Junior Engineer Civil Mechanical and Electrical Examination 2023 Paper I

Exam Date	09/10/2023
Exam Time	1:00 PM - 3:00 PM
Subject	Junior Engineer 2023 Mechanical Paper I

Section : **General Intelligence and Reasoning**

Q.1 **Select the set in which the numbers are related in the same way as are the numbers of the following set.**

(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)

(5, 2, 121)

(4, 3, 55)

Ans
1. (4, 2, 60) ✓
2. (6, 8, 91) ✗
3. (2, 8, 67) ✗
4. (3, 1, 9) ✗

Q.2 **Six students E,F,G,H,I and J are sitting around a circular table facing the centre. H is an immediate neighbour of both E and G. I is sitting third to the left of G. E is sitting second to the right of F. J is an immediate neighbour of both F and G. Who is immediate neighbour of both G and F?**

Ans
1. J ✓
2. H ✗
3. I ✗
4. E ✗

Q.3 **Select the correct combination of mathematical signs to sequentially replace the * signs and balance the given equation.**
17 * 7 * 12 * 6 * 2 = 119

Ans
1. − × ÷ + ✗
2. + ÷ × − ✗
3. + × − ÷ ✗
4. × − ÷ + ✓

Q.4 **If '×' means '−', '÷' means '+', '−' means '÷', '+' means '×', then what will be the correct answer of the following relation?**
375 - 25 ÷ 3 + 5 - 5 × 2 = ?

Ans
1. 15 ✗
2. 20 ✗
3. 16 ✓
4. 18 ✗

Q.5 Select the option figure which is embedded in the given figure as its part (rotation is NOT allowed).

Ans
1. 
2. 
3. 
4. 

Q.6 Select the option that is related to the third term in the same way as the second term is related to the first term and the sixth term is related to the fifth term.
27 : 95 :: 11 : ? :: 9 : 23

Ans
1. 27
2. 31
3. 34
4. 25

Q.7 Which letter-cluster will replace the question mark (?) to complete the given series?

ACAW, ELHA, IUOE, ?, UMCM

Ans
1. PMOI
2. PNOI
3. ONOI
4. ODVI

Q.8 Which of the following numbers will replace the question mark (?) in the given series?
30, 35, 29, ?, 28, 37

Ans
1. 34
2. 36
3. 33
4. 35

Q.9 If A denotes '÷', B denotes '×', C denotes '–' and D denotes '+', then what will be the value of the following equation?
90 D 121 A 11 B 10 C 90

Ans
1. 110
2. 90
3. 120
4. 100

Q.10 Which letter-cluster will replace the question mark (?) to complete the given series?

CFWI, ?, FHTK, IIQL, MJMM

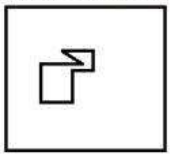
Ans
1. DGVJ
2. EIUJ
3. DIUI
4. EGUI

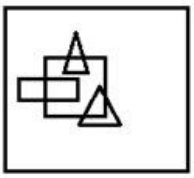
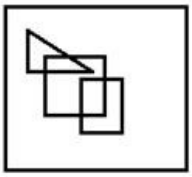
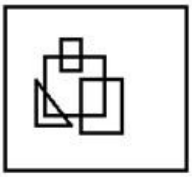
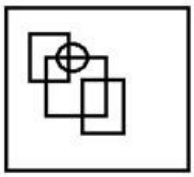
Q.11 Select the option that is related to the third word in the same way as the second word is related to the first word. (The words must be considered as meaningful English words and must not be related to each other based on the number of letters/number of consonants/vowels in the word)

Jaggery : Sugarcane :: Fabric : ?

Ans
- ✗ 1. Cloth
- ✗ 2. Tailor
- ✓ 3. Yarn
- ✗ 4. Suits

Q.12 Select the option in which the given figure is embedded (rotation is NOT allowed).

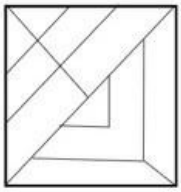


Ans
1. ✗ 
2. ✓ 
3. ✗ 
4. ✗ 

Q.13 In a certain code language, 'MARKET' is coded as '94', and 'SHOP' is coded as '50'. How will 'ITEMS' be coded in that language?

Ans
- ✗ 1. 66
- ✗ 2. 61
- ✗ 3. 144
- ✓ 4. 69

Q.14 How many triangles are there in the given figure?



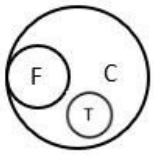
Ans
- ✗ 1. 13
- ✓ 2. 12
- ✗ 3. 10
- ✗ 4. 14

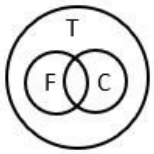
Q.15 Select the set in which the numbers are related in the same way as are the numbers of the given set.
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into its constituent digits. E.g. 13 – Operations on 13 such as adding /subtracting /multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)
(361, 49, 266)
(225, 36, 180)

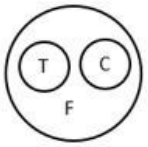
Ans
1. (49, 620, 300)
2. (289, 16, 136)
3. (12, 36, 48)
4. (256, 64, 160)

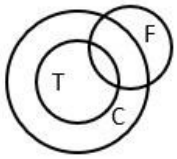
Q.16 Select the Venn diagram that best illustrates the relationship between the following classes.

Tables, Cupboards, Furniture

Ans
1.


2.


3.


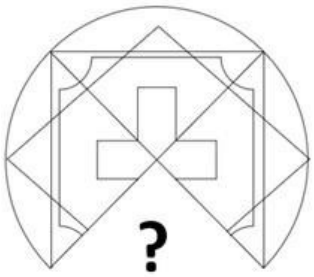
4.


Q.17 Seven people, A, B, C, D, E, F and G, are sitting in a straight row, facing north. Only 1 person sits to the left of D. A is an immediate neighbour of D. Only 2 people sit between F and D. Only 3 people sit between C and G. B is not an immediate neighbour of G. Only 2 people sit between E and A.

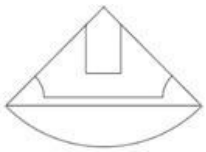
Who sits to the immediate right of F?

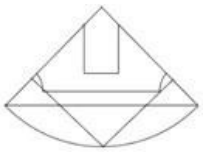
Ans
1. C
2. A
3. E
4. B

Q.18 Select the figure from the options that can replace the question mark (?) and complete the pattern.



Ans

1. 

2. 

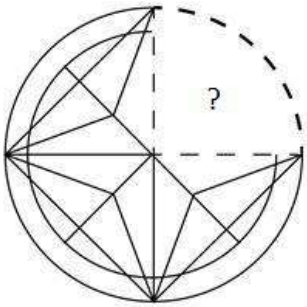
3. 

4. 

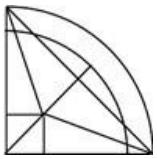
Q.19 **If**
'O ^ P' means 'O is the brother of P',
'O * P' means 'O is the mother of P',
'O + P' means 'O is the husband of P',
'O @ P' means 'O is the sister of P',
'O = P' means 'O is the son of P', and
'O % P' means 'O is the father of P',
then how is S related to M the following expression?
S = G % H @ E + F * M

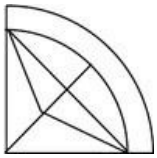
Ans
- ✓ 1. Father's brother
- ✗ 2. Son
- ✗ 3. Father's father
- ✗ 4. Mother's brother

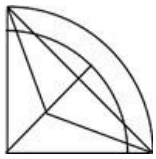
Q.20 Select the figure from the options that can replace the question mark (?) and complete the pattern.

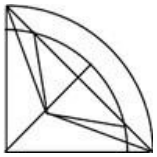


Ans

1. 

2. 

3. 

4. 

Q.21 Peter departs from his home and walks 10 m towards north and then turns right and walks 36 m. He turns left and walks 5 m. Now he turns left again and walks 25 m and stops. A pole is placed exactly 15 m south from where he is standing. How far and in which direction is his house from the pole? (Assuming that all turns are 90 degree turns only.)

Ans
- 1. 11 m, west
- 2. 21 m, west
- 3. 20 m, east
- 4. 10 m, east

Q.22 Select the option that represents the correct order of the given words as they would appear in an English dictionary.
1 - Ostracise
2 - Ossification
3 - Otherwise
4 - Ostensible
5 - Ostrich

Ans
- 1. 2, 1, 5, 4, 3
- 2. 2, 4, 1, 5, 3
- 3. 2, 1, 4, 5, 3
- 4. 2, 4, 5, 1, 3

Q.23 Select the number from among the given options that can replace the question mark (?) in the following series.
13, 29, 34, 71, 76, 155, 160, ?

Ans
- 1. 322
- 2. 323
- 3. 333
- 4. 332

Q.24 Select the word-pair that best represents a similar relationship to the one expressed in the pair of words given below.
(The words must be considered as meaningful English words and must not be related to each other based on the number of letters/number of consonants/ vowels in the word.)
Denver : Colorado

Ans
✗ 1. Canberra : Australia
✓ 2. Lucknow : Uttar Pradesh
✗ 3. Mysore : Karnataka
✗ 4. Delhi : India

Q.25 Each of the seven friends, Kirti, Siya, Amita, Preeti, Deepika, Jeet and Pari, has scored different marks in an exam. Pari has scored more than Kirti but less than Siya. Deepika has scored less than Preeti but more than Amita. Kirti has scored more than Preeti but less than Pari. Siya is not the highest scorer.

Who has scored the least marks?

Ans
✗ 1. Jeet
✗ 2. Siya
✓ 3. Amita
✗ 4. Pari

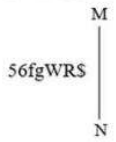
Q.26 Two statements are given followed by two conclusions numbered I and II. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements.

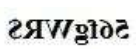
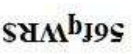
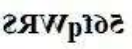
Statements:
All novels are textbooks.
No newspaper is a textbook.

Conclusions:
I. No novel is a newspaper.
II. At least some textbooks are novels.

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.27 Select the correct mirror image of the given combination when the mirror is placed at line MN as shown.



Ans
✓ 1. 
✗ 2. 
✗ 3. 
✗ 4. 

Q.28 Select the set in which the numbers are related in the same way as are the numbers of the following set.
(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/subtraction/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)

(8, 4, 6)

(13, 9, 10)

Ans
✗ 1. (6, 42, 4)
✗ 2. (2, 10, 1)
✗ 3. (3, 11 , 2)
✓ 4. (7, 4 , 5)

Q.29 Pointing towards a person in the photograph, Kamla said, "He is the daughter's brother of my husband's father Ashok. Ashok has only two children. How is the person in the photograph related to Kamla?

Ans
- ✔ 1. Husband
- ✘ 2. Sister's husband
- ✘ 3. Husband's brother
- ✘ 4. Husband's sister's son

Q.30 Select the combination of letters that when sequentially placed in the blanks of the given series, will complete the series.

L_M_NL_N_M_L_N_MN_L_M_NL

Ans
- ✔ 1. NMLMNLMLNM
- ✘ 2. NMLMLNMLNL
- ✘ 3. NMMLNLLMNM
- ✘ 4. MNLMNLMLNM

Q.31 Which of the following terms will replace the question mark (?) in the given series?
XYZV, STUQ, ?, IJKG, DEFB

Ans
- ✘ 1. NOPM
- ✔ 2. NOPL
- ✘ 3. NOPQ
- ✘ 4. NOPO

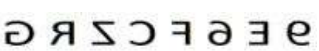
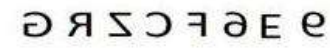
Q.32 Which of the following numbers will replace the question mark (?) in the given series?
212, 213, 215, 219, ?, 243, 275

Ans
- ✔ 1. 227
- ✘ 2. 235
- ✘ 3. 225
- ✘ 4. 237

Q.33 Select the option that represents the correct order of the given words as they would appear in an English dictionary.
1. Recession
2. Rebuke
3. Recognize
4. Receive
5. Recover

Ans
- ✔ 1. 2, 4, 1, 3, 5
- ✘ 2. 3, 2, 1, 5, 4
- ✘ 3. 3, 4, 1, 5, 2
- ✘ 4. 5, 4, 1, 3, 2

Q.34 Select the correct mirror image of the given combination when the mirror is placed at MN as shown below.

Ans
- ✘ 1. 
- ✘ 2. 
- ✔ 3. 
- ✘ 4. 

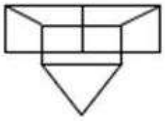
Q.35 In a certain code language, 'FALSE' is written as '97' and 'MYTH' is written as '46'. How will 'LEGEND' be written in that language?

Ans
- ✗ 1. 119
- ✗ 2. 115
- ✗ 3. 127
- ✓ 4. 121

Q.36 'DHL' is related to 'JLN' in a certain way based on the English alphabetical order. In the same way, 'MAC' is related to 'SEE'. Which of the following is related to 'FIP' using the same logic?

Ans
- ✗ 1. AEN
- ✗ 2. YEN
- ✓ 3. ZEN
- ✗ 4. ZEO

Q.37 Select the option that is embedded in the given figure (rotation is NOT allowed).



Ans
- ✗ 1. 
- ✓ 2. 
- ✗ 3. 
- ✗ 4. 

Q.38 If '+' means '–', '–' means '×', '×' means '÷', '÷' means '+', then what will come in place of the question mark (?) in the following equation?
35 ÷ 84 × 4 – 3 + 11 = ?

Ans
- ✗ 1. 79
- ✗ 2. 83
- ✓ 3. 87
- ✗ 4. 94

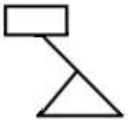
Q.39 In a certain code language, "ABHORRENT" is written as "TNERROHBA" and "CULINARY" is written as "YRANILUC". How will "DELETTANTE" be written in that language?

Ans
- ✗ 1. ELEDETANTT
- ✗ 2. ETNATTELDE
- ✓ 3. ETNATTELED
- ✗ 4. EDELETTANT

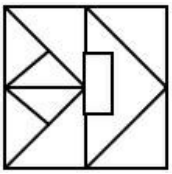
Q.40 Arrange the following words in a logical and meaningful order.
1. germinate
2. sapling
3. seed
4. seedling
5. tree

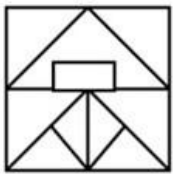
Ans
- ✓ 1. 3, 1, 4, 2, 5
- ✗ 2. 3, 1, 2, 4, 5
- ✗ 3. 3, 4, 2, 5, 1
- ✗ 4. 4, 2, 1, 3, 5

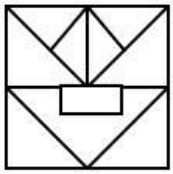
Q.41 Select the option in which the given figure is embedded (rotation is NOT allowed).

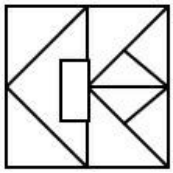


Ans

1. ✗ 

2. ✓ 

3. ✗ 

4. ✗ 

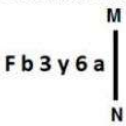
Q.42 Select the word-pair in which the two words are related in the same way as are the two words in the given pair.
(The words must be considered as meaningful English words and must not be related to each other based on the number of letters/number of consonants/vowels in the word)
Salt : Sodium

Ans
- ✗ 1. Leaves : Wood
- ✗ 2. Car : Petrol
- ✓ 3. Water : Hydrogen
- ✗ 4. Plant : Tree

Q.43 Ritu starts from point A and drives 9 km towards South. From here, she takes a left turn and drives 8 km. She then takes a left turn, drives 3 km, turns left and drives 12 km. Finally, she takes a right turn, drives 6 km and stops at point B. How far and in which direction is point B from point A?

Ans
- ✓ 1. 4 km towards West
- ✗ 2. 2 km towards East
- ✗ 3. 2 km towards West
- ✗ 4. 4 km towards East

Q.44 Select the correct mirror image of the given figure when the mirror is placed at MN as shown below.



Ans
- ✗ 1. 
- ✗ 2. 
- ✗ 3. 
- ✓ 4. 

Q.45 Select the word-pair that best represents a similar relationship to the one expressed in the pair of words given below. (The words must be considered as meaningful English words and must not be related to each other based on the number of letters/numbers of consonants/vowels in the word)

Chaos : Peace

Ans
- ✗ 1. Deep : Intense
- ✗ 2. Mourn : Deplore
- ✓ 3. Gradual : Abrupt
- ✗ 4. Generate : Produce

Q.46 Select the option that is related to the third word in the same way as the second word is related to the first word. (The words must be considered as meaningful English words and must not be related to each other based on the number of letters/number of consonants/vowels in the word)

Binocular : View :: Spoon : ?

Ans
- ✓ 1. Feed
- ✗ 2. Food
- ✗ 3. Fork
- ✗ 4. Utensil

Q.47 In a certain code language, "SPYH" is coded as "1714236" and "CFOG" is coded as "14135". How will "QTNP" be coded in that language?

Ans
- ✓ 1. 15181214
- ✗ 2. 14191314
- ✗ 3. 13191314
- ✗ 4. 15171114

Q.48 Select the correct option that indicates the arrangement of the following words in a logical and meaningful order.
1. Bicycle
2. Car
3. Train
4. Auto-rickshaw
5. Bus

Ans
- ✗ 1. 4, 1, 2, 3, 5
- ✓ 2. 1, 4, 2, 5, 3
- ✗ 3. 4, 2, 3, 5, 1
- ✗ 4. 4, 5, 2, 3, 1

Q.49 Which letter-cluster will replace the question mark (?) to complete the given series?

AYIN, BWLM, DUOL, ?, KQUJ

Ans
- ✗ 1. HSQM
- ✓ 2. GSRK
- ✗ 3. HTSL
- ✗ 4. GTRL

Q.50 Select the option that is related to the third term in the same way as the second term is related to the first term and the sixth term is related to the fifth term.
23 : 536 :: 21 : ? :: 18 : 331

Ans
- ✗ 1. 488
- ✗ 2. 444
- ✓ 3. 448
- ✗ 4. 484

Section : General Awareness

Q.1 Pandit Shambhu Maharaj is a renowned _____dancer.

Ans
- ✗ 1. Kuchipudi
- ✗ 2. Sattriya
- ✓ 3. Kathak
- ✗ 4. Odissi

Q.2 **Which of the following items may NOT be treated as an intermediary good?**

Ans
- ✗ 1. Maida produced in a flour mill
- ✓ 2. Maida used in a house to make paratha
- ✗ 3. Maida used to produce bread in a bakery
- ✗ 4. Maida used in a biscuit factory

Q.3 **In which year was the Television (TV) service started in India?**

Ans
- ✗ 1. 1975
- ✗ 2. 1968
- ✗ 3. 1986
- ✓ 4. 1959

Q.4 **According to the Global Multidimensional Poverty Index 2022, around_____people in India climbed out of poverty between 2005-06 and 2019-21.**

Ans
- ✗ 1. 500 million
- ✓ 2. 415 million
- ✗ 3. 450 million
- ✗ 4. 315 million

Q.5 **Name the project which was launched for tackling the increasing HIV prevalence in the eight North-Eastern states.**

Ans
- ✗ 1. Mission Aware
- ✗ 2. Mission Sampark
- ✓ 3. Project Sunrise
- ✗ 4. Project Empower

Q.6 **The first Bose-Einstein Condensate (BEC) made of which atom was reported by the team of Eric Cornell and Carl Wieman in 1995?**

Ans
- ✗ 1. ^{90}Sr
- ✓ 2. ^{87}Rb
- ✗ 3. ^{228}Ra
- ✗ 4. ^{137}Cs

Q.7 **What are Guyots?**

Ans
- ✗ 1. These are deep valleys, some comparable to the Grand Canyon.
- ✗ 2. It is a mountain with pointed summits.
- ✗ 3. These are low islands found in the tropical oceans consisting of coral reefs.
- ✓ 4. It is a flat topped seamount.

Q.8 Match the following columns.

Column-A	Column-B
i. Fat	a. Sugar
ii. Protein	b. Calcium and sodium
iii. Carbohydrate	c. Amino acid
iv. Minerals	d. Glycerol and fatty acid

Ans
- ✗ 1. i-a, ii-b, iii-c, iv-d
- ✗ 2. i-c, ii-d, iii-a, iv-b
- ✓ 3. i-d, ii-c, iii-a, iv-b
- ✗ 4. i-b, ii-a, iii-d, iv-c

Q.9 Match the column-A with column-B.

Column-A (Block Periodic Table)	Column-B (Elements)
a. s-block	i. La
b. p-block	ii. Cu
c. d-block	iii. Al
d. f-block	iv. Na

Ans
✗ 1. a-i, b-ii, c-iii, d-iv
✗ 2. a-i, b-iii, c-ii, d-iv
✗ 3. a-iii, b-iv, c-ii, d-i
✓ 4. a-iv, b-iii, c-ii, d-i

Q.10 Who was the Governor-General during the Anglo-Nepal war?

Ans
✗ 1. Lord Auckland
✗ 2. Lord Hardinge
✓ 3. Lord Hastings
✗ 4. Lord Wellesley

Q.11 Which of the following adulterants is mixed with sunflower oil and sesame oil to increase their quantity?

Ans
✗ 1. Mustard oil
✓ 2. Argemone oil
✗ 3. Rhodamine
✗ 4. Lentil oil

Q.12 What is the total outlay for extended period of Comprehensive Handicrafts Cluster Development Scheme, which has been extended till FY 2026?

Ans
✗ 1. ₹140 crore
✗ 2. ₹120 crore
✓ 3. ₹160 crore
✗ 4. ₹100 crore

Q.13 Where was India House founded in the UK?

Ans
✗ 1. Bristol
✗ 2. Manchester
✓ 3. London
✗ 4. Edinburgh

Q.14 Which of the following is a type of shield volcano that is large (up to several 1,000 m high and 200 km across) but NOT steep (usually 2° to 10°) and their magma is almost always mafic?

Ans
✗ 1. Mount Etna, Sicily
✗ 2. Mount Fuji, Japan
✓ 3. Kilauea volcano, Hawaii
✗ 4. Aguilera, Chile

Q.15 In June 2022, who became the first Indian to be recognised as the Global Sustainable Development Goal (SDG) Pioneer for water stewardship by the United Nations Global Compact (UNGC)?

Ans
✗ 1. Rajendra Singh
✗ 2. Ayyappa Masagi
✗ 3. Amla Ruia
✓ 4. Ramkrishna Mukkavilli

Q.16 Which of the following is the largest phylum of animalia?

Ans
✗ 1. Chordata
✗ 2. Annelida
✗ 3. Mollusca
✓ 4. Arthropoda

Q.17 When did Bhagat Singh and Batukeshwar Dutt throw the bombs inside the Central Assembly in Delhi?

Ans
- ✓ 1. 8 April 1929
- ✗ 2. 8 March 1929
- ✗ 3. 8 January 1929
- ✗ 4. 8 May 1929

Q.18 In which city will the 2024 Summer Olympic Games be held?

Ans
- ✗ 1. Beijing
- ✓ 2. Paris
- ✗ 3. Brisbane
- ✗ 4. Berlin

Q.19 How are resources divided on the basis of status of development?

Ans
- ✓ 1. Potential, developed stock and reserves
- ✗ 2. Renewable and non-renewable
- ✗ 3. Biotic and abiotic
- ✗ 4. Individual, community, national and international

Q.20 एक तालाब पारितंत्र के क्षेत्रों का नीचे से ऊपर की ओर सही क्रम क्या है?

Ans
- ✗ 1. हाइपोलिमनियन-थर्मोकलाइन-लाइटोरल
- ✗ 2. लाइटोरल-थर्मोकलाइन-एपीलिमनियन
- ✓ 3. हाइपोलिमनियन-थर्मोकलाइन-एपीलिमनियन
- ✗ 4. एपीलिमनियन-हाइपोलिमनियन-थर्मोकलाइन

Q.21 Electric field can be defined as:

Ans
- ✗ 1. energy per unit current
- ✗ 2. energy per unit charge
- ✓ 3. force per unit charge
- ✗ 4. force per unit current

Q.22 The Manusmrti, one of the best-known legal texts of early India, is written in _____.

Ans
- ✗ 1. Prakrit
- ✓ 2. Sanskrit
- ✗ 3. Pali
- ✗ 4. Hindi

Q.23 Which of the following Buddhist sites is NOT found in the Vengi region of Andhra Pradesh?

Ans
- ✓ 1. Chaukhandi
- ✗ 2. Nagarjunkonda
- ✗ 3. Amaravati
- ✗ 4. Jagayyapetta

Q.24 Which of the following Acts is regarded as the precursor to the Indian Constitution?

Ans
- ✗ 1. Government of India Act of 1909
- ✓ 2. Government of India Act of 1935
- ✗ 3. Government of India Act of 1945
- ✗ 4. Government of India Act of 1919

Q.25 Select the correct pair of Indian classical dancers of Odissi style.

Ans
- ✗ 1. Meenakshi Sundaram Pillai and Savitha Sastry
- ✗ 2. Mallika Sarabhai and Shobha Naidu
- ✗ 3. Amala Shankar and Singhajit Singh
- ✓ 4. Sujata Mohapatra and Madhavi Mudgal

Q.26 Which of the following is NOT included in fundamental duties?

Ans
- ✗ 1. Respect the national flag and the national anthem
- ✗ 2. To uphold and protect the sovereignty, unity and integrity of India
- ✗ 3. To value and preserve the rich heritage of our composite culture
- ✓ 4. Focus on personal development and individual activities only

Q.27 Protection of _____ is the fundamental duty of an Indian citizen.

Ans
- ✗ 1. children and old people
- ✗ 2. villages
- ✗ 3. holy scriptures
- ✓ 4. wildlife

Q.28 Which of the following is associated with Atoll?

Ans
- ✗ 1. Ocean basins with gently sloping terrain
- ✗ 2. It is made up of two mountain chains separated by a large depression
- ✗ 3. It is a seamount with a flat top
- ✓ 4. Low islands found in the tropical oceans consisting of coral reefs

Q.29 To which of the following gharanas of music did Ustad Amir Khan, a renowned vocalist, belong?

Ans
- ✗ 1. Jaipur-Atrauli
- ✗ 2. Rangeela
- ✗ 3. Agra
- ✓ 4. Indore

Q.30 Patayat Sahu, who was conferred the Padma Shri in the year 2023 by the President of India for his significant contribution in the field of medicinal plants in agriculture, is from _____.

Ans
- ✗ 1. West Bengal
- ✓ 2. Odisha
- ✗ 3. Chhattisgarh
- ✗ 4. Jharkhand

Q.31 According to the Centre for Monitoring Indian Economy (CMIE), in which state of India was the unemployment rate recorded as 0.1%, as of September 2022?

Ans
- ✗ 1. Tamil Nadu
- ✗ 2. Uttarakhand
- ✗ 3. Madhya Pradesh
- ✓ 4. Chhattisgarh

Q.32 What is the primary objective of cybersecurity?

Ans
- ✗ 1. To enhance internet connectivity
- ✗ 2. To create new software applications
- ✗ 3. To protect computers from physical damage
- ✓ 4. To prevent unauthorised access and data breaches

Q.33 Which of the following energy resources is also known as Liquid Gold?

Ans
- ✓ 1. Petroleum
- ✗ 2. Natural Gas
- ✗ 3. Uranium
- ✗ 4. Coal

Q.34 Which of the following factors is a geographical factor that affects the distribution of the population in India?

Ans
- ✗ 1. Industrialisation
- ✗ 2. Minerals
- ✓ 3. Climate
- ✗ 4. Urbanisation

Q.35 In October 2021, MUDRA Toolbox was launched by the _____ in five Indian languages.

Ans
- ✗ 1. Indian Agricultural Research Institute (ICAR)
- ✗ 2. Indian Council of Historical Research (ICHR)
- ✗ 3. Indian Council of Social Science Research (ICSSR)
- ✓ 4. Indian Council of Medical Research (ICMR)

Q.36 Who among the following is NOT part of the Goods and Services Tax Council of India?

Ans
- ✗ 1. Union Finance Minister
- ✓ 2. Lieutenant Governors of Union Territories
- ✗ 3. Union Minister of State in charge of Revenue or Finance
- ✗ 4. The Minister in-charge of Finance of each state or any other minister nominated by state government

Q.37 Which of the following measures of money supply is considered most liquid?

Ans
- ✓ 1. M1
- ✗ 2. M4
- ✗ 3. M2
- ✗ 4. M3

Q.38 The boundary line separating one drainage basin from another is called _____.

Ans
- ✗ 1. terrace
- ✓ 2. watershed
- ✗ 3. peneplain
- ✗ 4. flood plain

Q.39 What type of compound is formed when one hydrogen atom in ammonia is substituted by an alkyl or aromatic group?

Ans
- ✗ 1. Secondary amine
- ✓ 2. Primary amine
- ✗ 3. Ketone body
- ✗ 4. Carboxylic acid

Q.40 Which of the following is an example of a homeothermic animal?

Ans
- ✓ 1. Penguin
- ✗ 2. Salamander
- ✗ 3. Cobra
- ✗ 4. Tortoise

Q.41 Which of the following is an intermediate goods industry?

Ans
- ✗ 1. Manufacturing of plants and machineries
- ✗ 2. Manufacturing of refrigerators
- ✗ 3. Manufacturing of Cars
- ✓ 4. Manufacturing of tools

Q.42 According to the Census of India 2011, what is the sex ratio of Daman and Diu?

Ans
- ✗ 1. 518
- ✗ 2. 718
- ✗ 3. 818
- ✓ 4. 618

Q.43 _____ Central Administrative Tribunal benches exist all over India, as of December 2022.

Ans
- ✓ 1. 19
- ✗ 2. 16
- ✗ 3. 18
- ✗ 4. 17

Q.44 Who among the following attacked Gujarat and plundered the Somnath Temple in the 11th century?

Ans
- ✓ 1. Mahmud of Ghazni
- ✗ 2. Qutubuddin Aibak
- ✗ 3. Muhammad Bin Qasim
- ✗ 4. Ahmad Shah Abdali

Q.45 The Sangeet Natak Akademi gives fellowships to eminent artists. Gopika Varma received it for Mohiniyattam which is a dance form of which state?

Ans
- ✗ 1. Andhra Pradesh
- ✗ 2. Karnataka
- ✗ 3. Tamil Nadu
- ✓ 4. Kerala

Q.46 In which of the following games is the term 'header' associated?

Ans
- ✗ 1. Hockey
- ✗ 2. Cricket
- ✗ 3. Badminton
- ✓ 4. Football

Q.47 According to the Ministry of Textile, Government of India (2022-23), which fibre crop is majorly produced in Gujarat, Maharashtra and Telangana?

Ans
- ✓ 1. Cotton
- ✗ 2. Jute
- ✗ 3. Natural silk
- ✗ 4. Hemp

Q.48 Which of the following factors are responsible for spoilage of stored food?

Ans
- ✓ 1. Moisture and humidity that can allow microbial growth
- ✗ 2. High temperature and pressure
- ✗ 3. Low temperature and very high pressure
- ✗ 4. High salt and spice content

Q.49 What does the 'Print Range' option allow you to do when printing a document?

Ans
- ✗ 1. Adjust the size of the printed document to fit on a specific number of pages
- ✓ 2. Choose the specific pages or range of pages to be printed
- ✗ 3. Add header and footer information to the printed pages
- ✗ 4. Print the document with different fonts and styles

Q.50 President of India, Droupadi Murmu met President of Republic of Suriname, _____on the sidelines of the 17th Pravasi Bharatiya Divas Convention at Indore, Madhya Pradesh on 10 January 2023.

Ans
- ✗ 1. Desi Bouterse
- ✗ 2. Johan Kraag
- ✓ 3. Chandrikaprasad Santokhi
- ✗ 4. Ronald Venitiaan

Section : General Engineering Mechanical

Q.1 If the lower temperature fixed by the refrigeration application is high, the C.O.P. of the Carnot refrigerator will be _____.

Ans
- ✗ 1. very less
- ✗ 2. the same
- ✓ 3. high
- ✗ 4. less

Q.2 A closed vessel contains 5 kg of air, and 50 kJ of heat is given to it. If 75 kJ of work is done by the system, then which of the following is true?
(Take Cp = 1.005 kJ/kg-K, Cv = 0.718 kJ/kg-K)

Ans
1. The temperature of the air will decrease by 34.8°
2. The temperature of the air will decrease by 7°
3. The temperature of the air will increase by 5°
4. The temperature of the air will increase by 7°

Q.3 The value of the gross stage efficiency and Blade efficiency of the single stage of the impulse turbine are 65%and 78%respectively then the value of the nozzle efficiency will be

Ans
1. 100%
2. 83.33%
3. 50.7%
4. 50%

Q.4 A solid circular shaft of diameter d is subjected to the twisting moment T. Which of the following relations can be used to determine the stress developed in the shaft?

Ans
1. $\tau = \frac{32T}{\pi d^3}$
2. $\tau = \frac{64T}{\pi d^3}$
3. $\tau = \frac{16T}{\pi d^3}$
4. $\tau = \frac{128T}{\pi d^3}$

Q.5 In case of dual cycle of an IC engine, heat addition is _____.

Ans
1. both an isochoric and an isobaric process
2. only an isochoric process
3. anisentropic process
4. only an isobaric process

Q.6 The function of an air pre-heater is _____.

Ans
1. to increase the temperature of air after entering the furnace
2. to decrease the temperature of air after entering the furnace
3. to increase the temperature of air before entering the furnace
4. to decrease the temperature of air before entering the furnace

---

Q.7 The process of pushing the heated billet or slug of metal through an die orifice, thus forming an elongated part of a uniform cross-section corresponding to the shape of the die orifice is known as _____

Ans
1. Rolling process
2. Drawing process
3. Machining process
4. Extrusion process

Q.8 For the same temperature limit, which of the following cycles has maximum efficiency?

Ans
- ✓ 1. Carnot cycle
- ✗ 2. Diesel cycle
- ✗ 3. Normal Stirling cycle
- ✗ 4. Otto cycle

Q.9 Scavenging phenomenon occurred in Two-stroke IC engine when

Ans
- ✗ 1. Both inlet and outlet Valve are opened for a while simultaneously
- ✓ 2. Both transfer Port and exhaust port are opened for a while simultaneously
- ✗ 3. Both inlet and outlet Valve are fully closed
- ✗ 4. Both transfer port and exhaust port are fully closed

Q.10 In the boiler mountings, the blow-off cock is fitted at _____.

Ans
- ✗ 1. the top of the boiler shell
- ✓ 2. the bottom of the boiler shell
- ✗ 3. the middle of the boiler shell
- ✗ 4. near the steam supply line

Q.11 In the Bell-Coleman refrigeration cycle, the temperature of the refrigerant is maximum at the:

Ans
- ✗ 1. end of isentropic expansion
- ✓ 2. end of isentropic compression
- ✗ 3. end of constant pressure cooling process
- ✗ 4. start of isentropic compression

Q.12 Which of the following is the advantage of axial flow pump?

Ans
- ✗ 1. High head
- ✗ 2. Low volumetric discharge
- ✓ 3. High volumetric discharge
- ✗ 4. Medium discharge pressure

Q.13 The unit of density in FPS (Foot Pound System) is given by:

Ans
- ✗ 1. lb/ft^1
- ✗ 2. lb/ft^2
- ✓ 3. lb/ft^3
- ✗ 4. Lb^2/ft^3

Q.14 Which of the following statements is INCORRECT about the Benson boiler?

Ans
- ✗ 1. The average operating pressure for the Benson boiler is higher than 200 bar.
- ✗ 2. Benson boilers can be switched on very quickly.
- ✓ 3. The Benson boiler is heavier than other boilers.
- ✗ 4. In Benson boilers, drums are not used.

Q.15 The continuity equation $\frac{\partial u}{\partial x}+\frac{\partial v}{\partial y}=0$ is valid for a _____.

Ans
- ✓ 1. steady, 2D, incompressible flow
- ✗ 2. unsteady, 2D, compressible flow
- ✗ 3. steady, 2D, compressible flow
- ✗ 4. unsteady, 2D, incompressible flow

Q.16 The point of intersection of the line of action of the resultant hydrostatic force and the submerged surface is called _____.

Ans
- ✗ 1. centre of mass
- ✗ 2. centre of gravity
- ✓ 3. centre of pressure
- ✗ 4. centre of buoyancy

Q.17 The dimensional formula for specific gravity is given by:

Ans
- ✗ 1. $M^1L^1T^0$
- ✓ 2. $M^0L^0T^0$
- ✗ 3. $M^1L^0T^1$
- ✗ 4. $M^0L^1T^1$

Q.18 In Bell-Coleman Cycle, the pressure at the end of isentropic compression is same as:

Ans
- ✓ 1. the pressure at the start of isentropic expansion
- ✗ 2. the pressure at the end of isentropic expansion
- ✗ 3. the pressure at the start of isentropic compression
- ✗ 4. the pressure in constant pressure expansion

Q.19 Which of the following types of simple manometers measures the gauge pressure of only incompressible fluids?

Ans
- ✗ 1. Single column manometer
- ✗ 2. U-tube manometer
- ✓ 3. Piezometer
- ✗ 4. Differential U-tube manometer

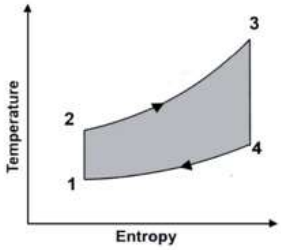
Q.20 If difference of axial components of velocity at inlet and outlet of a de-Laval turbine is found to be 120 m/s and mass flow rate of steam is 7 kg/s then axial thrust on the rotor is

Ans
- ✗ 1. 7 N
- ✗ 2. 17.14 N
- ✓ 3. 840 N
- ✗ 4. 120 N

Q.21 The bent tube of a Bourdon tube pressure gauge will change its shape when exposed to variations of _____.

Ans
- ✗ 1. displacement
- ✓ 2. pressure
- ✗ 3. voltage
- ✗ 4. resistance

Q.22 In the given T-S diagram of Otto cycle, which of the following processes is a heat addition process?



Ans
- ✗ 1. 4-1
- ✗ 2. 3-4
- ✓ 3. 2-3
- ✗ 4. 1-2

Q.23 The pressure intensity at a point in a fluid is given as 3.924 N/cm^2. What will be the corresponding height of fluid when the fluid is water?

Ans
- ✓ 1. 4 m of water
- ✗ 2. 2.5 m of water
- ✗ 3. 6 m of water
- ✗ 4. 3.5 m of water

Q.24 **The direction of the friction force is:**

Ans
- ✗ 1. in the direction of motion of the body
- ✗ 2. in the inclined direction of the motion of the body
- ✓ 3. in the opposite direction of motion of the body or in the opposite direction of the tendency to move
- ✗ 4. in the perpendicular direction of the motion of the body

Q.25 **Which of the following statements is correct about water-tube and fire-tube boilers?**

Ans
- ✗ 1. In case of water-tube boilers, hot gases flow in the tubes.
- ✗ 2. In case of fire-tube boilers, hot gases are surrounded over the tubes.
- ✓ 3. In case of fire-tube boilers, hot gases flow in the tubes.
- ✗ 4. In case of fire-tube boilers, water flows in the tubes.

Q.26 **Which of the following statements is true about hot working process?**

Ans
- ✓ 1. It is a process of working above recrystallisation temperature of the materials.
- ✗ 2. It is a process of working above room temperature.
- ✗ 3. Hot working process of tin is also a cold working process.
- ✗ 4. All hot working processes must be done above local environment temperature.

Q.27 **Heat addition during the constant pressure process is equal to _____.**

Ans
- ✗ 1. change in entropy
- ✗ 2. change in internal energy
- ✓ 3. change in enthalpy
- ✗ 4. specific heat

Q.28 **Which fluid is used to increase the rate of evaporation of the liquid ammonia passing through the evaporator in domestic Electrolux refrigeration system?**

Ans
- ✗ 1. Water
- ✗ 2. Ammonia
- ✓ 3. Hydrogen
- ✗ 4. Mercury

Q.29 **What will be the ratio of the pressure intensities of two fluids, one with a liquid column of 0.4 m of water and the other with a liquid column of 0.2 m of an oil of specific gravity 0.8?**

Ans
- ✗ 1. $\frac{7}{2}$
- ✓ 2. $\frac{5}{2}$
- ✗ 3. 2
- ✗ 4. $\frac{3}{2}$

Q.30 **If the manometric efficiency and mechanical efficiency of a centrifugal pump are 70% and 80%, respectively, then the overall efficiency will be:**

Ans
- ✗ 1. 80%
- ✗ 2. 75%
- ✓ 3. 56%
- ✗ 4. 40%

Q.31 **Which of the following is a forced circulation type of boiler?**

Ans
- ✗ 1. Lancashire boiler
- ✓ 2. LaMont boiler
- ✗ 3. Babcock & Wilcox boiler
- ✗ 4. Cochran boiler

Q.32 Which of the following is NOT the part of venturimeter setup?

Ans
- ✗ 1. Converging part
- ✓ 2. Float
- ✗ 3. Diverging part
- ✗ 4. Throat

Q.33 Which of the following statements related to rope drives is INCORRECT?

Ans
- ✗ 1. Rope drives have high mechanical efficiency.
- ✗ 2. Shafts do not require exact alignment.
- ✓ 3. It is used to transmit power only for shorter distances.
- ✗ 4. It has good crushing resistance.

Q.34 What will be the specific weight of one litre of petrol of specific gravity 0.7? (Take g = 9.81 m/sec^2)

Ans
- ✗ 1. 6256 N/m^3
- ✗ 2. 7286 N/m^3
- ✓ 3. 6867 N/m^3
- ✗ 4. 5436 N/m^3

Q.35 An impulse turbine is running at 1000 rpm with a net head 600 m. If the discharge through the nozzle is 0.1 m^3/s, then what will be the power available at the nozzle? Take g = 10 m/s^2.

Ans
- ✗ 1. 700 kW
- ✓ 2. 600 Kw
- ✗ 3. 525 kW
- ✗ 4. 450 kW

Q.36 Which of the following is NOT a type of steam separator?

Ans
- ✓ 1. Reciprocating type
- ✗ 2. Impact or baffle type
- ✗ 3. Centrifugal type
- ✗ 4. Reverse current type

Q.37 If the temperature of 'A' is equal to the temperature of 'B' and 'C', then the temperature of 'B' will be equal to the temperature of 'C'. This is known as:

Ans
- ✗ 1. law of thermal equilibrium
- ✗ 2. law of equality of temperature
- ✗ 3. Joule's law
- ✓ 4. zeroth law of thermodynamics

Q.38 In the context of work done of turbine, the power developed by the runner depends on which of the following parameters?

Ans
- ✓ 1. Whirl and blade velocities
- ✗ 2. Whirl velocity only
- ✗ 3. Blade velocity
- ✗ 4. Velocity at the exit of draft tube

Q.39 If the cutter and workpiece movements are in opposite directions, the milling process is known as -

Ans
- ✗ 1. Side milling
- ✓ 2. Up milling
- ✗ 3. Face milling
- ✗ 4. Down milling

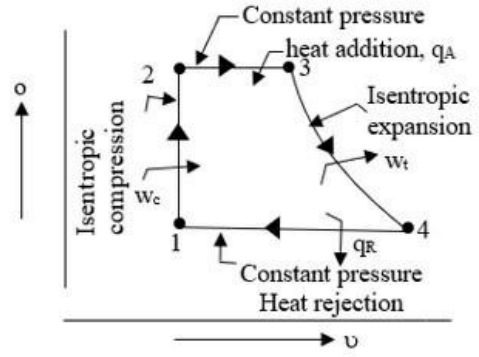
Q.40 Ammonia is NOT used in domestic refrigeration and comfort air-conditioning because:

Ans
- ✗ 1. its heat transfer coefficient is very low
- ✗ 2. lubricating oil is not soluble in ammonia at all
- ✗ 3. it is not soluble in water
- ✓ 4. it is toxic and flammable

Q.41 In a Carnot cycle, _____.

Ans
- ✔ 1. all processes are reversible
- ✘ 2. all processes are irreversible
- ✘ 3. only isothermal processes are reversible
- ✘ 4. only adiabatic processes are reversible

Q.42 The figure shows the P-V diagram of the _____.



Ans
- ✘ 1. otto cycle
- ✘ 2. steam engine
- ✔ 3. open cycle gas turbine
- ✘ 4. steam turbine

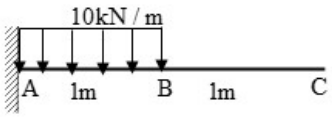
Q.43 0.2 m^3 of an ideal gas at the pressure of 2 MPa and 600 K is expanded isothermally to 5 times the initial volume. It is then cooled to 300 K at constant volume and then, compressed back polytropically to its initial state. The pressure just after the constant volume process is _____.

Ans
- ✘ 1. 0.8 Mpa
- ✘ 2. 0.4 MPa
- ✘ 3. 2.0 Mpa
- ✔ 4. 0.2 MPa

Q.44 Which of the following equations is NOT used in deriving the expression for discharge through the steam nozzle?

Ans
- ✘ 1. Steady flow energy equation
- ✘ 2. Continuity equation
- ✔ 3. Newton's equation of viscosity
- ✘ 4. Momentum equation

Q.45 A cantilever beam carries a uniformly distributed load over a span of 1 m as shown in the figure below. The reactive moment at point A is _____.



Ans
- ✘ 1. 30 kN-m
- ✘ 2. 0 kN-m
- ✔ 3. 5 kN-m
- ✘ 4. 10 kN-m

Q.46 For a laminar flow through a circular pipe, the wall shear stress across a section is a function of _____.

Ans
1. the pressure gradient $\frac{dp}{dz}$ and the radial coordinate r
2. the pressure gradient $\frac{dp}{dz}$ and the radius R
3. only the pressure gradient $\frac{dp}{dz}$
4. the pressure gradient $\frac{dp}{dz}$ and the axial velocity V_z

Q.47 Which of the following is NOT an example of brittle material?

Ans
1. Aluminium
2. Ceramic materials
3. High carbon steel
4. Cast iron

Q.48 If the line of stroke of a follower passes through the centre of rotation of a cam, then the cam is called _____.

Ans
1. globoidal cam
2. radial cam
3. offset cam
4. oscillating cam and follower

Q.49 Which of the following is NOT a merit of dead weight safety valve?

Ans
1. Simplicity of design
2. Suitable for high pressure boiler
3. It is a good choice for low-pressure vessels
4. Gives satisfactory performance during operation

Q.50 What pressure head of kerosene of specific gravity 0.8 will be equivalent to a pressure head of 100 m of water?

Ans
1. 100 m
2. 110 m
3. 125 m
4. 120 m

Q.51 A workpiece is taper turned using lathe, where large diameter of workpiece is D and small diameter d. If the length of this workpiece is L, then half angle α is given by:

Ans
1. $\tan\alpha = \frac{(D-d)}{3L}$
2. $\tan\alpha = \frac{(D-d)}{L}$
3. $\tan\alpha = \frac{(D-d)}{4L}$
4. $\tan\alpha = \frac{(D-d)}{2L}$

Q.52 Which of the following is the correct item for Double Volute in centrifugal pumps?

Ans
1. Flow is separated into two equal streams by two-cut waters that are 180° apart
2. Flow separation does not take place
3. Flow is separated into two equal streams by two-cut waters that are 90° apart
4. Flow is separated into two unequal streams by two-cut waters that are 90° apart

Q.53 In which of the following cycles does heat addition NOT take place at constant volume?

Ans
1. Otto cycle
2. Lenoir cycle
3. Dual cycle
4. Diesel cycle

Q.54 Which of the following equations is used to calculate major losses in pipes?

Ans
- ✗ 1. Reynolds's equation
- ✗ 2. Momentum equation
- ✓ 3. Darcy-Weisbach equation
- ✗ 4. Continuity equation

Q.55 What will be the atmospheric pressure at a location where the barometric reading is 750 mm Hg and the gravitational acceleration is g = 9.81 m/s^2? Assume the density of mercury to be 13,600 kg/m^3.

Ans
- ✗ 1. 10.006 kPa
- ✗ 2. 1000.6 Pa
- ✓ 3. 100.06 kPa
- ✗ 4. 100.06 Pa

Q.56 Which of the following is an isochoric process?

Ans
- ✗ 1. Heat supplied is zero.
- ✗ 2. Heating of steam in a cylinder containing a sliding piston.
- ✗ 3. Heat is supplied during evaporation.
- ✓ 4. Heating of steam in a closed rigid vessel.

Q.57 Functionality of nozzle is that,_____

Ans
- ✗ 1. It produces steam at very low velocity
- ✓ 2. It produces steam jet at very high velocity
- ✗ 3. It produces steam at very low pressure
- ✗ 4. It produces steam jet at very high pressure

Q.58 The velocity of flow between two adjacent streamlines is inversely proportional to the:

Ans
- ✗ 1. volume flow rate
- ✗ 2. circulation
- ✓ 3. spacing of the streamlines
- ✗ 4. specific weight

Q.59 Match the types of refrigerants with their representations.

Type of Refrigerant	Representation
1. CFC refrigerants	a. R-22
2. HFC refrigerants	b. R-11
3. HC refrigerants	c. R-134a
4. HCFC refrigerants	d. R-290

Ans
- ✗ 1. 1-a; 2-d; 3-b; 4-c
- ✓ 2. 1-b; 2-c; 3-d; 4-a
- ✗ 3. 1-a; 2-c; 3-d; 4-b
- ✗ 4. 1-b; 2-d; 3-c; 4-a

Q.60 On the stress-strain diagram, the material obeys Hooke's law till:

Ans
- ✗ 1. upper yield point
- ✗ 2. point of ultimate stress
- ✓ 3. elastic limit
- ✗ 4. lower yield point

Q.61 According to _____, the intensity of pressure in a liquid at rest is constant in all directions.

Ans
- ✗ 1. Boyle's law
- ✗ 2. hydrostatic law
- ✗ 3. Newton's law
- ✓ 4. Pascal's law

Q.62 If the C.O.P. of 1 TR ammonia-water absorption refrigeration plant is 0.5, then the heat supplied in the generator is _____. (1 TR = 3.51 kw)

Ans
- ✗ 1. 10.5 kW
- ✗ 2. 3.5 kW
- ✓ 3. 7 kW
- ✗ 4. 1.5 kW

Q.63 Which of the following is a suitable unit for measuring the capacity of refrigeration?

Ans
- ✗ 1. kJ
- ✓ 2. TR
- ✗ 3. Kw/kg
- ✗ 4. kg

Q.64 Which one of the following is correct statement about Blade cross sectional fluid flow area from inlet to outlet of a turbine?

Ans
- ✓ 1. Constant for impulse turbine and converging for reaction turbine
- ✗ 2. Constant for reaction turbine and diverging for impulse turbine
- ✗ 3. Constant for reaction turbine and converging for impulse turbine
- ✗ 4. Constant for impulse turbine and diverging for reaction turbine

Q.65 The ratio of the actual mass flow rate to that due to isentropic expansion in the steam nozzle is known as _____.

Ans
- ✗ 1. Mach number
- ✓ 2. coefficient of discharge
- ✗ 3. nozzle efficiency
- ✗ 4. critical pressure ratio

Q.66 If the pressure intensity at a point in a fluid is given as 2.7 N/cm^2, then what will be the pressure head of oil of specific gravity 0.9 at that point? Take g = 10 m/s^2.

Ans
- ✗ 1. 3 cm of oil
- ✗ 2. 30 cm of oil
- ✓ 3. 3 m of oil
- ✗ 4. 3 mm of oil

Q.67 If head imparted by impeller to water is equal to manometric head, then the manometric efficiency of the centrifugal pump will be:

Ans
- ✗ 1. 75%
- ✗ 2. 0%
- ✗ 3. 50%
- ✓ 4. 100%

Q.68 What is the value of the density of water at 4°C?

Ans
- ✗ 1. 1000 gm/cm^3
- ✗ 2. 100 gm/cm^3
- ✓ 3. 1 gm/cm^3
- ✗ 4. 10 gm/cm^3

Q.69 A thermometer works on the principle of _____.

Ans
- ✗ 1. 3rd law of thermodynamics
- ✓ 2. Zeroth law of thermodynamics
- ✗ 3. Joule's law
- ✗ 4. 2nd law of thermodynamics

Q.70 The correct expression for the dimensional formula of volumetric discharge in the fluid equations is given by _____.

Ans

✗ 1. L^3T^{-3}

✗ 2. L^2T^{-1}

✗ 3. L^3T^{-2}

✓ 4. L^3T^{-1}

Q.71 The reversible adiabatic process in Mollier chart is represented by _____.

Ans

✗ 1. a line parallel to the saturated water line

✗ 2. a line parallel to the saturated vapour line

✓ 3. a vertical line

✗ 4. a horizontal line

Q.72 In two-stroke petrol engine, the air Fuel mixture is prepared

Ans

✗ 1. Inside the Transfer Port

✗ 2. Inside the Crank case chamber

✗ 3. Inside the carburetor and Inside the cylinder

✓ 4. Inside the carburetor but outside the cylinder

Q.73 Which of the following about work transfer is NOT correct?

Ans

✗ 1. Work transfer is a boundary phenomenon.

✗ 2. Work is a transient phenomenon.

✗ 3. Work is given by the area under the curve on p-V diagram in case of non-flow process.

✓ 4. Work transfer is a thermodynamic property.

Q.74 Which of the following pressure measurement devices consists of a hollow metal tube bent like a hook whose end is closed and connected to a dial indicator needle?

Ans

✗ 1. Piezoelectric transducers

✗ 2. Pressure transducers

✓ 3. Bourdon tube

✗ 4. Strain-gauge pressure transducers

Q.75 Which of the following statements is correct about the forced-draught fan used in steam boilers?

Ans

✗ 1. The power required by an induced-draught fan is equal to that required by a forced-draught fan for the same amount of draught.

✓ 2. The power required by an induced-draught fan is greater than that required by a forced-draught fan for the same amount of draught.

✗ 3. The power required by an induced-draught fan is less than that required by a forced-draught fan for the same amount of draught.

✗ 4. The power required by an induced-draught fan may be greater than or less than that required by a forced-draught fan for the same amount of draught.

Q.76 The difference in low temperature cascade condenser temperature and high temperature cascade evaporator temperature is called _____.

Ans

✗ 1. average temperature

✓ 2. temperature overlap

✗ 3. degree of superheat

✗ 4. degree of subcooling

Q.77 What is the unit of measurement of actual evaporation in steam boilers?

Ans

✗ 1. kg fuel burnt / kg water evaporated

✗ 2. kg

✓ 3. kg water evaporated / kg fuel burnt

✗ 4. m^3/kg

Q.78 Which of the following ideal gas processes has the highest polytropic index?

Ans
- ✗ 1. Isentropic process
- ✗ 2. Isobaric process
- ✓ 3. Isochoric process
- ✗ 4. Isothermal process

Q.79 Which of the following statements is correct regarding governor?

Ans
- ✗ 1. It is not a compulsory device of the prime mover.
- ✗ 2. It controls the temperature of the prime mover.
- ✗ 3. It controls acceleration of the prime mover.
- ✓ 4. It controls the mean speed of the prime mover.

Q.80 Which among the following options has same thermal efficiency under ideal conditions (Operate within the same temperature)?

Ans
- ✗ 1. Carnot cycle and Otto cycle
- ✗ 2. Carnot and dual cycle
- ✗ 3. Carnot cycle and Brayton cycle
- ✓ 4. Carnot cycle and Stirling cycle

Q.81 Water is flowing steadily at a velocity of 20 m/s through a pipe of diameter 0.2 m. The pressure and elevation at point X are 400 kN/m^2 and 32 m, respectively, while those at another point Y are 300 kN/m^2 and 34 m, respectively. What will be the head loss between the points X and Y?

Take $g = 10\ m/s^2$.

Ans
- ✗ 1. 10 m
- ✓ 2. 8 m
- ✗ 3. 4 m
- ✗ 4. 6 m

Q.82 In which percentage generally is lubricating oil mixed with the fuel, which is then inducted into the carburettor in a mist lubricating system?

Ans
- ✓ 1. 3% to 6%
- ✗ 2. Zero
- ✗ 3. 30% to 40%
- ✗ 4. 40% to 50%

Q.83 Latent heat of vaporisation is NOT the _____.

Ans
- ✓ 1. heat required for complete conversion of ice into water
- ✗ 2. heat added at constant temperature of 100°C to convert water into steam
- ✗ 3. heat required for complete conversion of saturated liquid into dry saturated vapour
- ✗ 4. sum of internal latent heat and external work of evaporation

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Q.84 Which of the following evaporators are also known as prime-surface evaporators?

Ans
- ✗ 1. Plate evaporators
- ✗ 2. Shell-and-tube evaporators
- ✓ 3. Bare-tube coil evaporators
- ✗ 4. Finned-tube evaporators

Q.85 In aqua-ammonia absorption refrigeration system, incomplete rectification leads to accumulation of water in:

Ans
- ✗ 1. heat exchanger
- ✓ 2. condenser
- ✗ 3. absorber
- ✗ 4. evaporator

Q.86 In the refrigeration system, heat rejection factor is the ratio of _____.

Ans
- ✓ 1. heat rejected to the refrigeration capacity
- ✗ 2. refrigeration capacity to the work done by compressor
- ✗ 3. work done by compressor to the refrigeration capacity
- ✗ 4. load on the condenser to the COP

Q.87 In actual air-conditioning applications for R-12 and R-22 refrigerant and operating at a condenser temperature of 40°C and an evaporator temperature of 5°C, the heat rejection factor is about:

Ans
- ✗ 1. 2.15
- ✓ 2. 1.25
- ✗ 3. 1
- ✗ 4. 5.12

Q.88 The amount of water striking the runner of the reaction turbine is controlled by _____.

Ans
- ✓ 1. guide mechanism
- ✗ 2. draft tube
- ✗ 3. spear arrangement
- ✗ 4. casing

Q.89 Which of the following statements holds true, according to Kelvin Planck's statement?

Ans
- ✗ 1. It restricts the engine to have mechanical efficiency lesser than unity.
- ✓ 2. Perpetual motion machine of the 2nd kind is impossible.
- ✗ 3. Some amount of heat taken from a source must be rejected to a higher temperature sink.
- ✗ 4. A heat engine must exchange heat from a single heat reservoir.

Q.90 Which of the following point angles of a twist drill is used for general purpose work?

Ans
- ✓ 1. 118°
- ✗ 2. 138°
- ✗ 3. 108°
- ✗ 4. 128°

Q.91 The evaporation of feedwater at 100°C into dry and saturated steam at 100°C at atmospheric pressure is known as _____.

Ans
- ✗ 1. boiler efficiency
- ✗ 2. actual evaporation
- ✗ 3. boiler horsepower
- ✓ 4. equivalent evaporation

Q.92 A Kaplan turbine has an outside diameter of runner and hub diameter as 4 m and 2 m, respectively. If the velocity of flow at inlet is 8 m/s, then what will be the discharge passing through the turbine?

Ans
- ✗ 1. $6.8\ m^3/s$
- ✗ 2. $7.536\ m^3/s$
- ✓ 3. $75.36\ m^3/s$
- ✗ 4. $68\ m^3/s$

Q.93 Which of the following is the correct expression for pressure intensity?

Ans
- ✗ 1. $P = 1.5\rho gh$
- ✗ 2. $P = 0.5\rho gh$
- ✗ 3. $P = 2\rho gh$
- ✓ 4. $P = \rho gh$

Q.94 A closed system undergoes a process in which the work done by the system is 100 J and the internal energy decreases by 50 J. According to the first law of thermodynamics, what is the amount of heat transferred into or out of the system?

Ans
- ✗ 1. −50 J
- ✓ 2. 50 J
- ✗ 3. −150 J
- ✗ 4. 150 J

Q.95 Which of the following statements about equilibrium is correct?

Ans
- ✗ 1. Summation of all the forces acting in all the possible directions must be non-zero.
- ✗ 2. Summation of all the forces acting in one direction must not be zero.
- ✓ 3. Summation of all the forces acting in all the possible directions must be zero.
- ✗ 4. Summation of all the forces acting in one direction must be zero.

Q.96 What is the main function of the condenser in a Rankine cycle power plant?

Ans
- ✓ 1. To condense the steam till it transforms into saturated liquid
- ✗ 2. To increase the temperature of the cooling water
- ✗ 3. To decrease the efficiency of the cycle
- ✗ 4. To increase the pressure of the steam

Q.97 A circular opening, 3 m diameter, in a vertical side of a tank is closed by a disc of 3 m diameter which can rotate about a horizontal diameter and depth of centre of gravity from free surface is 4 m. What will be the total pressure on the disc?

Ans
- ✓ 1. 277.4 kN
- ✗ 2. 175.7 kN
- ✗ 3. 100 kN
- ✗ 4. 234.89 kN

Q.98 The SI unit of specific heat is:

Ans
- ✗ 1. Jkg/K
- ✓ 2. J/kg.K
- ✗ 3. JK/kg
- ✗ 4. J/kg

Q.99 Which of the following turbine has 50%degree of reaction?

Ans
- ✗ 1. Curtis turbine
- ✓ 2. Parson's turbine
- ✗ 3. Hero's Turbine
- ✗ 4. Rateau turbine

Q.100 If 5 litres of a certain oil weighs 30 N, then what will be the specific weight of that oil?

Ans
- ✗ 1. 300 N/m^3
- ✗ 2. 3000 N/m^3
- ✗ 3. 600 N/m^3
- ✓ 4. 6000 N/m^3