

DSSSB OCT NOV DEC 2025 Exam

Test Date	05/10/2025
Test Time	1:00 PM - 3:00 PM
Subject	Junior Engineer Mechanical

Section : General Intelligence and Reasoning Ability

Q.1 Six students, Tara, Claire, Lalit, Monica, Brandon and Rosy, are sitting around a circular table, facing away from the centre. Tara sits to the immediate left of Claire. Lalit sits second to the left of Monica. Two people sit between Rosy and Lalit when counted from the left of Lalit. Brandon is the immediate neighbour of Lalit. Who sits to the immediate left of Tara?

- Ans**
- ☒ 1. Rosy
 - ☐ 2. Tara
 - ☐ 3. Monica
 - ☐ 4. Lalit

Q.2 Select the correct mirror image of the given figure when the mirror is placed at MN as shown below.



- Ans**
- ☐ 1. Y z b e J 4
 - ☒ 2. Y z p e J 4
 - ☐ 3. Y z p e 7 4
 - ☐ 4. z Y p e J 4

Q.3 In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. 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.)

81, 243
73, 219

- Ans**
- ☐ 1. 35, 106
 - ☒ 2. 59, 177
 - ☐ 3. 44, 122
 - ☐ 4. 64, 172

Q.4 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. YJ - HP
 - ☐ 2. QM - KG
 - ☐ 3. OK - IE
 - ☐ 4. LH - FB

Q.5 If '+' means '-', '-' means '×', '×' means '÷', '÷' means '+', then what will come in place of the question mark (?) in the following equation?

$$184 - 7 \div 81 + 1265 \times 5 = ?$$

- Ans**
- ☐ 1. 1103
 - ☐ 2. 1134
 - ☒ 3. 1116
 - ☐ 4. 1122

Q.6 In a certain code language, 'GOTE' is coded as '5032' and 'DOGE' is coded as '2539'. What is the code for 'D' in the given code language?

- Ans**
- ☐ 1. 5
 - ☐ 2. 3
 - ☒ 3. 9
 - ☐ 4. 2

Q.7 In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. 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 its constituent digits. E.g. 13 – Operations on 13 such as adding / subtracting / multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

76, 57
68, 49

- Ans**
- ☐ 1. 48, 26
 - ☒ 2. 71, 52
 - ☐ 3. 54, 38
 - ☐ 4. 88, 66

Q.8 What should come in place of the question mark (?) in the given series?
5, 6, 9, 15, ?, 40

- Ans**
- ☐ 1. 22
 - ☐ 2. 28
 - ☐ 3. 20
 - ☒ 4. 25

Q.9 Jannit ranked 14th from the bottom and 22nd from the top in his class. How many students are there in his class?

- Ans**
- ☐ 1. 33
 - ☐ 2. 34
 - ☒ 3. 35
 - ☐ 4. 32

Q.10 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. AZ–YX
 - ☐ 2. SR–QP
 - ☒ 3. LK–IK
 - ☐ 4. GF–ED

Q.11 In a certain code language, 'EGOS' is coded as '8403' and 'ERGO' is coded as '3058'. What is the code for 'R' in the given code language?

- Ans**
- ☐ 1. 0
 - ☒ 2. 5
 - ☐ 3. 3
 - ☐ 4. 8

Q.12 JMDY is related to PSJE in a certain way based on the English alphabetical order. In the same way, HBRG is related to NHXM. To which of the given options is ZTJY related, following the same logic?

- Ans**
-  1. FRZE
 -  2. FZER
 -  3. PFZE
 -  4. FZPE

Q.13 If A means '+', B means '−', C means '×', D means '÷', then what will come in place of the question mark (?) in the following equation?
30 D 6 B 6 A 2 C 4 = ?

- Ans**
-  1. 5
 -  2. 1
 -  3. 3
 -  4. 7

Q.14 Select the triad which follows the same pattern as that followed by the two triads given below. Both triads follow the same pattern.

RO-LI-GD
NK-HE-CZ

- Ans**
-  1. UR-OL-IG
 -  2. YV-SP-MK
 -  3. HE-BY-WT
 -  4. CZ-VT-RO

Q.15 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 conclusions logically follow(s) from the statements.

Statement: All Soccers are Basketballs. All Basketballs are Baseballs.

Conclusion I: All Baseballs are Soccers.

Conclusion II: Some Baseballs are Soccers.

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

Q.16 In a certain code language,
A + B means 'A is the mother of B',
A – B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A ÷ B means 'A is the father of B'.
Based on the above, how is J related to N if 'J – K + L × M ÷ N'?

- Ans**
-  1. Mother's Father's Father
 -  2. Mother's Mother's Father
 -  3. Mother's Mother's Brother
 -  4. Mother's Father's Brother

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

88, 168, 248, 328, 408, ?

- Ans**
-  1. 388
 -  2. 488
 -  3. 468
 -  4. 588

Q.18 Refer to the following number and symbol series and answer the question that follows.
Counting to be done from left to right only.

(Left) 8 8 5 9 £ 6 7 1 # 9 @ 9 5 7 9 6 * 4 3 # & £ (Right)

How many such numbers are there each of which is immediately preceded by a symbol and also immediately followed by a symbol?

- Ans
- ☒ 1. 2
 - ☒ 2. 1
 - ☒ 3. 3
 - ☒ 4. 0

Q.19 Refer to the following letter and symbol series and answer the question that follows.
Counting to be done from left to right only.

(Left) N @ # € © # # @ @ X J £ U J * A € O B \$ R H (Right)

How many such letters are there each of which is immediately preceded by a symbol and also immediately followed by a symbol?

- Ans
- ☒ 1. 0
 - ☒ 2. 1
 - ☒ 3. 2
 - ☒ 4. 3

Q.20 J, K, L, M, N and O live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2, and so on, till the topmost floor is numbered 6. M lives on the floor numbered 5. J lives on a floor above M. Only N lives below L. K lives on an even numbered floor. How many people live below O?

- Ans
- ☒ 1. Four
 - ☒ 2. One
 - ☒ 3. Three
 - ☒ 4. Two

Section : General Awareness

Q.1 Which of the following are the two most popular high-altitude lakes in Ladakh?

- Ans
- ☒ 1. Pangong Tso and Tso Moriri
 - ☒ 2. Tsomgo Chho and Gadsar
 - ☒ 3. Gurudongmar and Tso Chen
 - ☒ 4. Tarsar and Samiti

Q.2 Which of the following schedules of the constitution deals with the allocation of seats in the Rajya Sabha to the state and Union territories?

- Ans
- ☒ 1. 4th
 - ☒ 2. 5th
 - ☒ 3. 3rd
 - ☒ 4. 6th

Q.3 What are epithelial cells primarily responsible for?

- Ans
- ☒ 1. Producing antibodies to fight infections
 - ☒ 2. Forming protective barriers and linings in tissues and organs
 - ☒ 3. Generating and transmitting electrical impulses in the nervous system
 - ☒ 4. Transporting water and nutrients throughout the body

Q.4 In August 2025, scientists recorded the sliteye shark for the first time in the Great Chagos Bank, the world's largest coral atoll, located in which ocean?

- Ans
- ☒ 1. Atlantic Ocean
 - ☒ 2. Pacific Ocean
 - ☒ 3. Indian Ocean
 - ☒ 4. Southern Ocean

Q.5	Animesh Kujur set the Indian national record of 20.32 seconds in how many metres race at the Asian Athletics Championship 2025 in Gumi, South Korea?
Ans	 1. 800 m  2. 200 m  3. 100 m  4. 400 m
Q.6	In August 2025, a genetic study revealed a possible genetic link to the unusually high rate of tuberculosis (TB) in which Particularly Vulnerable Tribal Group (PVTG) of central India?
Ans	 1. Baiga tribe  2. Birhor tribe  3. Sahariya tribe  4. Chenchu tribe
Q.7	How is the President of India elected?
Ans	 1. By the Prime Minister's appointment  2. By the members of the Parliament only  3. By a single transferable vote of electoral college  4. Directly by the citizens
Q.8	What is the term used to describe the sex ratio for the age group 0-6 years in India?
Ans	 1. Child Sex Ratio  2. Infant Sex Ratio  3. Teen Sex Ratio  4. Youth Sex Ratio
Q.9	Which of the following parts of the Indian Constitution deals with the fundamental rights?
Ans	 1. Part III  2. Part II  3. Part IV  4. Part IV-A
Q.10	Which of the following festivals marks the birth anniversary of Lord Krishna?
Ans	 1. Janmashtami  2. Durga Puja  3. Holi  4. Diwali
Q.11	In which of the following cities was the East India Association founded by Dadabhai Naoroji?
Ans	 1. London  2. Bombay  3. New York  4. Calcutta
Q.12	In August 2025, 34 students from Indian government schools were selected to visit Japan under which prestigious youth exchange initiative in science?
Ans	 1. Nippon Science Youth Programme  2. Sakura Science Programme  3. MEXT Science Exchange Programme  4. Asia-Japan Innovation Fellowship

Q.13 At which of the following places is the Northern Regional Language Centre located?

- Ans**
-  1. New Delhi
 -  2. Mumbai
 -  3. Patiala
 -  4. Mysuru

Q.14 'Indian Cultures as Heritage: Contemporary Pasts' is written by:

- Ans**
-  1. Jawaharlal Nehru
 -  2. VS Naipaul
 -  3. Romila Thapar
 -  4. Amartya Sen

Q.15 Which mountain range passes through Nashik district of Maharashtra?

- Ans**
-  1. Satmala
 -  2. Palani
 -  3. Dhauladhar
 -  4. Vindhya

Q.16 Which of the following Round Table Conferences was attended by Gandhi as the Congress representative at London during the Indian National Movement?

- Ans**
-  1. First Round Table Conference
 -  2. Fourth Round Table Conference
 -  3. Third Round Table Conference
 -  4. Second Round Table Conference

Q.17 What does the term 'net exports' refer to in national income accounting?

- Ans**
-  1. Imports minus exports
 -  2. Total exports and imports combined
 -  3. Exports and imports of intermediate goods
 -  4. Exports minus imports

Q.18 Which genetic principle states that genes located on different chromosomes assort independently during gamete formation?

- Ans**
-  1. Law of Co-dominance
 -  2. Law of Segregation
 -  3. Law of Independent Assortment
 -  4. Law of Dominance

Q.19 Animals in which the cells are arranged in two embryonic layers, an external ectoderm and an internal endoderm, are called:

- Ans**
-  1. triploblastic animals
 -  2. polyblastic animals
 -  3. monoblastic animals
 -  4. diploblastic animals

Q.20 The 'Multiplier Effect' in employment means:

- Ans**
-  1. output increases with more workers
 -  2. more jobs are created when demand increases
 -  3. jobs in one sector create more jobs in other sectors
 -  4. government spending increases national income

Q.1 The marked price of a toy is ₹600. If a shopkeeper allows two successive discounts of 10% and 5%, what will be the final selling price?

- Ans**
- ☒ 1. ₹513
 - ☐ 2. ₹495
 - ☐ 3. ₹500
 - ☐ 4. ₹486

Q.2 P and Q can complete a piece of work in 30 days and 40 days, respectively. R can destroy the entire work in 75 days. P and Q work every day, whereas R joins them every alternate day, starting from the 2nd day. This pattern is continued till the work is completed. In how much time (in days) will the entire work be done?

- Ans**
- ☐ 1. $20\frac{11}{35}$
 - ☐ 2. $18\frac{6}{35}$
 - ☐ 3. $17\frac{9}{35}$
 - ☒ 4. $19\frac{7}{27}$

Q.3 A conical water tank has a height of 24 cm and a base radius of 7 cm. Find the capacity of the tank in cubic centimetres. (Use $\pi = 22/7$)

- Ans**
- ☐ 1. 1233
 - ☒ 2. 1232
 - ☐ 3. 1223
 - ☐ 4. 1322

Q.4 Two trains of lengths 200 m and 300 m are moving towards each other at 60 km/hr and 90 km/hr, respectively. In how much time will they cross each other?

- Ans**
- ☒ 1. 12 seconds
 - ☐ 2. 8 seconds
 - ☐ 3. 10 seconds
 - ☐ 4. 14 seconds

Q.5 A car travels 300 km at 30 km/hr and returns at 60 km/hr. What is the average speed of the car?

- Ans**
- ☐ 1. 48 km/hr
 - ☒ 2. 40 km/hr
 - ☐ 3. 45 km/hr
 - ☐ 4. 42 km/hr

Q.6 The average of the first 41 odd natural numbers, is:

- Ans**
- ☐ 1. 40
 - ☐ 2. 20.5
 - ☒ 3. 41
 - ☐ 4. 42

Q.7 The selling price of 20 books is equal to the cost price of 37 books. Find the loss or gain percentage.

- Ans**
- ☒ 1. 85% gain
 - ☐ 2. $\frac{100}{17}\% \text{ loss}$
 - ☐ 3. $\frac{100}{17}\% \text{ gain}$
 - ☐ 4. 85% loss

Q.8 Amar can do a piece of work in 12 days and Mohan can do it in 18 days. If they work together on it for 6 days, then find the fraction of the work that is left.

- Ans**
- ☐ 1. $\frac{1}{5}$
 - ☐ 2. $\frac{2}{5}$
 - ☒ 3. $\frac{1}{6}$
 - ☐ 4. $\frac{2}{3}$

Q.9 Convert $0.\overline{16}$ into a vulgar fraction.

- Ans**
- ☐ 1. $\frac{16}{97}$
 - ☒ 2. $\frac{16}{99}$
 - ☐ 3. $\frac{1}{6}$
 - ☐ 4. $\frac{16}{90}$

Q.10 The number of prime numbers between 387 and 401, both included, is:

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

Q.11 Four shops A, B, C, and D are open for 5 days in a week. The sales data of these four shops in a particular week is given below.

Shop	Monday	Tuesday	Wednesday	Thursday	Friday
Shop A	120	135	150	140	130
Shop B	100	110	120	115	125
Shop C	90	100	110	105	95
Shop D	80	85	90	95	100

What is the total number of units sold by Shop A from Monday to Friday?

- Ans**
- ☐ 1. 700
 - ☐ 2. 650
 - ☐ 3. 600
 - ☒ 4. 675

Q.12 By how much is 60% of 60 greater than $\frac{2}{5}$ of 25?

- Ans**
- ☐ 1. 20
 - ☒ 2. 26
 - ☐ 3. 24
 - ☐ 4. 23

Q.13 A solid cube of side 12 cm is melted and cast into a solid cuboid of length 18 cm and breadth 16 cm. Find the height of the cuboid.

- Ans**
- ☐ 1. 8 cm
 - ☒ 2. 6 cm
 - ☐ 3. 5 cm
 - ☐ 4. 10 cm

Q.14 A merchant raised the price of his products by 70%. What percentage of discount (rounded off to one decimal place) should he give so as to sell the products at no profit and no loss?

- Ans**
- ☐ 1. 40.3%
 - ☐ 2. 43.6%
 - ☐ 3. 40.9%
 - ☒ 4. 41.2%

Q.15 When x is added to each of 21, 17, 6 and 5, then the numbers so obtained, in this order, are in proportion. If $4x : y :: y : (6x-3)$, and $y > 0$, what is the value of y ?

- Ans**
- ☐ 1. 2
 - ☒ 2. 6
 - ☐ 3. 5
 - ☐ 4. 8

Q.16 The average of 6 results is 51 and that of the first 5 is 50. The 6th result is:

- Ans**
- ☒ 1. 56
 - ☐ 2. 50
 - ☐ 3. 51
 - ☐ 4. 55

Q.17 In what duration (in years) will ₹2,400 fetch a simple interest of ₹1,080 at 3% per annum rate of interest?

- Ans**
- ☐ 1. 30
 - ☒ 2. 15
 - ☐ 3. 14
 - ☐ 4. 16

Q.18 A number when increased by 10%, gives 3080. The number is:

- Ans**
- ☐ 1. 8400
 - ☐ 2. 5600
 - ☐ 3. 1400
 - ☒ 4. 2800

Q.19 The ratio of the present ages of Raj and Amit is 5 : 7. If Raj is 25 years old now, find the present age of Amit.

- Ans**
- ☐ 1. 45 years
 - ☐ 2. 40 years
 - ☐ 3. 30 years
 - ☒ 4. 35 years

Q.20 The difference between the simple interest and the compound interest, compounded annually, on a certain sum of money for 2 years at 16% per annum is ₹441. Find the sum. [Give your answer to integral number without rounded off.]

- Ans**
- ☐ 1. ₹17,229
 - ☐ 2. ₹17,218
 - ☒ 3. ₹17,226
 - ☐ 4. ₹17,237

Q.1 Select the idiom that conveys the same meaning as the underlined segment in the given sentence.

When Sarah's business failed, her friend advised her to pick herself up and try again after falling.

- Ans**
- ☒ 1. beat around the bush
 - ☒ 2. bite the bullet
 - ☒ 3. get back on horse
 - ☒ 4. break the ice

Q.2 Select the option that can be used as a one-word substitute for the given group of words.

A person who studies the origin and history of words

- Ans**
- ☒ 1. Phalangist
 - ☒ 2. Seminist
 - ☒ 3. Etymologist
 - ☒ 4. Lexicographer

Q.3 Select the most appropriate article to fill in the blank. If no article is required, select 'No article required'.

_____ ancient manuscript was discovered in the ruins of the royal palace.

- Ans**
- ☒ 1. An
 - ☒ 2. The
 - ☒ 3. No article required
 - ☒ 4. A

Q.4 Select the most appropriate ANTONYM of the given word.

Aspersions

- Ans**
- ☒ 1. Insult
 - ☒ 2. Praise
 - ☒ 3. Criticism
 - ☒ 4. Defamation

Q.5 Select the most appropriate option that rectifies the incorrectly spelt word in the given sentence.

The meschievious child, grinning from ear to ear, hid his sister's favourite toy behind the couch, eagerly awaiting her reaction as she searched for it.

- Ans**
- ☒ 1. mischievous
 - ☒ 2. mischievous
 - ☒ 3. mischeivous
 - ☒ 4. mischievious

Q.6 Select the option that can be used as a one-word substitute for the given group of words.

The situation where someone is inappropriately affectionate

- Ans**
- ☒ 1. Affectionate
 - ☒ 2. Obsequious
 - ☒ 3. Effusive
 - ☒ 4. Sentimental

Q.7 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. The study was conducted by a US team of researchers who had one half of each pair of twins follow an omnivorous diet, while the other half followed a vegan diet for eight weeks.
B. Being on a vegan diet can slow down biological aging and changes DNA, according to a small new study involving 21 pairs of identical twins.
C. This phenomenon, known as epigenetic aging, was found to be reduced in metabolic and inflammatory systems, as well as in organs like the heart and liver, among those following a vegan diet.
D. A subsequent examination of the effects of diet on DNA revealed that DNA methylation, a process where gene expression deteriorates over time, was lower in those on a non-vegan diet.

Ans  1. BACD
 2. BADC
 3. BCDA
 4. BCAD

Q.8 Select the most appropriate **ANTONYM** of the given word.

Herald

Ans  1. Proponent
 2. Forerunner
 3. Rival
 4. Promoter

Q.9 Select the most appropriate option to fill in the blank.

It was a confusing situation. Many things were happening _____ the same time.

Ans  1. on
 2. at
 3. in
 4. since

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.

- A. Similarly, Plato's student Aristotle claimed that while relationships built on feelings like pleasure are common, they are less good for humankind than relationships built on goodwill and shared virtues.
B. This is because Aristotle thought relationships built on feelings last only as long as the feelings last.
C. The ancient Greek philosopher Plato thought that love might cause feelings like attraction and pleasure, which are out of your control.
D. However, these feelings are less significant than the loving relationships you choose to form as a result: lifelong bonds between people who help one another change and grow into their best selves.

Ans  1. CDAB
 2. CADB
 3. CDBA
 4. CABD

Q.11 Select the proverb that conveys the same meaning as the underlined segment in the given sentence.

When Pat decided to learn a new language at 60, he proved that one can start something new at any point of life.

Ans  1. one should not put all his eggs in one basket
 2. the early bird catches the worm
 3. one should strike when iron is hot
 4. it is better late than never

Q.12 Select the most appropriate article to fill in the blank. If no article is required, select 'No article required'.

_____ weather created havoc in the coastal village.

- Ans**
- ☒ 1. The
 - ☐ 2. An
 - ☐ 3. No article required
 - ☐ 4. A

Q.13 Select the most appropriate option to fill in the blank.

The scientist provided a _____ explanation for the phenomenon, which left the audience in awe.

- Ans**
- ☐ 1. selective
 - ☐ 2. confusing
 - ☒ 3. comprehensive
 - ☐ 4. simple

Q.14 Select the most appropriate option to fill in the blank.
Ms. Prarthana commented, "She wore a warm sweater _____ her winter coat."

- Ans**
- ☐ 1. upon
 - ☒ 2. underneath
 - ☐ 3. through
 - ☐ 4. unto

Q.15 Select the most appropriate option to fill in the blank.

During the development of the Eiffel Tower in the late 19th century, Gustave Eiffel faced criticism for the tower's design. However, the structure _____ celebrated as an architectural marvel and symbol of Paris.

- Ans**
- ☐ 1. is
 - ☒ 2. has been
 - ☐ 3. had been
 - ☐ 4. was

Comprehension:

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

Most of us try to avoid brown recluse spiders due to their potent venom. However, a team of scientists recently examined these arachnids closely and discovered something remarkable: the spiders were meticulously crafting an industrial-strength material for their webs using a sewing-like motion. Researchers believe that applying the spider's unique silk and technique to synthetic materials could benefit space travel, improve parachutes, enhance Hollywood stunts, and more. These findings are published in the journal *Materials Horizons*.

The spider uses its silk-producing organs, known as spinnerets, to sew the strands. The large spinnerets form a loop of silk thread, while the smaller spinnerets close the loop with a swift clamp-and-release action. "The motion is similar to how one might roll up an extension cord: by drawing out a length of cord, clamping it into a loop, and bundling the looped portion with the previous loops," explained Hannes Schniepp, an associate professor in the department of applied science at William & Mary College and the study's lead author. Under high magnification, Schniepp and his colleagues observed that the resulting material consists of multiple micro-loops that enhance the silk's strength. Co-author Sean Koebley, a graduate student, noted that even a single loop 'significantly enhances the toughness' of the material.

The brown recluse's silk is the only known spider silk to be thin and flat instead of round. Schniepp compared the sticky silk to a piece of Scotch tape, but 2000 times thinner. "Its thinness makes it very floppy, very sticky and has many other unique properties in the materials world," he added. This thinness is what allows the self-adhesive loops to form in the first place.

Although scientists have not yet created a man-made version of the material, efforts are underway. They have developed mathematical models to describe the web's structure and properties in detail and have already submitted a patent application for a spider-inspired synthetic product. They envision its use in space travel and other high-performance applications.

SubQuestion No : 16

Q.16 Select the most appropriate title for the given passage.

- Ans**
- ☐ 1. The dangers of Brown Recluse Spiders
 - ☐ 2. How Spiders Catch their Prey
 - ☒ 3. Innovations in Spider Silk Technology
 - ☐ 4. Schniepp's Obsession with Spiders

Comprehension:

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SubQuestion No : 17

Q.17 What is the main benefit of the spider's silk having multiple micro-loops?

- Ans**
- ☐ 1. It makes the silk waterproof.
 - ☐ 2. It helps the spider move faster.
 - ☒ 3. It enhances the silk's strength.
 - ☐ 4. It makes the silk more colourful.

Comprehension:

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

Most of us try to avoid brown recluse spiders due to their potent venom. However, a team of scientists recently examined these arachnids closely and discovered something remarkable: the spiders were meticulously crafting an industrial-strength material for their webs using a sewing-like motion. Researchers believe that applying the spider's unique silk and technique to synthetic materials could benefit space travel, improve parachutes, enhance Hollywood stunts, and more. These findings are published in the journal *Materials Horizons*.

The spider uses its silk-producing organs, known as spinnerets, to sew the strands. The large spinnerets form a loop of silk thread, while the smaller spinnerets close the loop with a swift clamp-and-release action. "The motion is similar to how one might roll up an extension cord: by drawing out a length of cord, clamping it into a loop, and bundling the looped portion with the previous loops," explained Hannes Schniepp, an associate professor in the department of applied science at William & Mary College and the study's lead author. Under high magnification, Schniepp and his colleagues observed that the resulting material consists of multiple micro-loops that enhance the silk's strength. Co-author Sean Koebley, a graduate student, noted that even a single loop 'significantly enhances the toughness' of the material.

The brown recluse's silk is the only known spider silk to be thin and flat instead of round. Schniepp compared the sticky silk to a piece of Scotch tape, but 2000 times thinner. "Its thinness makes it very floppy, very sticky and has many other unique properties in the materials world," he added. This thinness is what allows the self-adhesive loops to form in the first place.

Although scientists have not yet created a man-made version of the material, efforts are underway. They have developed mathematical models to describe the web's structure and properties in detail and have already submitted a patent application for a spider-inspired synthetic product. They envision its use in space travel and other high-performance applications.

SubQuestion No : 18

Q.18 According to the passage, what could the spider's silk potentially improve?

- Ans**
- ☐ 1. Agricultural techniques
 - ☐ 2. Construction materials
 - ☐ 3. Medical treatments
 - ☒ 4. Space travel and parachutes

Comprehension:

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

Most of us try to avoid brown recluse spiders due to their potent venom. However, a team of scientists recently examined these arachnids closely and discovered something remarkable: the spiders were meticulously crafting an industrial-strength material for their webs using a sewing-like motion. Researchers believe that applying the spider's unique silk and technique to synthetic materials could benefit space travel, improve parachutes, enhance Hollywood stunts, and more. These findings are published in the journal *Materials Horizons*.

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SubQuestion No : 19

Q.19 What is unique about the brown recluse's silk compared to other spiders' silks?

- Ans**
- ☒ 1. It is round and thick.
 - ☒ 2. It is thin and flat.
 - ☒ 3. It is opaque and sticky.
 - ☒ 4. It is transparent and has many colours.

Comprehension:

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

Most of us try to avoid brown recluse spiders due to their potent venom. However, a team of scientists recently examined these arachnids closely and discovered something remarkable: the spiders were meticulously crafting an industrial-strength material for their webs using a sewing-like motion. Researchers believe that applying the spider's unique silk and technique to synthetic materials could benefit space travel, improve parachutes, enhance Hollywood stunts, and more. These findings are published in the journal *Materials Horizons*.

The spider uses its silk-producing organs, known as spinnerets, to sew the strands. The large spinnerets form a loop of silk thread, while the smaller spinnerets close the loop with a swift clamp-and-release action. "The motion is similar to how one might roll up an extension cord: by drawing out a length of cord, clamping it into a loop, and bundling the looped portion with the previous loops," explained Hannes Schniepp, an associate professor in the department of applied science at William & Mary College and the study's lead author. Under high magnification, Schniepp and his colleagues observed that the resulting material consists of multiple micro-loops that enhance the silk's strength. Co-author Sean Koebley, a graduate student, noted that even a single loop 'significantly enhances the toughness' of the material.

The brown recluse's silk is the only known spider silk to be thin and flat instead of round. Schniepp compared the sticky silk to a piece of Scotch tape, but 2000 times thinner. "Its thinness makes it very floppy, very sticky and has many other unique properties in the materials world," he added. This thinness is what allows the self-adhesive loops to form in the first place.

Although scientists have not yet created a man-made version of the material, efforts are underway. They have developed mathematical models to describe the web's structure and properties in detail and have already submitted a patent application for a spider-inspired synthetic product. They envision its use in space travel and other high-performance applications.

SubQuestion No : 20

Q.20 Based on your reading, select the most appropriate synonym of floppy.

- Ans**
- ☒ 1. fragile
 - ☒ 2. firm
 - ☒ 3. heavy
 - ☒ 4. flexible

Q.1	निम्नलिखित विकल्पों में शुद्ध वाक्य अंकित कीजिए।
Ans	✗ 1. अपनी भाषा का गौरव मां को शीतल कर देने वाला होता है। ✗ 2. अपनी भासा का गौरव मन को शीतल कर देने वाला होता है। ✗ 3. अपनी भाषा का गौरव मन को सीतल कर देने वाला होता है। ✓ 4. अपनी भाषा का गौरव मन को शीतल कर देने वाला होता है।
Q.2	दिये गये मुहावरों में से कौन-सा मुहावरा अपने अर्थ से सुमेलित नहीं है—
Ans	✗ 1. अवसर चूकना - मौका खोना ✓ 2. अब-तब करना - बुरे ढंग से बोलना ✗ 3. अरमान निकालना - इच्छा पूरी करना ✗ 4. अपने सिर लेना - स्वीकार करना
Q.3	उचित कारक चिह्न से दिए गए वाक्य का रिक्त स्थान पूर्ण करें— सब जानते हैं कि आगरा का ताजमहल शाहजहाँ बनवाया था।
Ans	✗ 1. से ✗ 2. का ✗ 3. द्वारा ✓ 4. ने
Q.4	निम्न विकल्पों में से सही वाक्य क्रम की पहचान करें -
Ans	✗ 1. नाखून होते हैं बिल्ली के पंजे में। ✓ 2. बिल्ली के पंजे में नाखून होते हैं। ✗ 3. होते हैं नाखून बिल्ली के पंजे में। ✗ 4. पंजे में बिल्ली के होते हैं नाखून।
Q.5	निम्नलिखित शब्दों को सही क्रम में लगाकर वाक्य बनाइये अचानक / गाड़ी / सामने / एक / आ / गई
Ans	✗ 1. एक गाड़ी अचानक सामने आ गई ✗ 2. सामने अचानक गाड़ी एक आ गई ✓ 3. अचानक एक गाड़ी सामने आ गई ✗ 4. अचानक एक गाड़ी आ गई सामने
Q.6	निम्न शब्द का विलोम पहचाने। कनीय
Ans	✗ 1. अमीर ✗ 2. जमीर ✗ 3. गरीब ✓ 4. वरीय
Q.7	उचित कारक चिह्न से दिए गए वाक्य का रिक्त स्थान पूर्ण करें— गीता में कहा गया है कि कर्म मनुष्य का अधिकार है।
Ans	✗ 1. में ✗ 2. का ✗ 3. से ✓ 4. पर
Q.8	निम्नलिखित विकल्पों में शुद्ध वाक्य अंकित कीजिए।
Ans	✗ 1. मनुष्य का जीवन सत्य न्याय और श्रेष्ठ कि स्थापना के लिए है। ✗ 2. मनुष्य का जीवन सत्य, न्याय और श्रेष्ठा की स्थापना के लिए है। ✗ 3. मनुष्य का जीवन सत्य न्याय और श्रेष्ठ की स्तापना के लिए है। ✓ 4. मनुष्य का जीवन सत्य, न्याय और श्रेष्ठ की स्थापना के लिए है।
Q.9	दिए गए वाक्यांश के लिए निम्न में से एक शब्द होगा-- 'जिसमें किसी का कोई हेतु या कारण न हो'
Ans	✓ 1. अहैतुक ✗ 2. अहित ✗ 3. अहितु ✗ 4. आहूत

Q.10 'तिनका' निम्न में से किस अनेकार्थी शब्द का एक अर्थ है--

- Ans
-  1. खग
 -  2. खल
 -  3. खर
 -  4. कोट

Q.11 निम्नलिखित मुहावरे का सार्थक अर्थ अंकित कीजिए।
अंग-अंग फूले न समाना

- Ans
-  1. अत्यधिक उदंड होना
 -  2. अत्यधिक प्रसन्न होना
 -  3. अत्यधिक क्रोधित होना
 -  4. अत्यधिक फूल जाना

Q.12 उचित कारक चिह्न से दिए गए वाक्य का रिक्त स्थान पूर्ण करें—
सर्दी के दिनों में कैप जीवन एक लम्बी पिकनिक के समान हुआ करता था।

- Ans
-  1. पर
 -  2. के लिए
 -  3. का
 -  4. से

Q.13 निम्न में से तद्भव शब्द पहचानें-

- Ans
-  1. वेष
 -  2. मरण
 -  3. भभूत
 -  4. मंडप

Q.14 निम्न शब्द का विलोम पहचाने।
कुसुम

- Ans
-  1. ब्रज
 -  2. वज्र
 -  3. आम्र
 -  4. अग्र

Q.15 दिए गए वाक्यांश के लिए निम्न में से एक शब्द होगा--
'राजमवन के अंदर महिलाओं का निवास'

- Ans
-  1. अंतेपुर
 -  2. गुप्तकक्ष
 -  3. अंतःपुर
 -  4. अधिवास

Comprehension:

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

सरस्वती पत्रिका का प्रकाशन इंडियन प्रेस इलाहाबाद से सन् 1900 में शुरू हुआ। 1903 में इसके संपादक आचार्य महावीर प्रसाद द्विवेदी बनाये गए। सरस्वती ने उस समय की राष्ट्रीय आकांक्षा को वाणी दी। सरस्वती ने ज्ञान-विज्ञान के नये क्षेत्रों में प्रवेश किया और प्रमाणित किया कि हिंदी में जटिल विषयों को प्रस्तुत करने की क्षमता निहित है। सरस्वती ने हिंदी गद्य को परिनिष्ठित रूप दिया, उसमें व्याप्त अनगढ़पन और अराजकता को समाप्त कर उसे एकरूपता प्रदान की। इसने गद्य और पद्य की भाषा के द्वंद्व को समाप्त किया और पद्य के लिए भी खड़ी बोली को सुनिश्चित किया। द्विवेदी जी ने साहित्य के मध्ययुगीन आदर्शों का विरोध किया, रीतिकालीन भावबोध और कलारूपों को अस्वीकार किया और अपने युग और समाज की ज़रूरतों के अनुकूल साहित्य रचने की प्रेरणा लेखकों में जगायी। उन्होंने साहित्य को समाज से जोड़ा।

SubQuestion No : 16

Q.16 'सरस्वती' पत्रिका के संदर्भ में असत्य कथन है--

- Ans
-  1. इसने प्रमाणित किया कि हिंदी जटिल विषयों को प्रस्तुत कर सकती है।
 -  2. इसने हिंदी गद्य को परिनिष्ठित रूप प्रदान किया।
 -  3. इसने उस समय की राष्ट्रीय आकांक्षा को वाणी दी।
 -  4. इसने गद्य और पद्य के मध्य के द्वंद्व को और विस्तृत किया।

Comprehension:

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

सरस्वती पत्रिका का प्रकाशन इंडियन प्रेस इलाहाबाद से सन् 1900 में शुरू हुआ। 1903 में इसके संपादक आचार्य महावीर प्रसाद द्विवेदी बनाये गए। सरस्वती ने उस समय की राष्ट्रीय आकांक्षा को वाणी दी। सरस्वती ने ज्ञान-विज्ञान के नये क्षेत्रों में प्रवेश किया और प्रमाणित किया कि हिंदी में जटिल विषयों को प्रस्तुत करने की क्षमता निहित है। सरस्वती ने हिंदी गद्य को परिनिष्ठित रूप दिया, उसमें व्याप्त अनगढ़पन और अराजकता को समाप्त कर उसे एकरूपता प्रदान की। इसने गद्य और पद्य की भाषा के द्वंद्व को समाप्त किया और पद्य के लिए भी खड़ी बोली को सुनिश्चित किया। द्विवेदी जी ने साहित्य के मध्ययुगीन आदर्शों का विरोध किया, रीतिकालीन भावबोध और कलारूपों को अस्वीकार किया और अपने युग और समाज की ज़रूरतों के अनुकूल साहित्य रचने की प्रेरणा लेखकों में जगायी। उन्होंने साहित्य को समाज से जोड़ा।

SubQuestion No : 17

Q.17 द्विवेदी जी के विषय में असत्य कथन है--

- Ans
- ☒ 1. इन्होंने साहित्य के मध्ययुगीन आदर्शों का विरोध किया।
 - ☒ 2. इन्होंने साहित्यकारों को रीतिकालीन परिपाटी पर लेखन के लिए प्रेरित किया।
 - ☒ 3. द्विवेदी जी 1903 में 'सरस्वती' के सम्पादक बने।
 - ☒ 4. इन्होंने साहित्य को समाज से जोड़ने का महत्ती कार्य किया।

Comprehension:

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

सरस्वती पत्रिका का प्रकाशन इंडियन प्रेस इलाहाबाद से सन् 1900 में शुरू हुआ। 1903 में इसके संपादक आचार्य महावीर प्रसाद द्विवेदी बनाये गए। सरस्वती ने उस समय की राष्ट्रीय आकांक्षा को वाणी दी। सरस्वती ने ज्ञान-विज्ञान के नये क्षेत्रों में प्रवेश किया और प्रमाणित किया कि हिंदी में जटिल विषयों को प्रस्तुत करने की क्षमता निहित है। सरस्वती ने हिंदी गद्य को परिनिष्ठित रूप दिया, उसमें व्याप्त अनगढ़पन और अराजकता को समाप्त कर उसे एकरूपता प्रदान की। इसने गद्य और पद्य की भाषा के द्वंद्व को समाप्त किया और पद्य के लिए भी खड़ी बोली को सुनिश्चित किया। द्विवेदी जी ने साहित्य के मध्ययुगीन आदर्शों का विरोध किया, रीतिकालीन भावबोध और कलारूपों को अस्वीकार किया और अपने युग और समाज की ज़रूरतों के अनुकूल साहित्य रचने की प्रेरणा लेखकों में जगायी। उन्होंने साहित्य को समाज से जोड़ा।

SubQuestion No : 18

Q.18 'सरस्वती' पत्रिका का प्रकाशन कहाँ से होता था--

- Ans
- ☒ 1. इलाहाबाद
 - ☒ 2. दिल्ली
 - ☒ 3. लखनऊ
 - ☒ 4. कानपुर

Comprehension:

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

सरस्वती पत्रिका का प्रकाशन इंडियन प्रेस इलाहाबाद से सन् 1900 में शुरू हुआ। 1903 में इसके संपादक आचार्य महावीर प्रसाद द्विवेदी बनाये गए। सरस्वती ने उस समय की राष्ट्रीय आकांक्षा को वाणी दी। सरस्वती ने ज्ञान-विज्ञान के नये क्षेत्रों में प्रवेश किया और प्रमाणित किया कि हिंदी में जटिल विषयों को प्रस्तुत करने की क्षमता निहित है। सरस्वती ने हिंदी गद्य को परिनिष्ठित रूप दिया, उसमें व्याप्त अनगढ़पन और अराजकता को समाप्त कर उसे एकरूपता प्रदान की। इसने गद्य और पद्य की भाषा के द्वंद्व को समाप्त किया और पद्य के लिए भी खड़ी बोली को सुनिश्चित किया। द्विवेदी जी ने साहित्य के मध्ययुगीन आदर्शों का विरोध किया, रीतिकालीन भावबोध और कलारूपों को अस्वीकार किया और अपने युग और समाज की ज़रूरतों के अनुकूल साहित्य रचने की प्रेरणा लेखकों में जगायी। उन्होंने साहित्य को समाज से जोड़ा।

SubQuestion No : 19

Q.19 निम्न में से 'परिनिष्ठित' का अर्थ है--

- Ans
- ☒ 1. मौलिक
 - ☒ 2. पूर्णतः अशुद्ध
 - ☒ 3. कृत्रिम
 - ☒ 4. पूर्णतः शुद्ध

Comprehension:

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

सरस्वती पत्रिका का प्रकाशन इंडियन प्रेस इलाहाबाद से सन् 1900 में शुरू हुआ। 1903 में इसके संपादक आचार्य महावीर प्रसाद द्विवेदी बनाये गए। सरस्वती ने उस समय की राष्ट्रीय आकांक्षा को वाणी दी। सरस्वती ने ज्ञान-विज्ञान के नये क्षेत्रों में प्रवेश किया और प्रमाणित किया कि हिंदी में जटिल विषयों को प्रस्तुत करने की क्षमता निहित है। सरस्वती ने हिंदी गद्य को परिनिष्ठित रूप दिया, उसमें व्याप्त अनगढ़पन और अराजकता को समाप्त कर उसे एकरूपता प्रदान की। इसने गद्य और पद्य की भाषा के द्वंद्व को समाप्त किया और पद्य के लिए भी खड़ी बोली को सुनिश्चित किया। द्विवेदी जी ने साहित्य के मध्ययुगीन आदर्शों का विरोध किया, रीतिकालीन भावबोध और कलारूपों को अस्वीकार किया और अपने युग और समाज की ज़रूरतों के अनुकूल साहित्य रचने की प्रेरणा लेखकों में जगायी। उन्होंने साहित्य को समाज से जोड़ा।

SubQuestion No : 20

Q.20 निम्न में से 'अनुकूल' का विलोम शब्द है--

- Ans
- ☒ 1. प्रतिकूल
 - ☒ 2. आकुल
 - ☒ 3. विकल
 - ☒ 4. भिन्न

Q.1 Which of the following is NOT a correct basis for classifying internal combustion engines?

- Ans**
- ☐ 1. Method of cooling
 - ☐ 2. Method of ignition
 - ☒ 3. Type of working fluid
 - ☐ 4. Type of fuel used

Q.2 Which of the following statements is true for shear force and bending moment?

- Ans**
- ☐ 1. Double Integration of bending moment with respect to x is equal to shear force.
 - ☒ 2. The rate of change of the bending moment with respect to x is equal to the shearing force.
 - ☐ 3. The rate of change of the shear force with respect to x is equal to the bending moment.
 - ☐ 4. Integration of bending moment with respect to x is equal to shear force.

Q.3 The intake valve in a four-stroke diesel engine typically opens:

- Ans**
- ☒ 1. before top dead centre (BTDC)
 - ☐ 2. after bottom dead centre (ABDC)
 - ☐ 3. at top dead centre (TDC)
 - ☐ 4. at bottom dead centre (BDC)

Q.4 On a Temperature–Entropy (T–S) diagram, the constant pressure line within the wet region of steam is represented by:

- Ans**
- ☐ 1. a straight line with a negative slope from the entropy axis
 - ☒ 2. a straight line parallel to the entropy axis
 - ☐ 3. a straight line parallel to the temperature axis
 - ☐ 4. a straight line with a positive slope from the entropy axis

Q.5 Which of the following is NOT an application of jet propulsion devices?

- Ans**
- ☐ 1. Missiles
 - ☒ 2. Scuba diving
 - ☐ 3. Spacecraft
 - ☐ 4. High-altitude aircraft

Q.6 The Francis turbine is classified as:

- Ans**
- ☒ 1. mixed flow reaction turbine
 - ☐ 2. pure impulse turbine
 - ☐ 3. tangential flow turbine
 - ☐ 4. axial flow turbine

Q.7 A cantilever beam of 4 m length carries a uniformly distributed load (UDL) 2 kN/m over the half span from the free end of a cantilever. What is the bending moment at the fixed end of the cantilever?

- Ans**
- ☒ 1. 12 kN-m
 - ☐ 2. 2 kN-m
 - ☐ 3. 0 kN-m
 - ☐ 4. 4 kN-m

Q.8 In a reaction turbine, the pressure drop occurs:

- Ans**
- ☐ 1. only in the draft tube
 - ☐ 2. only in the nozzle
 - ☐ 3. only in the runner
 - ☒ 4. partly in fixed blades and partly in moving blades

Q.9 Negative slip occurs in a reciprocating pump when:

- Ans**
- ☐ 1. suction lift is very high
 - ☐ 2. actual discharge < theoretical discharge
 - ☒ 3. actual discharge > theoretical discharge
 - ☐ 4. suction pipe is long and pump speed is low

Q.10 The Kaplan turbine is a/an:

- Ans**
- ☐ 1. mixed flow impulse turbine
 - ☐ 2. tangential flow impulse turbine
 - ☒ 3. axial flow reaction turbine
 - ☐ 4. axial flow impulse turbine

Q.11 In an impulse turbine, the pressure drop occurs:

- Ans**
- ☐ 1. only in the runner
 - ☒ 2. only in the nozzle
 - ☐ 3. throughout the runner and nozzle
 - ☐ 4. nowhere, the pressure remains constant

Q.12 In a single-acting reciprocating pump, water is delivered:

- Ans**
- ☒ 1. during delivery stroke only
 - ☐ 2. during both strokes
 - ☐ 3. during suction stroke only
 - ☐ 4. continuously without fluctuation

Q.13 The water in a cross-flow turbine passes through the runner:

- Ans**
- ☐ 1. only tangentially without entering the runner
 - ☒ 2. twice, entering the runner first from outside, then through the inside
 - ☐ 3. multiple times through the same path
 - ☐ 4. once in a single direction

Q.14 The section modulus depends on which of the following?

- Ans**
- ☒ 1. Moment of inertia
 - ☐ 2. Modulus of rigidity
 - ☐ 3. Poisson's ratio
 - ☐ 4. Toughness

Q.15 Which assumption is made in the ideal Otto cycle?

- Ans**
- ☐ 1. Heat is rejected at constant volume
 - ☐ 2. Compression and expansion are isobaric
 - ☒ 3. Combustion occurs at constant volume
 - ☐ 4. Combustion occurs at constant pressure

Q.16 When a column is subjected to axial load which does not pass through the geometrical axis of the column, the two stresses – direct compressive stress and bending stress (either tensile or compressive) – develop in the cross-section of the column. The resulting stresses at any layer in the cross-section will be _____.

- Ans**
- ☐ 1. the difference of the two stresses
 - ☐ 2. greater of the two stresses
 - ☒ 3. the algebraic sum of the two stresses
 - ☐ 4. smaller of the two stresses

Q.17 When a short column is subjected to eccentric loading, in which of the following cases will the resulting stresses be partly tensile and partly compressive across the section?

- Ans**
- ☐ 1. When direct compressive stress is equal to bending stress produced due to bending couple
 - ☐ 2. In all cases, the resulting stresses at any layer in the cross-section will be compressive stress
 - ☐ 3. When direct compressive stress is greater than bending stress produced due to bending couple
 - ☒ 4. When bending stress produced due to bending couple is greater than the direct compressive stress

Q.18 If a beam is subjected to bending, which of the following expressions will give maximum moment of resistance for a rectangular section, having depth 'd' equal to twice the width and maximum bending stress ' $f_{\max}$ '?

- Ans
- ☐ 1. $\frac{1}{6} d^3 f_{\max}$
 - ☐ 2. $\frac{1}{12} d^4 f_{\max}$
 - ☒ 3. $\frac{1}{12} d^3 f_{\max}$
 - ☐ 4. $\frac{1}{24} d^4 f_{\max}$

Q.19 For engineering stress-strain diagram, which of the following statements is correct about stress calculation?

- Ans
- ☒ 1. Stress calculation is based on original cross-sectional area.
 - ☐ 2. Yield stress calculation is based on real cross-sectional area and ultimate stress calculation is based on original cross-sectional area.
 - ☐ 3. Yield stress calculation is based on original cross-sectional area and ultimate stress calculation is based on real cross-sectional area.
 - ☐ 4. Stress calculation is based on real cross-sectional area.

Q.20 The nature of variation of the bending stress, along the depth of a beam, is:

- Ans
- ☐ 1. cubic
 - ☐ 2. parabolic
 - ☐ 3. non-linear
 - ☒ 4. linear

Section : **Discipline2**

Q.1 Which of the following forces are considered in any free-body diagram (FBD)?

- 1. External forces
- 2. Internal forces
- 3. Weight of the body
- 4. Reaction by support

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

Q.2 When rotating parts are NOT completely balanced, which of the following is a possible outcome?

- Ans
- ☐ 1. Elimination of vibration
 - ☐ 2. Relieving stress in the various members
 - ☐ 3. Decreased loads on bearings
 - ☒ 4. Enhanced loads on bearings

Q.3 What is the primary reason for a slip in a belt drive?

- Ans
- ☐ 1. Elastic stretch of the belt
 - ☐ 2. Initial tension in the belt
 - ☐ 3. Incorrect pulley alignment
 - ☒ 4. Insufficient friction between the belt and pulley

Q.4 A flat belt drive has a tension of 20 N on the tight side and 10 N on the slack side. What will be the initial tension in the belt?

- Ans
- ☐ 1. 30 N
 - ☐ 2. Zero
 - ☒ 3. 15 N
 - ☐ 4. 5N

Q.5 The Parallelogram law of forces is applicable for:

- Ans**
- ☐ 1. offset forces
 - ☐ 2. non-coplanar forces
 - ☒ 3. concurrent forces
 - ☐ 4. non-concurrent forces

Q.6 Which of the following expressions correctly defines the Power of a Governor?

- Ans**
- ☐ 1. Power = Mean effort + Lift of sleeve
 - ☒ 2. Power = Mean effort $\times$ Lift of sleeve
 - ☐ 3. Power = Mean effort / Lift of sleeve
 - ☐ 4. Power = Mean effort – Lift of sleeve

Q.7 Which of the following is a derived unit?

- Ans**
- ☐ 1. Steradian
 - ☐ 2. Radian
 - ☐ 3. Candela
 - ☒ 4. Radian/second

Q.8 Which of the following is generally NOT required for the representation of a force?

- Ans**
- ☐ 1. Magnitude
 - ☒ 2. Mass
 - ☐ 3. Direction
 - ☐ 4. Point of application

Q.9 The working compartment of which of the following types of dynamometers consists of special, semi-circular shaped vanes cast into a stainless steel rotor and stators?

- Ans**
- ☐ 1. Eddy current dynamometer
 - ☐ 2. Rope brake dynamometer
 - ☒ 3. Hydraulic dynamometer
 - ☐ 4. Prony brake dynamometer

Q.10 Which of the following is NOT a valid reason for using V-belts in factories and workshops?

- Ans**
- ☐ 1. They can be run in either direction.
 - ☐ 2. They are easy to install and remove.
 - ☐ 3. They are made endlessly, so there is no problem with joints.
 - ☒ 4. The drive is negative due to a significant slip.

Q.11 Which of the following statements is INCORRECT about the requirement of an ignition system?

- Ans**
- ☐ 1. An ignition system should be inexpensive and convenient to handle.
 - ☒ 2. An ignition system should produce very little spark between electrodes of plugs at the correct timing.
 - ☐ 3. An ignition system should be compact and easy to maintain.
 - ☐ 4. An ignition system should function efficiently over the entire range of the engine speed.

Q.12 In a simple wheel and axle machine, a load of 25 kN is raised by an effort of 5 kN at an efficiency of 80%. What will be the diameter of the axle if the diameter of the wheel is 375 mm?

- Ans**
- ☐ 1. 50 mm
 - ☐ 2. 40 mm
 - ☐ 3. 30 mm
 - ☒ 4. 60 mm

Q.13 The difference between the tooth space and the tooth thickness in a spur gear, as measured along the pitch circle, is known as:

- Ans**
- ☐ 1. runout
 - ☒ 2. backlash
 - ☐ 3. tooth clearance
 - ☐ 4. pitch error

Q.14 If the torque causing failure is 1000 N-m and the design factor is 2, then what will the value of the design torque be?

- Ans**
- ☐ 1. 1000 N-m
 - ☒ 2. 500 N-m
 - ☐ 3. 2000 N-m
 - ☐ 4. 800 N-m

Q.15 Which of the following is a type of spring-controlled Governor?

- Ans**
- ☒ 1. Pickering Governor
 - ☐ 2. Porter Governor
 - ☐ 3. Inertia Governor
 - ☐ 4. Watt Governor

Q.16 What is the composition of Biogas that is produced by anaerobic fermentation of wet livestock wastes?

- Ans**
- ☐ 1. Methane (40% to 70%) and hydrogen
 - ☐ 2. Ethane (30% to 50%) and carbon dioxide
 - ☒ 3. Methane (40% to 70%) and carbon dioxide
 - ☐ 4. Ethane (30% to 50%) and hydrogen

Q.17 If three coplanar forces acting on a body are represented in magnitude and direction by the sides of a closed triangle taken in order, then:

- Ans**
- ☐ 1. the body must accelerate
 - ☒ 2. the body must be in equilibrium
 - ☐ 3. the resultant force must be maximum
 - ☐ 4. the body must not be in equilibrium

Q.18 A small block of weight 100 N is placed on an inclined plane, which makes an angle of 30° with the horizontal. The component of weight perpendicular to the inclined plane is:

- Ans**
- ☐ 1. 100 N
 - ☐ 2. 10 N
 - ☒ 3. 86.6 N
 - ☐ 4. 50 N

Q.19 Which material is commonly used in the construction of flat V-belts for industrial applications?

- Ans**
- ☐ 1. Leather
 - ☐ 2. Brass
 - ☐ 3. Ceramic
 - ☒ 4. Rubber

Q.20 A block of mass m rests on an adjustable frictional incline. When the plane is gradually elevated, the block just commences motion at an inclination of 30° to the horizontal. Determine the coefficient of static friction (μ) between the block and the plane.

Ans

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

Section : Discipline3

Q.1 The application of measuring high voltages using AC potentiometers can be measured _____.

Ans

- ☐ 1. directly
- ☐ 2. connecting two capacitors in parallel in conjunction with potentiometers
- ☐ 3. connecting two inductors in series in conjunction with potentiometers
- ☒ 4. connecting two capacitors in series in conjunction with potentiometers

Q.2 One of the main causes of power loss in a transmission line is _____.

Ans

- ☐ 1. Newton's effect
- ☒ 2. Joule effect
- ☐ 3. Fleming's effect
- ☐ 4. Faraday's effect

Q.3 Select the correct relation between the actual load causing failure and the design load.

Ans

- ☐ 1. Design load = Load causing failure $\times$ Design factor
- ☒ 2. Design load = $\frac{\text{Load causing failure}}{\text{Design factor}}$
- ☐ 3. Design load = Load causing failure
- ☐ 4. Design load = $\frac{\text{Design factor}}{\text{Load causing failure}}$

Q.4 Double parallel fillet-welded joints are primarily designed to resist:

Ans

- ☐ 1. tensile strength only
- ☐ 2. bending strength only
- ☐ 3. torsional strength only
- ☒ 4. shear strength only

Q.5 Leaf springs are mostly used in which of the following applications?

Ans

- ☐ 1. Valve mechanisms
- ☒ 2. Automobiles
- ☐ 3. Watches
- ☐ 4. Electrical mechanisms

Q.6 How does a radial electrical power distribution system handle transformer failures?

Ans

- ☐ 1. By automatically switching to backup transformers
- ☒ 2. By rerouting power through alternate feeders
- ☐ 3. By reducing the overall power demand of the consumers
- ☐ 4. By increasing the power generation at the main substation

Q.7 What is the function of a STATCOM (static synchronous compensator)?

- Ans**
- ☐ 1. To control the voltage and frequency of the AC system
 - ☐ 2. To convert AC power to DC power for transmission
 - ☒ 3. To provide reactive power compensation in the AC system
 - ☐ 4. To generate synchronous power for the AC system

Q.8 What is the electric field intensity at which the air in the immediate vicinity of conductors undergoes breakdown and becomes conducting?

- Ans**
- ☐ 1. 1000 kV/m
 - ☒ 2. 3000 kV/m
 - ☐ 3. 5000 kV/m
 - ☐ 4. 10000 kV/m

Q.9 Which of the following is NOT a reason for systematic error in measuring systems?

- Ans**
- ☐ 1. Known non-linearity
 - ☐ 2. Sensitivity shift
 - ☐ 3. Zero offset
 - ☒ 4. Response time

Q.10 In an indicating instrument, the pointer comes back to zero when the deflecting torque is removed. This is done by _____.

- Ans**
- ☐ 1. a damping device
 - ☐ 2. both deflecting and controlling devices
 - ☒ 3. a controlling device
 - ☐ 4. a deflecting device

Q.11 In an axially loaded symmetrical welded joint, the transverse fillet welds are designed to resist:

- Ans**
- ☐ 1. bending stress only
 - ☐ 2. torsional stress only
 - ☒ 3. tensile stress only
 - ☐ 4. bending stress and torsional stress only

Q.12 The most suitable voltage level of a secondary distribution system is _____.

- Ans**
- ☒ 1. 230 V/415 V
 - ☐ 2. 22 kV
 - ☐ 3. 66 kV
 - ☐ 4. 11 kV

Q.13 In an oscilloscope, which amplifier is the principal factor in determining the sensitivity and bandwidth?

- Ans**
- ☒ 1. Vertical amplifier
 - ☐ 2. Horizontal amplifier
 - ☐ 3. Broad bandwidth amplifier
 - ☐ 4. Narrow bandwidth amplifier

Q.14 The highest speed at which a bearing can continuously operate without seizure or other failures due to excessive heat is called:

- Ans**
- ☒ 1. limiting speed of a bearing
 - ☐ 2. peak efficiency speed
 - ☐ 3. frictional speed of the bearing
 - ☐ 4. operating slip speed

Q.15 Armored and unarmored cables fall under which classification category?

- Ans**
- ☐ 1. Voltage-based classification
 - ☐ 2. Application-based classification
 - ☐ 3. Insulation-based classification
 - ☒ 4. Construction-based classification

Q.16 The length of the coupler nut of a turnbuckle is obtained by considering which of the following criteria?

- Ans**
- ☐ 1. Tearing of the coupler nut
 - ☐ 2. Tearing of the coupler
 - ☐ 3. Tearing of the threads of the rods at their root
 - ☒ 4. Shearing of the threads of the coupler nut at their root

Q.17 In case of short transmission lines, the maximum voltage regulation occurs at:

- Ans**
- ☐ 1. both lagging and leading pf
 - ☒ 2. lagging pf
 - ☐ 3. unity pf
 - ☐ 4. leading pf

Q.18 Which of the following statements is **INCORRECT** about standardisation?

- Ans**
- ☐ 1. Standardisation speeds up the design work.
 - ☐ 2. Number of normally applicable standard sizes and types are reduced.
 - ☐ 3. Use of standardised parts increases system reliability.
 - ☒ 4. Standardisation does not facilitate the production.

Q.19 Which of the following is a disadvantage of a gravity-controlled instrument?

- Ans**
- ☐ 1. It is cheaper.
 - ☐ 2. It is not subject to fatigue.
 - ☒ 3. It gives a cramped scale.
 - ☐ 4. It is unaffected by temperature.

Q.20 The sensitivity of the oscilloscope is directly proportional to the _____ of the vertical amplifier.

- Ans**
- ☐ 1. bandwidth
 - ☐ 2. rise time
 - ☐ 3. frequency
 - ☒ 4. gain

Section : **Discipline4**

Q.1 If the installed capacity of plant 20 MW produces annual output of 2.24×10^6 kWh and remains in operation for 1000 hours in a year, then the value of plant use factor is ____.

- Ans**
- ☐ 1. 0.13
 - ☐ 2. 0.1
 - ☒ 3. 0.112
 - ☐ 4. 0.158

Q.2 What is the importance of a fusible plug in a geyser?

- Ans**
- ☐ 1. To protect the heating element against burning
 - ☐ 2. To protect the thermostat of the geyser
 - ☒ 3. To protect the geyser against blasting due to excessive steam pressure
 - ☐ 4. To release the extra water from the geyser

Q.3 In a synchronous motor, the output mechanical power available at the rotor shaft is _____ the gross mechanical power developed in the rotor.

- Ans**
- ☒ 1. less than
 - ☐ 2. greater than
 - ☐ 3. independent of
 - ☐ 4. equal to

Q.4 Which of the following formulas is correct for work, if F and s are force and displacement, respectively, and θ is the angle between them?

- Ans
- ☐ 1. $W = F \cdot s \cdot \tan \theta$
 - ☐ 2. $W = F \cdot s \cdot \sin \theta$
 - ☒ 3. $W = F \cdot s \cdot \cos \theta$
 - ☐ 4. $W = F \cdot s \cdot \csc \theta$

Q.5 A generating station has a connected load of 93 MW and a maximum demand of 30 MW, the units generated being 87.6×10^6 per annum. Calculate the average demand.

- Ans
- ☐ 1. 100×10^{-6} W
 - ☐ 2. 5789 kW
 - ☒ 3. 10000 kW
 - ☐ 4. 6900 kW

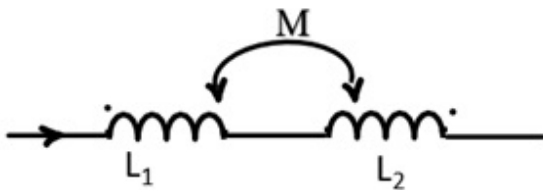
Q.6 Which scenario would have the lowest cost per unit of electricity (kWh)?

- Ans
- ☐ 1. A system with a load factor of 0.2
 - ☒ 2. A system with a load factor of 0.8
 - ☐ 3. A system with a load factor of 0.1
 - ☐ 4. A system with a load factor of 0.4

Q.7 Which of the following can be used with the starch components for the production of bioethanol through fermentation?

- Ans
- ☐ 1. Acid
 - ☐ 2. Milk
 - ☒ 3. Sugar
 - ☐ 4. Alcohol

Q.8 If $L_1 = 20$ H, $L_2 = 30$ H and $M = 7$ H, the total inductance in the figure shown below is _____.



- Ans
- ☐ 1. 43 H
 - ☐ 2. 64 H
 - ☐ 3. 57 H
 - ☒ 4. 36 H

Q.9 Identify the INCORRECT statement about hunting in synchronous motors.

- Ans
- ☐ 1. It causes shaft fatigue.
 - ☒ 2. It causes oscillations of stator current frequency.
 - ☐ 3. It causes oscillations in shaft torque.
 - ☐ 4. It can lead to loss of synchronism.

Q.10 The input power consumption in an electrical circuit is 240 W and the output power is 120 W. The power efficiency will be _____.

- Ans
- ☐ 1. 75%
 - ☐ 2. 100%
 - ☒ 3. 50%
 - ☐ 4. 25%

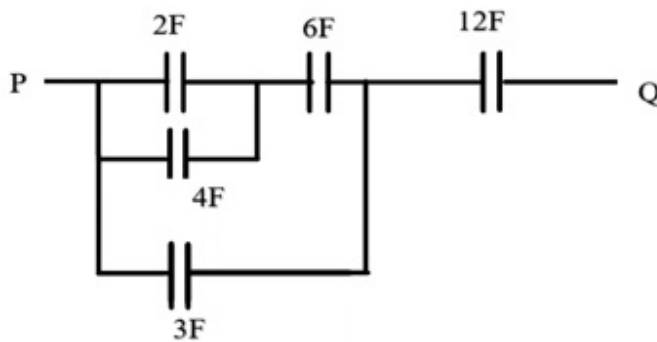
Q.11 Which of the following statements regarding damping systems is correct?
(i) The damping system facilitates the pointer to rest within a short time.
(ii) When the moving system is at rest, the system should provide damping torque.
(iii) Damping torque is dependent on operating current.

- Ans**
- ☒ 1. Only statement (ii)
 - ☒ 2. Only statement (i)
 - ☒ 3. Only statement (iii)
 - ☒ 4. Statements (i) and (ii)

Q.12 Which of the following statements regarding Fire tube boiler is correct?

- Ans**
- ☒ 1. Hot water flows through the tubes and the hot gases of combustion flow over these tubes.
 - ☒ 2. Water flows through the tubes and the hot gases of combustion flow over these tubes
 - ☒ 3. The hot gasses of combustion pass through the tubes surrounded by water.
 - ☒ 4. Water flows through the tubes and the hot water flow over these tubes.

Q.13 The total capacitance between the points P and Q in the figure is:



- Ans**
- ☒ 1. 20F
 - ☒ 2. 18F
 - ☒ 3. 4F
 - ☒ 4. 27F

Q.14 The current division rule can be applied in a node where _____.

- Ans**
- ☒ 1. two resistances are connected in series
 - ☒ 2. three resistance are connected in series
 - ☒ 3. two resistances are connected in parallel
 - ☒ 4. either two resistances are connected in series or connected in parallel

Q.15 What is the primary focus of mini and micro-hydel plants?

- Ans**
- ☒ 1. Generating power from ocean tides
 - ☒ 2. Utilising low-head water sources in hilly terrain for power generation
 - ☒ 3. Generating power from high heads in urban areas
 - ☒ 4. Harnessing power from coastal water sources

Q.16 If the load of a synchronous motor is increased, keeping the excitation constant, then the condition arises when the motor is stopped and the rotor is _____.

- Ans**
- ☒ 1. pulled out of synchronism
 - ☒ 2. pulled in synchronism
 - ☒ 3. found to breakdown
 - ☒ 4. stopped

Q.17 Which material is used in filament illumination in the incandescent lamp?

- Ans**
- ☒ 1. Silicon
 - ☒ 2. Copper
 - ☒ 3. Aluminium
 - ☒ 4. Tungsten

Q.18 The load curve is helpful in deciding _____.

- Ans**
- ☐ 1. the maximum efficiency of generators
 - ☐ 2. the speed of the generator units
 - ☒ 3. the operating schedule of the generator units
 - ☐ 4. faults in the generator units

Q.19 Inside the infinite solenoid, what is the shape of magnetic field lines?

- Ans**
- ☐ 1. Perpendicular straight line
 - ☒ 2. Parallel straight line
 - ☐ 3. Circular line
 - ☐ 4. Ellipsoidal line

Q.20 The purpose of an external prime mover to start a synchronous motor is to _____.

- Ans**
- ☐ 1. excite the field winding of the rotor
 - ☐ 2. improve the efficiency of the motor
 - ☐ 3. reduce losses at the time of starting
 - ☒ 4. bring the synchronous motor close to synchronous speed

Section : **Discipline5**

Q.1 The Einstein relation in regard to semiconductors relates to _____.

- Ans**
- ☐ 1. the gradient of electron concentration and the gradient of hole concentration in current equations
 - ☐ 2. the mobility values in the drift current equations and the diffusion current density in the diffusion current equation
 - ☐ 3. intrinsic charge concentrations of electrons and holes in the semiconductor
 - ☒ 4. the mobility values in the drift current equations and the diffusion coefficient values in the diffusion current equation

Q.2 Which of the following relations is correct about the amplification factor of a JFET?

- Ans**
- ☐ 1. Amplification factor = AC drain resistance / transconductance
 - ☒ 2. Amplification factor = AC drain resistance $\times$ transconductance
 - ☐ 3. Amplification factor = AC drain resistance + transconductance
 - ☐ 4. Amplification factor = AC drain resistance – transconductance

Q.3 If the cut-off frequency of an OP-AMP is 5 Hz and the voltage gain is 2,00,000, then the unity gain frequency is _____.

- Ans**
- ☒ 1. 1 MHz
 - ☐ 2. 10 MHz
 - ☐ 3. 40 kHz
 - ☐ 4. 100 kHz

Q.4 The electrode material used in spot welding is typically made of _____.

- Ans**
- ☐ 1. stainless steel
 - ☐ 2. chromium
 - ☐ 3. lead
 - ☒ 4. copper

Q.5 Consider the following statements regarding the torque developed in synchronous motors.

- A) It is the maximum torque at which a motor can start rotating at a given frequency.
B) Upon increasing the load, the magnetic locking between the stator and the rotor becomes weak.
C) At a load angle of 90° , the motor produces the maximum torque.

From the above-mentioned statements, the type of torque developed in synchronous motors is called the _____.

- Ans**
- ☒ 1. pull-in torque
 - ☒ 2. pull-out torque
 - ☒ 3. starting torque
 - ☒ 4. maximum torque

Q.6 The luminous flux emitted by a source per unit solid angle, measured in the direction in which the intensity is required, is called _____.

- Ans**
- ☒ 1. luminous flux
 - ☒ 2. candela
 - ☒ 3. luminous intensity
 - ☒ 4. candle power

Q.7 The amount of luminous flux (visible light) incident on a surface per unit area is called _____.

- Ans**
- ☒ 1. candela
 - ☒ 2. candela power
 - ☒ 3. luminance
 - ☒ 4. lux

Q.8 If the Fermi level is nearer to conduction band and it lies just below the conduction band at room temprature, then the semiconductor is _____.

- Ans**
- ☒ 1. an intrinsic semiconductor
 - ☒ 2. an n-type semiconductor
 - ☒ 3. a p-type semiconductor
 - ☒ 4. both n-type and p-type semiconductor

Q.9 Which of the following statements are correct about a ceiling fan?

- I) It uses a permanent capacitor single phase induction motor.
II) The direction of rotation can be easily reversed by interchanging the connection to the supply of both the main and auxiliary winding.
III) It uses a capacitor start capacitor run single phase induction motor.
IV) The direction of rotation can be easily reversed by interchanging the connection to the supply of either the main or auxiliary winding alone.

- Ans**
- ☒ 1. Only Statements III and IV
 - ☒ 2. Only Statements I and III
 - ☒ 3. Only Statements I and IV
 - ☒ 4. Only Statements I and II

Q.10 Which of the following are the properties of Ajax Wyatt core type induction furnace?

- I) The operating cost is high compared to the direct core type induction furnace.
II) Highly efficient for heat production
III) The furnace is suitable for continuous production
IV) The crucibles are present in the furnace

- Ans**
- ☒ 1. Only I and IV
 - ☒ 2. Only I and III
 - ☒ 3. Only II and III
 - ☒ 4. Only II, III and IV

Q.11 The total quantity of light energy emitted per second from a luminous body is called _____.

- Ans**
- ☐ 1. lumen
 - ☐ 2. foot-candle
 - ☐ 3. candle power
 - ☒ 4. luminous flux

Q.12 If E_A is the internal generated voltage of the synchronous generator and V_ϕ is the phase voltage with $\cos \phi$ as power factor and torque angle as (δ) of the synchronous generator, then the static stability limit of the synchronous generator is _____.

- Ans**
- ☐ 1. $Q_{out} = 3 V_\phi I_A \sin \phi$
 - ☐ 2. $P_{max} = 3 V_\phi E_A / X_s$
 - ☒ 3. $P = 3 V_\phi E_A \sin \delta / X_s$
 - ☐ 4. $P_{out} = 3 V_\phi I_A \cos \phi$

Q.13 For a NPN BJT, the maximum current DC gain is given in _____ configuration and minimum DC current gain is in _____ configuration.

- Ans**
- ☒ 1. common collector; common base
 - ☐ 2. common emitter; common base
 - ☐ 3. common base; common collector
 - ☐ 4. common base; common emitter

Q.14 The NPN BJT transistor can work as closed switch in _____ region, open switch in _____ region and as an amplifier in the _____ region.

- Ans**
- ☐ 1. cut-off; active; saturation
 - ☐ 2. active; saturation; cut-off
 - ☒ 3. saturation; cut-off; active
 - ☐ 4. active; cut-off; saturation

Q.15 A 3-phase alternator has 3 poles and 36 stator slots with distributed windings. How many slots per pole per phase does it have?

- Ans**
- ☐ 1. 3 slots per pole
 - ☐ 2. 6 slots per pole
 - ☒ 3. 4 slots per pole
 - ☐ 4. 5 slots per pole

Q.16 Which of the following amplifier configurations is also known as a source follower?

- Ans**
- ☒ 1. Common drain configuration
 - ☐ 2. Common gate configuration
 - ☐ 3. Common substrate configuration
 - ☐ 4. Common source configuration

Q.17 When light strikes a surface with an Absorption Factor of 0.8, what portion of the light is absorbed?

- Ans**
- ☒ 1. 80%
 - ☐ 2. 0.8%
 - ☐ 3. 8%
 - ☐ 4. 20%

Q.18 A MOSFET will work as a switch when it is operated in _____.

- Ans**
- ☐ 1. cut-off region only
 - ☐ 2. linear region only
 - ☒ 3. both cut-off and saturation region
 - ☐ 4. saturation region only

Q.19 Which of the following statements regarding pitch factor are true?

- A) The N^{th} harmonic pitch factor cannot be reduced to zero.
- B) The flux density distribution contains both even and odd harmonics.
- C) The components of the third harmonic do not appear in the line-line voltage.
- D) Pitch factor is different for different harmonics.

Ans  1. Only B and C

 2. Only C and D

 3. Only A and B

 4. Only A and C

Q.20 How does the electric toaster adjust the toasting time?

Ans  1. By sensing the bread's moisture level

 2. By using a built-in timer

 3. By measuring the temperature of the heating element

 4. By adjusting the power supply