of the time period
 - ☐ 4. One full time period

Q.20 In simple harmonic motion, the ratio of maximum potential energy to total energy is _____.

- Ans
- ☐ 1. infinite
 - ☐ 2. 0
 - ☐ 3. 0.5
 - ☒ 4. 1

Q.1 The Bernoulli principle expresses which fundamental physical law in fluid motion?

- Ans**
- ☐ 1. Law of conservation of angular momentum
 - ☐ 2. Law of conservation of momentum
 - ☐ 3. Law of conservation of mass
 - ☒ 4. Law of conservation of energy

Q.2 For an ideal gas undergoing an isobaric process, the slope of the P-V curve is _____.

- Ans**
- ☐ 1. positive
 - ☐ 2. infinite
 - ☒ 3. zero
 - ☐ 4. negative

Q.3 A fluid flows steadily between two parallel plates spaced 0.01 m apart, creating a velocity gradient of 50 s^{-1} . If the shear stress developed in the fluid is 10 Pa, what is the coefficient of viscosity of the fluid?

- Ans**
- ☐ 1. 0.25 Pa.s
 - ☐ 2. 0.05 Pa.s
 - ☐ 3. 0.15 Pa.s
 - ☒ 4. 0.20 Pa.s

Q.4 The equation of state of a perfect gas is expressed as $PV = nRT$, where R represents the _____.

- Ans**
- ☐ 1. ideal gas pressure
 - ☐ 2. internal energy
 - ☒ 3. universal gas constant
 - ☐ 4. specific gas constant

Q.5 Avogadro's number is defined as the number of:

- Ans**
- ☐ 1. electrons in 1 gram of a substance
 - ☐ 2. molecules in 1 gram of a substance
 - ☒ 3. atoms in 1 mole of a substance
 - ☐ 4. molecules in 1 litre of gas at STP

Q.6 What is the relation between molar specific heat capacity at constant volume (C_V) and molar specific heat capacity at constant pressure (C_P) in case of an ideal gas? (R = universal gas constant)

- Ans**
- ☐ 1. $C_P C_V = R$
 - ☐ 2. $C_P + C_V = R$
 - ☐ 3. $\frac{C_P}{C_V} = R$
 - ☒ 4. $C_P - C_V = R$

Q.7 In a heat engine, if no heat is rejected to the sink ($Q_C = 0$), the efficiency will be _____.

- Ans**
- ☐ 1. 0%
 - ☐ 2. -10%
 - ☒ 3. 100%
 - ☐ 4. 50%

Q.8 Water at 100°C absorbs 2260 kJ of heat per kg to become steam at 100°C . This quantity is called _____.

- Ans**
- ☒ 1. latent heat of vaporisation
 - ☐ 2. latent heat of fusion
 - ☐ 3. specific heat
 - ☐ 4. sensible heat

Q.9 Soap bubbles are spherical in shape because:

- Ans**
- ☒ 1. surface tension tries to minimise surface area
 - ☐ 2. gravity acts equally in all directions
 - ☐ 3. atmospheric pressure is same everywhere
 - ☐ 4. pressure inside is uniform

Q.10 The bulk modulus of the solid is defined as the ratio of _____ stress and _____ strain.

- Ans**
- ☐ 1. shear; hydraulic
 - ☐ 2. hydraulic; shear
 - ☐ 3. pressure; shear
 - ☒ 4. hydraulic; volume

Q.11 The upward force acting on an aerofoil moving through air due to the pressure difference between its upper and lower surfaces is known as:

- Ans**
- ☐ 1. Thrust
 - ☐ 2. Bernoulli force
 - ☒ 3. Dynamic lift
 - ☐ 4. Viscous force

Q.12 Which of the following statements is true in case of mean free path of a molecule?

- Ans**
- ☐ 1. It is linearly proportional to the number density but inversely proportional to the size of the molecule.
 - ☐ 2. It is inversely proportional to the number density but linearly proportional to the size of the molecule.
 - ☐ 3. It is not dependent on the number density and size of the molecule.
 - ☒ 4. It is inversely proportional to the number density and size of the molecule.

Q.13 A liquid changes its phase from liquid to a gas at constant temperature. Which of the following statements best describes the role of latent heat of vaporisation for this process?

- Ans**
- ☐ 1. To increase the density of the substances
 - ☐ 2. To increase the temperature of the substance
 - ☐ 3. To increase the kinetic energy of the molecules
 - ☒ 4. To overcome the intermolecular forces of attraction

Q.14 Which of the following factors is ignored in the ideal Bernoulli equation when applied to blood flow?

- Ans**
- ☐ 1. Kinetic energy of blood
 - ☐ 2. Gravitational potential energy
 - ☐ 3. Pressure variations
 - ☒ 4. Viscosity of blood

Q.15 Each side of a cube is measured to be 7.203 m. What is the total surface area (in m²) of the cube to appropriate significant figures?

- Ans**
- ☐ 1. 310
 - ☒ 2. 311.3
 - ☐ 3. 311
 - ☐ 4. 311.29

Q.16 The dimensional formula of force is:

- Ans**
- ☐ 1. $[M^0L^1T^{-1}]$
 - ☐ 2. $[M^2LT^{-1}]$
 - ☐ 3. $[ML^2T^{-2}]$
 - ☒ 4. $[MLT^{-2}]$

Q.17 Which of the following physical phenomena is a direct result of surface tension?

- Ans**
- ☐ 1. The formation of an ice on a lake
 - ☐ 2. The sinking of a heavy stone in water
 - ☒ 3. The spherical shape of a small liquid drop
 - ☐ 4. The boiling of water at 100°C

Q.18 What does the latent heat of fusion represent from the following?

- Ans**
- ☒ 1. The heat energy required to convert a solid into a liquid at constant temperature
 - ☐ 2. The energy released when a gas turns into liquid
 - ☐ 3. The heat energy needed to increase the temperature of a substance
 - ☐ 4. The energy required to turn a liquid into vapour

Q.19 The term 'gauge pressure' refers to:

- Ans**
- ☐ 1. pressure measured with respect to zero depth
 - ☐ 2. pressure measured with respect to vacuum
 - ☒ 3. pressure measured with respect to atmospheric pressure
 - ☐ 4. pressure independent of fluid density

Q.20 Which of the following materials exhibits high plasticity?

- Ans**
- ☐ 1. Steel
 - ☐ 2. Glass
 - ☒ 3. Lead
 - ☐ 4. Rubber

Section : **Discipline9**

Q.1 Which of the following statements is correct about work done?

- Ans**
- ☐ 1. Work depends only on force, not displacement.
 - ☐ 2. Work is a vector quantity.
 - ☐ 3. Work is always positive.
 - ☒ 4. Work is scalar but can be positive, negative or zero.

Q.2 The work-energy theorem is valid for which of the following?

- Ans**
- ☐ 1. Only constant forces
 - ☐ 2. Only frictionless motion
 - ☐ 3. Only conservative forces
 - ☒ 4. Both conservative and non-conservative forces

Q.3 If silver and gold bars are immersed in a water bath at thermal equilibrium, thermodynamic variable _____ of silver and gold is _____.

- Ans**
- ☐ 1. temperature; not equal
 - ☐ 2. hydraulic pressure; not equal
 - ☐ 3. bulk modulus; equal
 - ☒ 4. temperature; equal

Q.4 If a machine does 200 J of work in 10 seconds, the power developed is _____.

- Ans**
- ☐ 1. 200 W
 - ☒ 2. 20 W
 - ☐ 3. 2 W
 - ☐ 4. 10 W

Q.5 A heat engine with efficiency 0.4 operates between a cold reservoir and a hot reservoir. It takes 400 J of heat from the hot reservoir. How much heat (in J) does it deliver to the cold reservoir?

- Ans**
- ☐ 1. 360
 - ☒ 2. 240
 - ☐ 3. 480
 - ☐ 4. 120

Q.6 A 2 kg object starts from rest and moves with a constant acceleration of 3 m/s^2 over a distance of 4 m. What is the amount of work done on the object which is equal to the final kinetic energy gained?

- Ans**
- ☐ 1. 18 J
 - ☐ 2. 12 J
 - ☒ 3. 24 J
 - ☐ 4. 30 J

Q.7 During a two-dimensional inelastic collision, which of the following is true?

- Ans**
- ☐ 1. Kinetic energy is fully conserved.
 - ☐ 2. Both momentum and energy are not conserved.
 - ☐ 3. Kinetic energy increases.
 - ☒ 4. Momentum is conserved along each direction.

Q.8 A certain polyatomic gas molecule has 3 translational and 2 rotational degrees of freedom. Based on the equipartition of energy principle, what is its molar specific heat at constant volume (C_V)?

- Ans**
- ☐ 1. $3R$
 - ☐ 2. $2R$
 - ☐ 3. $\frac{3}{2}R$
 - ☒ 4. $\frac{5}{2}R$

Q.9 A small electric appliance works with a voltage of 200 V and draws a current of 0.4 A. How much electric power does the appliance consume?

- Ans**
- ☐ 1. 200 W
 - ☐ 2. 50 W
 - ☐ 3. 20 W
 - ☒ 4. 80 W

Q.10 Two objects with masses 2 kg and 6 kg move in the same direction along a straight line with speeds of 6 m/s and 3 m/s, respectively. If they collide and stick together, what is their common velocity after the perfectly inelastic collision?

- Ans**
- ☐ 1. 4.25 m/s
 - ☐ 2. 3.5 m/s
 - ☐ 3. 4.05 m/s
 - ☒ 4. 3.75 m/s

Q.11 Mechanical energy is NOT conserved in the presence of _____.

- Ans**
- ☐ 1. gravity
 - ☒ 2. friction
 - ☐ 3. elastic spring force
 - ☐ 4. electrostatic force

Q.12 When a force of 1 kg wt moves a body through a distance of 1 m in the direction of the applied force, the work done (in joule) by the force is given by:

- Ans**
- ☐ 1. 0
 - ☐ 2. 1
 - ☐ 3. 98
 - ☒ 4. 9.8

Q.13 A body of mass m moving with velocity u collides inelastically with a stationary body of the same mass. After collision, the velocity of the system is _____.

- Ans
- ☐ 1. 0
 - ☐ 2. $2u$
 - ☐ 3. u
 - ☒ 4. $u/2$

Q.14 Which of the following statements is true about conservative forces?

- Ans
- ☐ 1. Examples include friction and drag.
 - ☐ 2. Work done is path dependent.
 - ☐ 3. Work done in a closed loop is not zero.
 - ☒ 4. Potential energy can be defined for it.

Q.15 When heat is supplied to a system and no work is done ($W = 0$), the heat added:

- Ans
- ☒ 1. changes only the internal energy
 - ☐ 2. remains constant
 - ☐ 3. changes only the work done
 - ☐ 4. is lost

Q.16 A thermally insulated system is subjected to an adiabatic compression, during which 100 J of the work is done on the system. What is the resulting change in internal energy?

- Ans
- ☒ 1. **+ 100 J**
 - ☐ 2. **+ 50 J**
 - ☐ 3. **0 J**
 - ☐ 4. **– 100 J**

Q.17 Which of the following is an example of a reversible process?

- Ans
- ☐ 1. Melting of ice in water
 - ☐ 2. Frictional heating of a moving block
 - ☒ 3. Infinitely slow compression of a gas by a piston
 - ☐ 4. Expansion of gas into vacuum

Q.18 A 2 kg object, moving at 5 m/s, collides and sticks to a 1 kg object, moving at 2 m/s, in the same direction. How much kinetic energy is lost in the collision?

- Ans
- ☐ 1. 24 J
 - ☐ 2. 12 J
 - ☐ 3. 27 J
 - ☒ 4. 3 J

Q.19 The lengths of a rectangular block are measured as 7.40 cm, 3.0 cm and 1.250 cm. How many significant figures are there in each of these measurements, respectively?

- Ans
- ☐ 1. 2, 2, 3
 - ☒ 2. 3, 2, 4
 - ☐ 3. 2, 1, 3
 - ☐ 4. 3, 1, 4

Q.20 The relative error is given by _____.

- Ans
- ☐ 1. Square of absolute error
 - ☒ 2. Absolute error / Measured value
 - ☐ 3. True value – Measured value
 - ☐ 4. Measured value $\times$ Absolute error

Q.1 What is the simplest kind of learning called?

- Ans**
- ☐ 1. Skill learning
 - ☐ 2. Verbal learning
 - ☐ 3. Observational learning
 - ☒ 4. Conditioning

Q.2 Which of the following knowledge processes is most closely associated with the discipline of social sciences?

- Ans**
- ☐ 1. Problem-solving, logical reasoning, and deductive thinking
 - ☐ 2. Experimentation, intuition, and empiricism
 - ☒ 3. Observation, social inquiry, and historical discovery
 - ☐ 4. Narrating, appreciating, and creating

Q.3 Which Act recognises multiple categories of disability relevant to CWSN?

- Ans**
- ☒ 1. RPWD Act, 2016
 - ☐ 2. Inclusive Education Act, 2010
 - ☐ 3. PWD Act, 1995
 - ☐ 4. RTE, 2009

Q.4 Which of the following best distinguishes role-play from simulation in educational contexts?

- Ans**
- ☐ 1. Both involve acting, but simulation excludes real-world contexts.
 - ☐ 2. Role-play includes cognitive tasks; simulation does not.
 - ☒ 3. Simulation is rule-based, role-play allows emotional expression.
 - ☐ 4. Role-play is scripted; simulation is improvised.

Q.5 Which of the following best explains how gender is understood in social sciences?

- Ans**
- ☒ 1. Gender norms vary and cause discrimination.
 - ☐ 2. Gender is purely determined by biological differences between males and females.
 - ☐ 3. Gender is fixed and universal across time and society.
 - ☐ 4. Gender is a medical concept defined by physical characteristics.

Q.6 According to whose approach do students learn better if the content is provided in smaller units?

- Ans**
- ☒ 1. BF Skinner
 - ☐ 2. Sigmund Freud
 - ☐ 3. Albert Bandura
 - ☐ 4. Lev Vygotsky

Q.7 Which of the following best describes fluid intelligence?

- Ans**
- ☐ 1. Accumulated cultural knowledge
 - ☒ 2. Capacity to reason and solve novel problems
 - ☐ 3. Ability to recall factual knowledge
 - ☐ 4. Memory for autobiographical events

Q.8 What is the ability of multilingual people to select words from either of their languages during the course of uttering a sentence called?

- Ans**
- ☐ 1. Translation
 - ☐ 2. Code-mixing
 - ☐ 3. Bilingualism
 - ☒ 4. Code switching

Q.9 Continuous and Comprehensive Evaluation supports which of the following?

- Ans**
- ☐ 1. Annual testing
 - ☒ 2. Holistic growth
 - ☐ 3. Weekly ranking
 - ☐ 4. Academic labelling

Q.10 The grants and allocations to a school are which type of resource?

- Ans**
- ☒ 1. Financial resource
 - ☐ 2. Physical resource
 - ☐ 3. Human resource
 - ☐ 4. Material resource

Q.11 Which of the following are diagnostic assessments used for?

- Ans**
- ☐ 1. Final grades
 - ☐ 2. Scoring rubrics
 - ☐ 3. Selecting toppers
 - ☒ 4. Identifying difficulties

Q.12 Constructing knowledge through dialogue is emphasised in which of the following?

- Ans**
- ☐ 1. Cognitive load theory
 - ☐ 2. Behaviourist models
 - ☐ 3. Fixed curriculum delivery
 - ☒ 4. Socratic teaching

Q.13 Which of the following is NOT a characteristic of content analysis?

- Ans**
- ☒ 1. Subjectivity
 - ☐ 2. Systematic
 - ☐ 3. Objectivity
 - ☐ 4. Generality

Q.14 What does the term gender socialisation refer to?

- Ans**
- ☐ 1. The process of teaching children scientific facts about gender
 - ☐ 2. The biological development of a person's identity
 - ☐ 3. The separation of boys and girls in physical education
 - ☒ 4. The learning of gender norms, behaviours and identities from society

Q.15 According to Piaget, the ability to perform reversible mental operations is first seen during the _____.

- Ans**
- ☐ 1. formal operational stage
 - ☐ 2. preoperational stage
 - ☒ 3. concrete operational stage
 - ☐ 4. sensorimotor stage

Q.16 Anecdotal records focus on:

- Ans**
- ☐ 1. attendance
 - ☐ 2. learning milestones
 - ☒ 3. behavioural incidents
 - ☐ 4. objective scores

Q.17 The National Trust Act, 1999, focuses on the care and welfare of persons with which types of disabilities?

- Ans**
- ☒ 1. Autism, cerebral palsy, mental retardation, and multiple disabilities
 - ☐ 2. Learning disabilities
 - ☐ 3. Orthopedic disabilities only
 - ☐ 4. Visual and hearing impairments

Q.18 Which theory states that learning is influenced by internal motivation and self-actualisation?

- Ans**
- ☐ 1. Cognitivism
 - ☒ 2. Humanism
 - ☐ 3. Behaviourism
 - ☐ 4. Social learning

Q.19 Which of the following is the most appropriate purpose of dramatisation in the classroom?

- Ans**
- ☒ 1. Enhancing deep engagement with content
 - ☐ 2. Memorisation of historical facts
 - ☐ 3. Passive observation of concepts
 - ☐ 4. Entertainment for children

Q.20 The subject-centred approach is primarily concerned with which of the following?

- Ans**
- ☐ 1. Life experiences
 - ☐ 2. Skill acquisition
 - ☒ 3. Discipline mastery
 - ☐ 4. Social development