



VIZAG

Steel Management Trainee 2020

Mechanical Engineering

Mega Mock Challenge (May 30 - May 31 2020)

Questions & Solutions

1. **Arrange the following words in the sequence as they appear in English dictionary order.**

- | | |
|---------------------|---------------------|
| 1) Master | 2) Marvel |
| 3) Market | 4) Marker |
| 5) Marble | 6) Margin |
| A. 6, 5, 4, 2, 1, 3 | B. 5, 6, 4, 3, 2, 1 |
| C. 5, 6, 4, 3, 1, 2 | D. 5, 4, 6, 3, 2, 1 |

Ans. B

Sol. Correct appearance in English dictionary order is-

- 5) Marble
- 6) Margin
- 4) Marker
- 3) Market
- 2) Marvel
- 1) Master

Correct order is 5, 6, 4, 3, 2, 1.

Hence, option B is the correct answer.

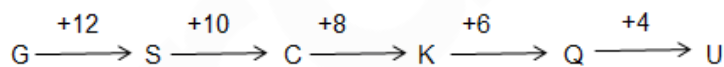
2. **A series is given with one term missing. Select the correct alternative from the given ones that will complete the series.**

G, S, C, ?, Q, U

- | | |
|------|------|
| A. M | B. K |
| C. F | D. O |

Ans. B

Sol. Given series follows the pattern given below:



Hence, option B is the correct answer.

3. Ravi wants to go to university. He starts from his home which is in the East towards the west and comes to crossing. The road to the left ends in a theatre straight ahead is the hospital and to the right is University. In which direction the university with respect to the theatre?

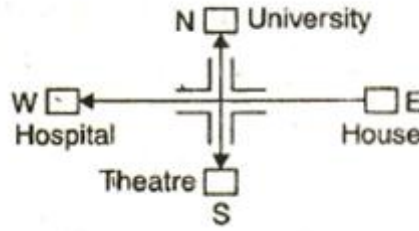
- | | |
|-------------------|-----------------|
| A. South or North | B. East or West |
| C. North | D. Can't say |
| E. South | |

Ans. C

Sol. Starting from his house in the East, Ravi moves westwards. The road to the left ends in a theatre straight ahead is the hospital and to the right is University

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Hence, option C is the correct answer.

4. **In the following question, select the related group of letters from the given alternatives.**

F: M :: K: ?

A. T

B. K

C. R

D. C

Ans. C

As,

$$F \xrightarrow{+7} M$$

Sol. Similarly,

$$K \xrightarrow{+7} R$$

Thus, F: M :: K: R

Hence, option C is the correct answer.

5. **In the following question, select the odd letters from the given alternatives.**

A. AI

B. OU

C. AD

D. IO

Ans. C

Sol. All are in pairs of 'Vowels' except 'AD'.

Hence, option C is the correct answer.

6. **A series is given with one term missing. Select the correct alternative from the given ones that will complete the series.**

DI, KP, RW, YD, ?

A. FK

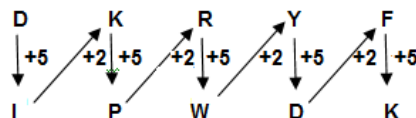
B. EL

C. DJ

D. FP

Ans. A

Sol. In this question, we show that -



So ? = FK

Hence, option A is the correct answer.

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7. A series is given with one term missing. Select the correct alternative from the given ones that will complete the series

MP, OR, QT, SV, ?

- A. UX
- B. TW
- C. TU
- D. XU

Ans. A

Sol.

Alphabet	A	B	C	D	E	F	G	H	I	J	K	L	M
Position value	1	2	3	4	5	6	7	8	9	10	11	12	13
Alphabet	Z	Y	X	W	V	U	T	S	R	Q	P	O	N
Position value	26	25	24	23	22	21	20	19	18	17	16	15	14

$M + 2 \Rightarrow O, O + 2 \Rightarrow Q, Q + 2 \Rightarrow S$ and $S + 2 \Rightarrow \mathbf{U}$

$P + 2 \Rightarrow R, R + 2 \Rightarrow T, T + 2 \Rightarrow V$ and $V + 2 \Rightarrow \mathbf{X}$

Hence, option A is the correct answer.

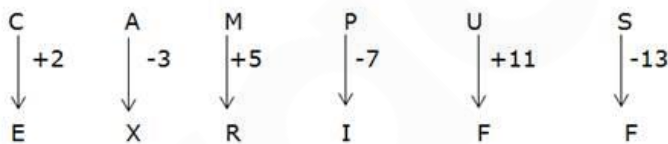
8. In a certain code 'CAMPUS' is coded as 'EXRIFF'. In the same code how will 'COMPANY' be coded as?

- A. LAPELRI
- B. ELRILAP
- C. ELAPRIL
- D. APELRIL

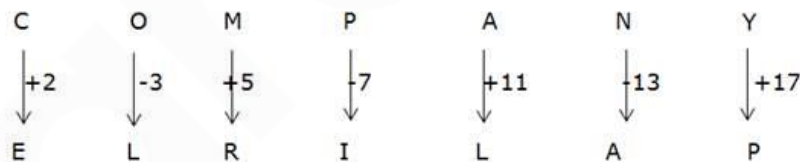
Ans. B

Sol. The code is as follows:

As,



Similarly,



Hence, option B is the correct answer.

9. In certain language, POT is written as '15', then how will HIKE be written in that code language?

- A. 24
- B. 21
- C. 36
- D. 30

Ans. A

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11. In the following question, select the odd number from the given alternatives.

- A. 2195
- B. 5193
- C. 3561
- D. 9521

Ans. B

Sol. Product of all four digit of these three number 2195,3561,9521 is 90.

2195=> 2*1*9*5=90

3561=>3*5*6*1=90

9521=>9*5*2*1=90

5193=>5*1*9*3=135

So odd number is 5193

Hence, option B is the correct answer.

12. In the following question, select the odd number from the given alternatives.

- A. 4 - 64
- B. 6 - 214
- C. 3 - 27
- D. 5 - 125

Ans. B

Sol. Cube of 4 is 64

Cube of 3 is 27

cube of 5 is 125

Cube of 6 is 216, but in option (B) it is written 214.

Hence, option B is the correct answer.

13. In the following question, select the related group of letters from the given alternatives.

REKM : UHNP : : PKDL : ?

- A. SNGO
- B. SGNO
- C. SNOG
- D. MAHG

Ans. A

Sol.

Alphabet	A	B	C	D	E	F	G	H	I	J	K	L	M
Position value	1	2	3	4	5	6	7	8	9	10	11	12	13
Alphabet	Z	Y	X	W	V	U	T	S	R	Q	P	O	N
Position value	26	25	24	23	22	21	20	19	18	17	16	15	14

R + 3 ⇒ U

E + 3 ⇒ H

K + 3 ⇒ N

M + 3 ⇒ P

Likewise,

P + 3 ⇒ S

K + 3 ⇒ N

D + 3 ⇒ G

L + 3 ⇒ O

Hence, option A is the correct answer.

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14. **In the following question, select the related word from the given alternatives.**

Ear: Sound :: Eye : ?

- A. Light
- B. ray
- C. spectacle
- D. wind

Ans. A

Sol. Ear can sense sound. Similarly, Eye can sense light.

Hence, option A is the correct answer.

15. **In the following question, statement(s) is given followed by two conclusions, I and II. You have to consider the statement to be true, even if It seems to be at variance from commonly known facts. You have to decide which of the given conclusion(s), if any, follow(s) from the given statement(s).**

Statements :

After landing on the Moon, Neil Armstrong said, "One small step for a man, a giant leap for mankind.

Conclusions :

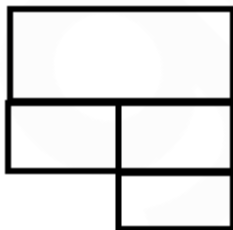
- I. Neil Armstrong presented himself as mankind.
 - II. The words of Neil Armstrong loud achievement of mankind.
- A. Both I and II follows
 - B. Neither I nor II follows
 - C. Only Conclusion I follows
 - D. Only conclusion II follows

Ans. D

Sol. Based on the given statement it can be concluded that the words of Neil Armstrong express the loud achievement of mankind so, conclusion II can be concluded. However, conclusion I is vague.

Hence, option D is the correct answer.

16. **How many rectangles are there in the given figure?**



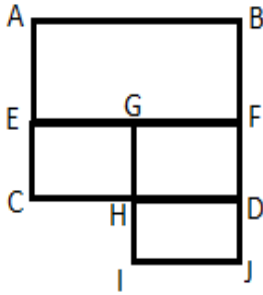
- A. 5
- B. 6
- C. 7
- D. 8

Ans. C

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Sol.



After observation the rectangles are, ABEF, ABDC, EGHC, EFDC, GFDH, IJDH and IJFG.

So total number of rectangles are 7.

Hence, option C is the correct answer.

17. **Which of the following options shows the logical and meaningful pattern of the given words.**

- | | |
|---------------------|---------------------|
| 1) Hour | 2) Month |
| 3) Second | 4) Day |
| 5) Minute | 6) Week |
| A. 2, 3, 4, 1, 6, 5 | B. 3, 5, 1, 4, 6, 2 |
| C. 2, 3, 4, 1, 5, 6 | D. 6, 2, 5, 4, 3, 1 |

Ans. B

Sol. Correct order of Time is-

- 3. Second
- 5. Minute
- 1. Hour
- 4. Day
- 6. Week
- 2. Month

Correct order is- 3, 5, 1, 4, 6, 2

Hence, option B is the correct answer.

18. **Arrange the following words in a logical sequence as they would appear in the English dictionary.**

- | | |
|------------------|------------------|
| 1) Jacklight | 2)Jacket |
| 3) Jade | 4) Joker |
| 5) Jampacked | |
| A. 2, 1, 3, 5, 4 | B. 3, 1, 2, 5, 4 |
| C. 1, 2, 3, 4, 5 | D. 2, 3, 1, 4, 5 |

Ans. A

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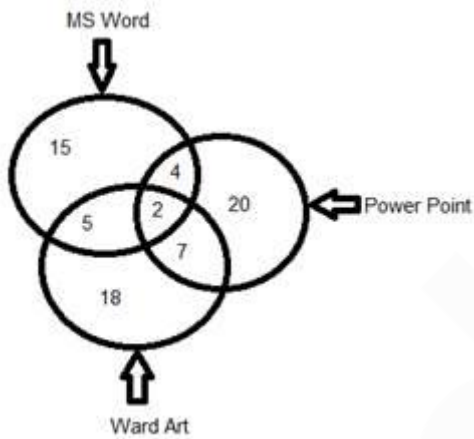
Sol. Correct appearance in English dictionary order is-

- 2) Jacket
- 1) Jacklight
- 3) Jade
- 5) Jampacked
- 4) Joker

Correct order is-2, 1, 3, 5, 4

Hence, option A is the correct answer.

19. In the following Venn Diagram, shows information about the software of the computer.

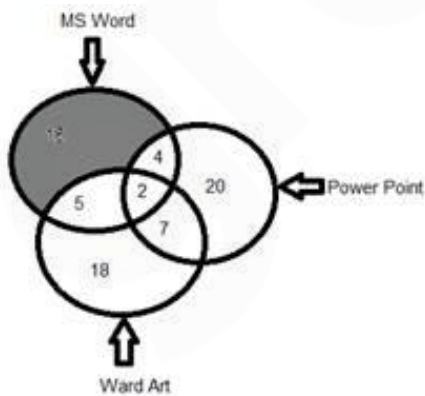


The person who has the only ms word?

- A. 19
- B. 17
- C. 15
- D. 20

Ans. C

Sol.



In the above of figure shaded part represents the person who has only MS Word = 15

Hence, option C is the correct answer.

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22. **In the following question, select the related word from the given alternatives.**

Dinar : Iraq :: ? : Iran

- A. Yen
- B. Dirham
- C. Dollar
- D. Rial

Ans. D

Sol. Yen - the currency of Japan.

Dirham - the currency of the United Arab Emirates.

Dollar - currency of the United states of America, New Zealand, Canada etc.

Dinar is the currency of Iraq and Rial is the currency of Iran. Thus, (Dinar : Iraq :: Rial : Iran).

Hence, option D is the correct answer.

23. **In the following question, select the odd word from the given alternatives.**

- A. Marburg
- B. Lassa
- C. Rabies
- D. Chin

Ans. D

Sol. **Marburg** - is a severe illness of humans and non-human primates caused by either of the two Marburgviruses, Marburg virus (MARV) and Ravn virus (RAVV).

Lassa - Lassa fever is an acute viral hemorrhagic illness caused by Lassa virus, a member of the Arenavirus family of viruses. It is transmitted to humans from contacts with food or household items contaminated with rodent excreta.

Rabies - Rabies is a virus that is usually spread by the bite or scratch of an animal.

Chin is a part of human Body.

Hence, option D is the correct answer.

24. **In the following question, select the odd word from the given alternatives.**

- A. Nepal
- B. Germany
- C. China
- D. India

Ans. B

Sol. India, Nepal and China are the neighboring countries they all share International boundaries with each other. While, Germany is entirely different from these three as it is a Western European country.

Hence, option B is the correct answer.

25. **Select the correct mirror image of the given figure when the mirror is placed on the right of the figure.**

LBWP

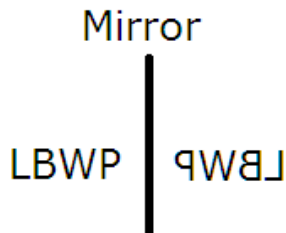
- A. LBWP
- B. $\text{pWB\textbar{L}}$
- C. $\text{p\textbar{WB}}$
- D. $\text{pWB\textbar{L}}$

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Ans. D

Sol. In a plane mirror, a mirror image is a reflected duplication of an object that appears almost identical, but it is reversed in the direction perpendicular to the mirror surface. As an optical effect, it results from reflection of substances such as a mirror or water.



Hence, option D is the correct answer.

26. **In the following question, select the related number from the given alternatives.**

4231: 19 :: 5132: ?

A. 14

B. 15

C. 16

D. 18

Ans. A

Sol. Here, logic is first digit²+second digit + third digit²+fourth digit

so,

$$4^2+3^1=19$$

Similarly: $5^1 + 3^2= 14$

Hence, option A is the correct answer.

27. **Select the number that can replace the question mark (?) in the following series.**

600, 120, 30, 10, 5, ?

A. 4

B. 5

C. 3

D. 2

Ans. B

Sol. In the above question every succeeding number is divided by 5, 4, 3, 2 and 1 respectively.

$$600 \times \frac{1}{5} = 120$$

$$120 \times \frac{1}{4} = 30$$

$$30 \times \frac{1}{3} = 10$$

$$10 \times \frac{1}{2} = 5 \text{ and}$$

$$5 \times 1 = 5$$

Hence, 5 is the correct answer.

Hence, option B is the correct answer.

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28. In the following question, select the related number from the given alternatives.

$$9 : 81 :: 12 : ?$$

- A. 124
- B. 104
- C. 134
- D. 144

Ans. D

Sol. Here numbers are related with its square.

In $9 : 81$

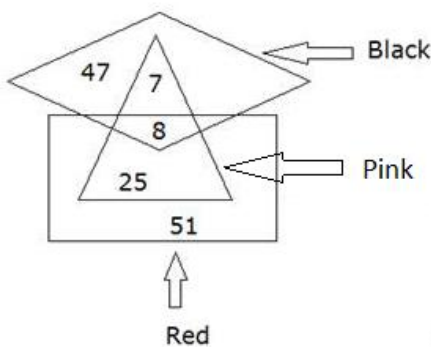
$$81 = 9^2$$

Similarly

$$? = 12^2 = 144$$

Hence, option D is the correct answer.

29. The following Venn Diagram shows the information of the person who likes different colours.

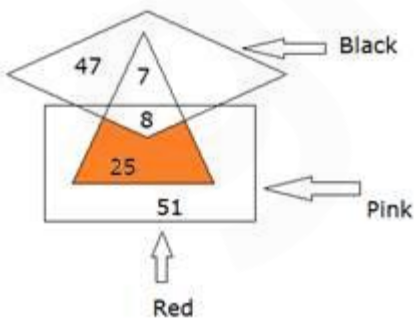


The person who likes Pink and Red Colors but not Black?

- A. 7
- B. 8
- C. 25
- D. 47

Ans. C

Sol.



The person who likes Pink and Red Colors but not Black is the shaded part which is 25.

Hence, option C is the correct answer.

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30. In the following question, select the missing number from the given alternatives.

5	8	6
11	9	10
9	13	17
46	?	43

- A. 61
- B. 16
- C. 32
- D. 59

Ans. D

Sol. 1st Column:

$$(5 \times 11) - 9 = 55 - 9 = 46$$

2nd Column:

$$(8 \times 9) - 13 = 72 - 13 = 59$$

3rd Column:

$$(6 \times 10) - 17 = 60 - 17 = 43$$

Hence, option D is the correct answer.

31. Choose the word almost nearest in meaning to the word given below:

Abnormal

- A. Unnatural
- B. Aggressive
- C. Unique
- D. Informal

Ans. A

Sol. The word "abnormal" means unusual, unnatural and irregular. So, the word "unnatural" is similar to the meaning of the given word.

32. Select the most appropriate synonym of the given word.

Venal

- A. Corrupt
- B. Comprehensible
- C. Legible
- D. Forgivable

Ans. A

Sol. Venal means corrupt; prepared to do dishonest or immoral thing in return for money. So, option A is the correct answer. The meanings of the other words are:

Comprehensible = able to be understood; intelligible

Legible = clear enough to read

Forgivable = able to be forgiven or tolerated; excusable

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The expert mason reported to the contractor that there was no question of the walls falling up.

- A. expert mason reported to the contractor B. that there was no question
C. of the walls falling up D. (D)

Ans. C

Sol. The error is in part (C) of the sentence. The error is of phrasal usage in the sentence. The correct phrase should be 'falling down' as there is no logical meaning of 'walls falling up'.

37. Select the most appropriate option to substitute the bracketed segment in the given sentence. If no substitution is required, select 'No improvement'.

Sita didn't (so far as) blink when she heard she had won the scholarship to Cambridge.

- A. so much as B. as far as
C. as good as D. No improvement

Ans. A

Sol. The correct phrase to be used in the given sentence is "so much as" which means "even". The sentence means to say, "Sita didn't even blink when she heard she had won the scholarship to Cambridge".

Hence, option A is the correct answer.

38. **Identify the best way to improve the underlined part of the given sentence. If there is no improvement required, select 'no Improvement'.**

Do you mind me leaving this payment until next year?

- A. I B. my
C. mine D. No improvement

Ans. B

Sol. A possessive pronoun is used with a gerund. The reason is that the gerund form of a verb functions as a noun. In the given sentence the verb "leaving" is a gerund and working as a noun. So, it must be preceded by a possessive pronoun i.e. 'my'.

Examples :- She doesn't approve of my gambling.

Hence, option B is the correct answer.

39. **Choose the most appropriate alternative to complete the sentence:**

There were _____ participants at the conference that we had trouble seating them.

- A. much more B. many more
C. so many D. too many

Ans. C

Sol. The correct clause is "so many.....that". Since the sentence uses "that" which gives us a hint that "so that" will also be used in the sentence. Thus, option C is the correct answer.

So much and **so many** refer to the amount or the number of something. The object is introduced by **that**. See example:

Ravi had so many problems that he wasn't able to sleep the whole night.

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40. **Choose the most appropriate answer and fill in the blanks:**

The principal congratulated him _____ passing the final exam.

- A. in
- B. at
- C. on
- D. with

Ans. C

Sol. The correct preposition to be used in the given sentence is "on".

Explanation:

The preposition *on* is used when expressing one's good wishes in the context of a happy event.

Congratulations on your marriage!

Congratulations can be offered as praise for someone's achievement. In that context, the preposition to use is *for*.

Congratulations for completing the project on time.

Hence, option C is the correct answer.

41. **Select the word which means the same as the group of words given.**

Line on map which connects places having same temperature

- A. isobar
- B. isotherm
- C. latitude
- D. meridian

Ans. B

Sol. Let's understand the meaning of the given words:-

Isotherm = a line on a map connecting points having the same temperature at a given time or on average over a given period

Isobar = a line on a map connecting points having the same atmospheric pressure at a given time or on average over a given period

Latitude = a measure of a relative position north or south on the Earth's surface, measured in degrees from the equator

Meridian = a great imaginary circle on the surface of the Earth that runs north and south through the North Pole and South Pole

Hence, option B is the correct answer.

42. In the following question, out of the five alternatives, select the word similar in meaning to the given word/phrase.

Person travelling from place to place

- A. Journeyman
- B. Tramp
- C. Mendicant
- D. Itinerant
- E. None of these

Ans. D

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Sol. Itinerant = a person who travels from place to place.

Tramp = a person who travels from place to place on foot in search of work or as a vagrant or beggar.

Journeyman = a trained worker who is employed by someone else.

Mendicant = a beggar.

So, the correct word is "itinerant".

43. **Direction:** In the following question, four words are given out of which one is correctly spelt. Indicate the correctly spelt word.

A. insaucient

B. insouciant

C. insouciant

D. insauciant

Ans. B

Sol. The correctly spelt word is "insouciant" which means showing a casual lack of concern.

44. **Direction:** In the following question, four words are given out of which one is correctly spelt. Indicate the correctly spelt word.

A. embarrassment

B. embarassment

C. embarrassent

D. embarrasment

Ans. C

Sol. The correct spelling is "Embarrassment" which means a feeling of self-consciousness, shame, or awkwardness.

45. Given below are some idioms/phrases followed by four alternative meanings to each. Choose the response A, B, C or D. which is the most appropriate expression.

Call into question

A. Summon as a witness

B. To doubt

C. Prove a theory

D. To challenge

Ans. B

Sol. The idiom "call in question" means to raise a question or doubt about someone or something. Hence, the most suitable answer is option B.

46. **Read the following passage and answer the questions that follow.**

Most of us are not very good listeners. We tend to believe that at meetings we shall be judged by the amount we can contribute in sheer volume of words rather than how much we absorb other people's ideas. When we are listening, or think we are, we find it almost impossible to stop talking to ourselves. We assume that what the other person is saying is dreary and pointless. We don't open our mouth, of course, because that is just plain bad manners; but we do tend to use our listening moment to work out and rehearse what we hope to say. Again and again at meetings you will hear people hotly denouncing views that have never been put forward or defending to the last breath those that have never been attacked. We live in competitive world and most of us are concerned with putting our own ideas across or beating the other in argument about their ideas.

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At meetings, we believe we shall be judged by theA. number of questions we put to the speaker

- B. noise we make while other are speaking
- C. volume of words we contribute
- D. amount of ideas we absorb from others

Ans. C

Sol. As per the passage, we tend to believe that at meetings we shall be judged by the amount of words or what we speak, we can contribute in the sheer volume rather than how much we absorb other people's ideas.

Hence, option C is the correct answer.

47. "It is just plain bad manners". This refers to
- A. talking to ourselves
 - B. using offensive language
 - C. sleeping soundly while somebody is talking
 - D. interrupting the speaker frequently

Ans. D

Sol. When someone is putting his/her points in a meeting, we are not supposed to open our mouth and interrupt that person as this is considered as bad manners. Therefore, option D is the correct answer.

48. Often at times, you will hear people hotly denouncing
- A. views held universally
 - B. views that have never been put forward
 - C. absurd arguments put forward by others
 - D. views that are opposed to their own

Ans. B

Sol. As per the passage, often at times, you will hear people hotly denouncing at meetings with the views that have never been put forward or desperately defending or supporting arguments.

Hence, option B is the correct answer.

49. "Defending to the last breath" means
- A. refusing to yield before enemy attack
 - B. trying to save somebody from an attack of breathlessness
 - C. sacrificing one's own life for defending positions on the battle front
 - D. desperately defending or supporting arguments or points of view

Ans. D

Sol. Defending to the last breath means one desperately defends or supports arguments or points of view. Thus, option D is the correct answer.

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50. Dreary in the present context means
- | | |
|----------------|------------------|
| A. humorous | B. lively |
| C. provocative | D. uninteresting |

Ans. D

Sol. The word "dreary" means unattractive and having nothing of any interest. Thus, the word "uninteresting" expresses the same meaning as "dreary".

51. Schedule VI of the constitution deals with tribal areas of which states?
- | |
|--|
| A. Arunachal Pradesh, Manipur, Tripura and Mizoram |
| B. Assam, Meghalaya, Manipur and Mizoram |
| C. Assam, Meghalaya, Tripura and Sikkim |
| D. Assam, Meghalaya, Tripura and Mizoram |

Ans. D

Sol. Schedule VIth of constitution deals with tribal areas of **Assam, Meghalaya, Tripura and Mizoram.**

- The sixth schedule to the Constitution includes **10 autonomous district councils in 4 states.**
- The provisions related to VIth Schedule are mentioned in **Article 244.**
- The District Council and Regional Council consist of a maximum of 30 **members.**
- The district councils and regional councils have powers to make laws on certain matters with the approval of the Governor.

52. Which chemical released from onion that makes us cry while cutting onions?
- | | |
|-----------------------------|-------------------------------|
| A. Syn-propanethial-S-oxide | B. Syn-propanethial-Na-Oxide |
| C. Syn-propanethial-C-oxide | D. Trans-propanethial-P-oxide |

Ans. A

Sol. • The chemical responsible for tears in eyes while cutting onions is Syn-propanethial-S-oxide.

- When we cut the onions the synthase enzymes of onion convert the amino acids sulfoxides into Sulfenic Acid. The unstable sulfenic acid rearranges itself into syn-propanethial-S-oxide.
- Syn-propanethial-S-oxide gets into the air and comes in contact with our eyes. The lachrymal glands become irritated and produce the tears.

53. As per the SIPRI Report released in April, 2020, India stands at what position in military spenders in 2019?
- | | |
|----------|-----------|
| A. First | B. Second |
| C. Third | D. Fourth |

Ans. C

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Sol. As per the SIPRI Report released in April, 2020, **India stands at third position** in military spenders in 2019.

* SIPRI stands for **Stockholm International Peace Research Institute**.

* The report was based on military spending of different countries, in which **US got first position and China got second position**.

* Report suggests that the total military expenditure of world is increased by **3.6%** in 2019 as compared to 2018.

* As per Report, **India** spent 71.1 bn \$ in 2019, which is an increment of **6.8%** from previous year.

54. Power of Siberia is a mega gas pipeline project between which countries?

- A. Russia and Czech Republic B. Russia and China
C. Russia, Mongolia and China D. China, Turkmenistan and Pakistan

Ans. B

Sol. Power of Siberia is a mega gas pipeline project between **Russia and China**.

- It is the first cross border gas pipeline between Russia and China.
- The pipeline stretches more than **3,000km**.
- The pipeline will pass through the deltas of the **Yangtze and Amur** Rivers of China.

55. In March 2020, the "Chief Ministers Akhannaba Sanaroisingi Tengbang (CMAST)" scheme was launched by which state of India?

- A. Meghalaya B. Tripura
C. Mizoram D. Manipur

Ans. D

Sol. * In March 2020, the **Chief Ministers Akhannaba Sanaroisingi Tengbang (CMAST)** scheme was launched by Manipur state government.

* Under this scheme, the Cash awards will be awarded for Olympians who bag gold, silver, bronze, and the winners will be given **Rs.1 crore, Rs.75 lakh, and Rs.50 lakh** respectively.

* Manipur state government also launched the **Chief Ministergi Artiste Singgi Tengbang (CMAT)**.

* This scheme has been designed for renowned artistes.

56. What is the full form of DMA?

- A. Direct Multimedia Access B. Direct Memory Access
C. Direct Memory Action D. Dual Memory Access

Ans. B

Sol. • **The full form of DMA is Direct Memory Access.**

• Direct Memory Access is computer system feature to allow hardware subsystems to access main system memory. DMA and CPU does other operations while the transfer is in

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progress and finally receives an interrupt from the DMA controller when the operation is done.

- DMA can also be used for the memory to memory copying or moving of data within memory.

57. The total no. of ministers in council of ministers shall not exceed ____% of the strength of Legislative assembly?

- A. 10
- B. 15
- C. 20
- D. 25

Ans. B

Sol. * **The total no. of ministers in council of ministers shall not exceed 15 % of the strength of Legislative assembly.**

* Also number of minister including chief minister in any state shall not be less than 12.

* This provision was added through 91st Amendment Act of 2003.

58. Sunlight is captured by which compound in leaves of a green plant?

- A. Melanin
- B. Chlorophyll
- C. Magnesium
- D. Myoglobin

Ans. B

Sol. • **Plant captures sunlight by compound called Chlorophyll.**

• Chlorophyll is a green pigment found in chloroplasts of algae and plants. It is essential for the process of photosynthesis.

• Two types of chlorophyll exist in the photosystem of green plants:

- a) Chlorophyll a
- b) Chlorophyll b

59. The Governor-General of India was given the title of Viceroy for the first time in:

- A. 1857
- B. 1858
- C. 1856
- D. 1859

Ans. B

Sol. • The Governor-General of India was given the title of Viceroy for the first time in 1858.

• The title "viceroy and governor-general" was first used in the queen's proclamation appointing Viscount Canning in 1858.

• **The Government of India Act 1833** converted the title into "governor-general of India".

• The first governor-general of British India was Lord William Bentinck.

60. Who is known as the Father of Civil Aviation in India?

- A. Sir George Cayley
- B. J R D Tata
- C. Orville Wright
- D. None of above

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Ans. B

Sol. • **J R D Tata is known as the Father of Civil Aviation in India.**

- He became the first Indian to pass the pilot's examination with No 1 endorsed on his flying license and his passion for flying was fulfilled with the formation of the Tata Aviation Service in 1932.

61. Constantan is an alloy of copper and _____.

- A. Aluminium
- B. Iron
- C. Tin
- D. Nickel

Ans. D

Sol. * Constantan is a copper–nickel alloy also known as Eureka.

- * It usually consists of 55% copper and 45% nickel. Its main feature is the low thermal variation of its resistivity, which is constant over a wide range of temperatures.

62. Indian Space Research Organization was founded in which year?

- A. 1969
- B. 1971
- C. 1975
- D. 1977

Ans. A

Sol. • **The Indian Space Research Organisation was founded in 1969.**

- Prior to this, it existed with name The Indian National Committee for Space Research or INCOSPAR. INSCOSPAR was established in 1962 by Jawaharlal Nehru.
- Dr. Vikram Sarabhai is considered as father of Indian Space Research.

63. Which law of physics says that a line between the sun and the planet sweeps equal areas in equal times?

- A. Kepler's first law
- B. Kepler's second law
- C. Archimedes's law
- D. Einstein theory

Ans. B

Sol.

Kepler's second law states that a line between the sun and the planet sweeps equal areas in equal times.

- This law infers that the speed of the planet increases as it nears the sun and decreases as it recedes from the sun.
- First law of kepler states that the orbit of every planet is an ellipse with the Sun at one of the two foci.
- Johannes kepler published these laws between 1609 to 1619.

64. A trade mark is an example of _____.

- A. Current assets
- B. Intangible assets
- C. Fixed assets
- D. Liquid assets

Ans. B

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- Sol. • A trademark is a type of **intellectual property right**.
- It consists of a **design, sign, or expression** which helps in identifying products or services & differentiating from other products.
 - Trademarks used to identify services are called **service marks**.
 - **A trade mark is an example of Intangible assets.**

65. Hypermetropia is related to which of the following body parts?

- A. Lungs
B. Eyes
C. Brain
D. Ears

Ans. B

- Sol. • Hypermetropia is a common eye condition where nearby objects appear blurred, but your vision is clearer when looking at things further away.
- It is corrected by spectacles or contact lenses with lenses which are convex in shape.

66. Government of India implemented the POSHAN Abhiyaan across the country to address the_____.

- A. To deal with the problem of economic recession.
B. To protect women during pregnancy.
C. Problem of malnutrition
D. All of the above

Ans. C

Sol. * In March 2020, the Government of India implemented the **POSHAN Abhiyaan** across the country to address the **problem of malnutrition**.

* The campaign aims to reduce malnutrition in the country.

* POSHAN (Prime Minister's Overarching Scheme for Holistic Nutrition) Abhiyaan is the Government of India's flagship programme to improve nutritional outcomes for children, pregnant women, and lactating mothers.

* It was launched by **Prime Minister Narendra Modi Modi** on the International Women's Day **on 8 March 2018 in Jhunjhunu, Rajasthan**.

67. Boron, Germanium, Arsenic, Antimony etc. elements are known as_____.

- A. Metals
B. Mixed Metals
C. Non Metals
D. Metalloids

Ans. D

Sol. Boron, Germanium, Arsenic, Antimony etc. elements are known as **Metalloids**.

- Metalloids are elements classified in periodic table which exhibits **some properties of metals and some properties of non metals**.

- These are arranged in zigzag path in periodic table between metals and non metals.

- **Boron, silicon, germanium, arsenic, antimony, tellurium, and polonium are metalloids.**

- Typical metalloids have a metallic appearance, but they are brittle and only fair conductors of electricity.

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68. What is the role of split ring in an electric motor?
- A. It converts mechanical energy to electric energy
 - B. It transfers power between rotating and stationary structures
 - C. It reduces the unnecessary sound in the motor
 - D. It reverses the direction of current in the coil

Ans. D

Sol. **Split ring** reverses the direction of current in the coil.

- The split ring in the electric motor is also known as a **commutator**.
- It consists of a cylindrical shell which contains two insulated splits.
- It is used in **DC machines**.

69. Which of the following is popularly called "Hypo"?
- A. Silver Bromide
 - B. Aluminium Silicate
 - C. Sodium Thiosulphate
 - D. None of above

Ans. C

Sol. • **Sodium Thiosulphate is popularly called "Hypo"**.

- It is an inorganic compound with the formula **$\text{Na}_2\text{S}_2\text{O}_3 \cdot x\text{H}_2\text{O}$** .
- It is **used as a medication to treat cyanide poisoning, pityriasis versicolor and to decrease side effects from cisplatin**.

70. "Economic theory of Famines" is written by _____.
- A. Vishveshvaraiya
 - B. Amartya Sen
 - C. Hargobind Khurana
 - D. Arvind Subramanyam

Ans. B

Sol. **The book 'Economic theory of Famines' was written by Amartya Sen in 1981**

- In this book, he argued that famine occurs not only from a lack of food, but also from inequalities built into mechanisms for distributing food.
- Amartya Sen is a Nobel Prize winner in 1998 and a Bharat Ratan awardee of 1999
- He gave the concept of "Welfare Economics" and also credited to develop 'Human Development Index' with Mabub ul Haq.

71. The average of first three numbers is double of the fourth number. If the average of all the four numbers is 12, find the 4th number.
- A. 16
 - B. 48/7
 - C. 20
 - D. 18/7

Ans. B

Sol. The average of first three numbers is double of the fourth number.

Let first three numbers be a, b and c

And fourth no be d

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Then,

$$(a + b + c)/3 = 2d$$

$$\rightarrow a + b + c = 6d \text{ -----eq(1)}$$

the average of all the four numbers is 12

therefore,

$$a + b + c + d = 4 \times 12 = 48 \text{ -----eq(2)}$$

by using eq(1) in eq(2)

$$6d + d = 48$$

$$\rightarrow 7d = 48$$

$$\rightarrow d = 48/7$$

72. A man rows to a place 72 km away and back to the starting point in 10 hours. If the time taken to travel 24 km downstream is equal to time taken to travel 16 km upstream. Find the speed of the stream.

A. 3 km/hr

B. 2 km/hr

C. 4 km/hr

D. 5 km/hr

E. None of these

Ans. A

Sol. Time = distance/speed

Let the speed of the boat be 'a' km/hr and speed of the stream be 'b' km/hr.

Relative speed of boat while going upstream = (a - b) km/hr

Relative speed of boat while going downstream = (a + b) km/hr

Given, Aman rows to a place 72km away and back to the starting point in 10 hours.

Time taken = 10 hours

$$\therefore \frac{72}{a - b} + \frac{72}{a + b} = 10$$

$$\Rightarrow \frac{1}{a - b} + \frac{1}{a + b} = \frac{5}{36} \text{ -----1}$$

Also the time taken to travel 24 km downstream is equal to time taken to travel 16km upstream.

$$\therefore \frac{24}{a + b} = \frac{16}{a - b}$$

$$\Rightarrow 3a - 3b = 2a + 2b$$

$$\Rightarrow a = 5b$$

Substituting value of a in eq1

$$\Rightarrow \frac{1}{4b} + \frac{1}{6b} = \frac{5}{36}$$

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$$\Rightarrow \frac{5}{12b} = \frac{5}{36}$$

$$\Rightarrow b = 3 \text{ km/hr}$$

$$\therefore a = 3 \times 5 = 15 \text{ km/hr}$$

Speed of stream = 3 km/hr

73. Out of the given options what should come in place of 'a' so that 4560a is divisible by 4?

- A. 0
- B. 2
- C. 6
- D. 5

Ans. A

Sol. 4560a

To make any number divisible by 4 its last two digits must be divisible by 4 considering 0a, checking options

00 : divisible by 4

02 : not divisible by 4

06 : not divisible by 4

05 : not divisible by 4

So 'a' is replaced by 0

74. In an examination 73% of the candidates passed in quantitative aptitude test, 70% passed in General awareness and 64% passed in both. If 6300 failed in both subjects the total number of examinees were

- A. 60000
- B. 50000
- C. 30000
- D. 25000

Ans. C

Sol. Percentage of students who pas in one or two or both subjects = $73 + 70 - 64 = 79\%$

$$\therefore \text{Unsuccessful students} = 100 - 79 = 21\%$$

If the total number of examinees be x, then

$$21\% \text{ of } x = 6300$$

$$\Rightarrow x \times \frac{21}{100} = 6300$$

$$\Rightarrow x = \frac{6300 \times 100}{21} = 30000$$

75. A merchant buys 25 litres of milk daily at the rate of ₹ 12 per litre. He mixes 5 litres of water in it and sells at the rate ₹ 10.40 per litre. His gain/loss is:

- A. 8% profit
- B. 2% profit
- C. 4% profit
- D. 6% profit

Ans. C

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Sol. A merchant buys 25 litres of milk daily at the rate of ₹ 12 per litre.

Therefore,

$$\text{Total CP} = 25 \times 12 = 300$$

He mixes 5 litres of water in it and sells at the rate ₹ 10.40 per litre.

$$\text{Quantity of new mixture} = 25 + 5 = 30 \text{ litres}$$

$$\text{Total SP} = 10.40 \times 30 = 312$$

$$\text{Gain} = \text{SP} - \text{Cp} = 312 - 300 = 12$$

$$\text{Gain \%} = (\text{gain}/\text{CP}) \times 100$$

$$\Rightarrow \text{gain \%} = (12/300) \times 100 = 4\%$$

76. By mistake, instead of dividing Rs. 117 among A, B and C in the ratio $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ it was divided in the ratio of 2:3:4. Who gains the most and by how much?

A. A, Rs. 28

B. B, Rs. 3

C. C, Rs. 20

D. C, Rs. 25

Ans. D

Sol. Original ratio of A, B, and C = $\frac{1}{2} : \frac{1}{3} : \frac{1}{4} = 6 : 4 : 3$

$$\therefore \text{Share of A} = \frac{6}{13} \times 117 = \text{Rs.}54$$

$$\text{Share of B} = \frac{4}{13} \times 117 = \text{Rs.}36$$

$$\text{Share of C} = \frac{3}{13} \times 117 = \text{Rs.}27$$

The ratio of A, B, and C by mistake = 2 : 3 : 4

$$\therefore \text{Share of A} = \frac{2}{9} \times 117 = \text{Rs.}26$$

$$\text{Share of B} = \frac{3}{9} \times 117 = \text{Rs.}39$$

$$\text{Share of C} = 13 \times 4 = \text{Rs.}52$$

Therefore, it is clear from the above calculation that C gains maximum i.e. $52 - 27 = \text{Rs.} 25$

77. A moving train passes a platform 50 m long in 14 s and a lamp-post in 10 s. The speed of the train is

A. 24 km/h

B. 36 km/h

C. 40 km/h

D. 45 km/h

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Ans. D

Sol. Suppose length of train = x m

According to the question,

$$\frac{x+50}{14} = \frac{x}{10} \Rightarrow 14x = 10x + 500$$

$$\Rightarrow 4x = 500$$

$$\Rightarrow x = \frac{500}{4} = 125\text{m}$$

Therefore, speed

$$= \frac{125}{10} \times \frac{18}{5} = 45\text{km/h}$$

78. A and B can do a piece of work in 12 days, B and C in 15 days, C and A in 20 days. A alone can do the work in

A. 15 2/3 day

B. 30 days

C. 24 days

D. 40 days

Ans. B

Sol. **Short Trick:**

let Total Work=LCM(12,15,20)=60

	Days	Efficiency
A+B	12	5
B+C	15	4
C+A	20	3

 $2(A+B+C)=12$

$$A+B+C=6$$

$$A=(A+B+C)-(B+C)$$

$$A=6-4 =2$$

Time required by A to complete 60 units of work

$$=60/2=30 \text{ Days}$$

Basic Method:

$$(A + B)\text{'s 1 day's work} = 1/12$$

$$(B + C)\text{'s 1 day's work} = 1/15$$

$$(C + A)\text{'s 1 day's work} = 1/20$$

On adding all three,

$$2(A + B + C)\text{'s 1 day's work}$$

$$= \frac{1}{12} + \frac{1}{15} + \frac{1}{20} = \frac{5+4+3}{60}$$

$$= \frac{12}{60} = \frac{1}{5}$$

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(A + B + C)'s 1 day's work

$$= \frac{1}{10}$$

$$\therefore \text{A's 1 day's work} = \frac{1}{10} - \frac{1}{15}$$

$$= \frac{3-2}{30} = \frac{1}{30}$$

\therefore Time taken by A = 30 days

79. If the average of 6 consecutive even numbers is 25, the difference between the largest and the smallest number is

- A. 8
- B. 10
- C. 12
- D. 14

Ans. B

Sol. If the average of 6 consecutive even numbers is 25.

Then numbers will be 20, 22, 24, 26, 28, 30

difference between the largest and the smallest number = $30 - 20 = 10$

80. Four different electronic devices make a beep after every 30 minutes, 1 hour, 1 hour 30 minutes and 1 hour 45 minutes respectively. All the device beeped together a.m. 12 noon.

They will again beep together at:

- A. 12 midnight
- B. 3 a.m.
- C. 6 a.m.
- D. 9 a.m.

Ans. D

Sol. Interval after which the devices will beep together

$$= (\text{L.C.M. of } 30, 60, 90, 105) \text{ min} = 1260 \text{ min} = 21 \text{ hrs}$$

So, the devices will again beep together 21 hrs after 12 noon *i.e.*, at 9 a.m.

81. P, Q and R invested in the ratio 4 : 5 : 6 in a business. If 10% of the total profit goes to charity and Q's share is Rs 4320, find the total profit.

- A. 14000
- B. 15000
- C. 14400
- D. 16400

Ans. C

Sol. Let the total profit be P

remaining profit after 10% donation = $0.9P$

Q's share in remaining profit = $\frac{5}{(4+5+6)}$ of remaining profit

= $\frac{1}{3}$ of remaining profit

$$= \frac{0.9P}{3} = 0.3P = 4320$$

$$P = \frac{4320}{0.3} = 14400$$

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Sol. Let number be x and divisor be k.

According to the given condition,

$$\begin{aligned}
 x &= 49k + 32 \\
 &= 7 \times 7k + 7 \times 4 + 4 \\
 &= 7(7k + 4) + 4
 \end{aligned}$$

Hence, remainder is 4.

Alternate Method:

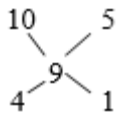
Let the number be 81 as it leaves 32 as remainder when divided by 49.

So, 81 leaves 4 as remainder when divided by 7.

85. 90 coins makes Rs. 8.10 which contain the coin of 10 Ps and 5Ps. Find number of coins of 5 ps.

- A. 18
- B. 36
- C. 9
- D. 24

Ans. A



Sol.

$$\text{Aveg. Value} \rightarrow \frac{8.10}{90} = \frac{810\text{PS}}{90} = 9 \text{ PS}$$

$$1/5 \times 90 = 18$$

86. A man spends 15% of his income. If his expenditure is Rs. 75, his income (in rupees) is:

- A. 400
- B. 300
- C. 750
- D. 500

Ans. D

Sol. A man spends 15% of his income. If his expenditure is Rs. 75

$$15\% \text{ of income} = 75$$

$$\Rightarrow \text{total income} = (75/15) \times 100 = 500$$

87. The ratio of the numbers of boys and girls of a school with 504 students is 13:11. What will be the new ratio if 12 more girls are admitted?

- A. 91:81
- B. 81:91
- C. 9:10
- D. 10:9

Ans. A

Sol. Total numbers of girls in the school:

$$= 504 \times \frac{11}{13+11} = 504 \times \frac{11}{24} = 231$$

Total numbers of boys in the school:

$$= 504 \times \frac{13}{13+11} = 504 \times \frac{13}{24} = 273$$

$$\text{Now, total numbers of girls when 12 more girls are admitted} = 231 + 12 = 243$$

$$\therefore \text{New ratio of boys and girls} = 273 : 243 = 91 : 81$$

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Ans. A

Sol. Principle amount = ₹12000

Time = 5 yr

Interest = ₹ 3600

$$\text{Rate} = \frac{3600 \times 100}{12000 \times 5} = \frac{360000}{60000} = 6\%$$

91. Neelam, Supriti, and Pallavi start running around a circular stadium and complete one round in 14s, 12s and 16s respectively. In how much time, they will meet again at the starting points?

A. 5 min 30 sec

B. 6 min 36 sec

C. 5 min 45 sec

D. 5 min 36 sec

E. none of these

Ans. D

Sol. Required time = LCM of 14,12,16

= 336 s = 5 min 36 sec

92. 9 litre mixture contains spirit and water. In this mixture water is 15%. Now if 9 litre mixture is again added and that have 8% water. Find the total percent of spirit = ?

A. $12\frac{1}{2}\%$

B. $11\frac{1}{2}\%$

C. $98\frac{1}{2}\%$

D. $88\frac{1}{2}\%$

Ans. D

Sol. water is $\rightarrow \frac{9 \times 15}{100} = \frac{1.35}{100} = 1.35$

water is $\rightarrow \frac{9 \times 8}{100} = 0.72$

water = $\frac{1.35 + 0.72}{9 + 9} = 11.5\%$

Spirit = 88.5%

93. An inlet P can fill a tank in 30 minutes. 5 other inlets, each of 25% efficiency of P can fill tank in what time?

A. 24 minutes

B. 10 minutes

C. 30 minutes

D. 45 minutes

Ans. A

Sol. Since other inlets are of 25% efficiency of P so they take $30 \times 4 = 120$ minutes each to fill the tank.

So, in 1 min other inlet will fill = $1/120$.

But since there are 5 inlets, they will fill = $(1/120) \times 5 = 1/24$

So, together they can fill the inlet completely in 24 minutes.

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The remaining girls are in Cricket. 18 per cent of the boys are in Hockey and the remaining in Football.

Number of boys in Hockey forms what per cent of the number of girls in the same game? (rounded off to two digits after decimal)

- A. 96.43
- B. 113.70
- C. 90.36
- D. 117.43
- E. 128.91

Ans. A

Sol.

Games	Girls	Boys
Hockey	840	810
Cricket	480	1395
Tennis	480	720
Football	660	675
Volleyball	540	900

$$\text{Required percentage} = \frac{810}{840} \times 100 = 96.43\%$$

97. What is the number of girls in Cricket and Hockey?
- A. 1380
 - B. 1220
 - C. 1320
 - D. 1200
 - E. None of these

Ans. C

Sol. Required number of girls in Cricket and Hockey = (480 + 840) = 1320

98. Number of boys in Cricket forms what per cent of total number of the students in the school?
- A. 16.8%
 - B. 9.75%
 - C. 12.25%
 - D. 16%
 - E. 18.6%

Ans. E

Sol. Required percentage = $\frac{1395}{7500} \times 100 = 18.6\%$

99. What is the total number of boys in Tennis and Volleyball together?
- A. 1380
 - B. 1620
 - C. 1400
 - D. 1520
 - E. None of these

Ans. B

Sol. Total number of boys in Tennis and Volleyball = (720+900) = 1620

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100. What is the number of boys in Football?
A. 800
B. 570
C. 640
D. 675
E. None of these

Ans. D

Sol. Total number of boys in Football = 675

101. Gantt charts are used for
A. forecasting sales
B. production schedule
C. scheduling and routing
D. linear programming

Ans. B

Sol. A Gantt chart is a horizontal bar chart developed as a production control tool in 1917 by Henry L. Gantt, an American engineer and social scientist. Frequently used in project management, a Gantt chart provides a graphical illustration of a schedule that helps to plan, coordinate, and track specific tasks in a project.

102. State of wet vapor can be specified only by
A. Pressure and volume
B. Temperature and dryness fraction
C. Pressure and dryness fraction
D. All of the above

Ans. D

Sol. State of wet vapor can be specified either pressure or temperature and dryness fraction or volume.

103. Choose the CORRECT diagram for the shear stress distribution in the hollow shaft along the radius.



Ans. D

Sol. From the torsion equation

$$\frac{T}{J} = \frac{\tau_{max}}{R_o} = \frac{G\theta}{L}$$

$$\tau \propto R$$

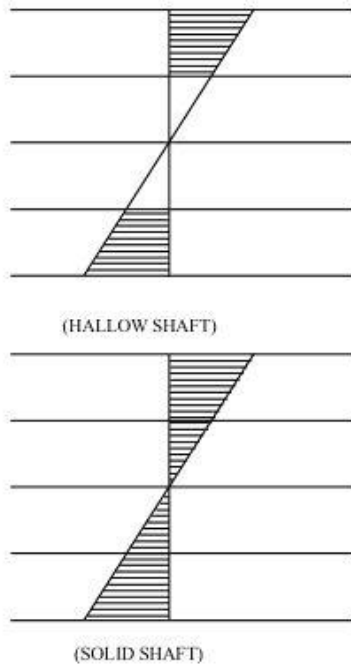
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The shear stress varies in direct proportion with the distance 'r' or radius 'r' from the axis of shaft.

from the diagram:



104. A simple gear train transferring power from the driver to driven has 5 idler gears. What can be said confidently regarding the motion of the driver and the driven gear?
- A. They will be opposite to each other
 - B. They will be in same sense
 - C. Opposite in some cases and same in some cases
 - D. Insufficient data

Ans. B

Sol. In a simple gear train when odd number of idler gears are used, the motion of driver and driven are in the same sense.

when the number of idler gears are even, the direction of rotation of driver and driven gear will be opposite.

105. Out of the following alternatives, which one constitutes an Open pair:
- A. Nut & Lead Screw
 - B. Journal Bearing arrangement.
 - C. Socket & Ball joint.
 - D. Cam & Follower

Ans. D

Sol. Cam & follower is an open pair, rest all are closed pair examples.

106. Which of the following aspects are relevant product characteristics in product development?
- 1. Functional aspects
 - 2. Operational aspects
 - 3. Durability and dependability aspects
 - 4. Aesthetic aspects

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- A. 1, 2 and 3 only
B. 1, 2 and 4 only
C. 3 and 4 only
D. 1, 2, 3 and 4

Ans. D

Sol. Functional Aspect:

When the marketing possibilities of a product have been explored, the functional scope of the product has to be carefully analysed and properly defined. The definition of the objective of a product does speak about the complete functional scope of the product. A mixer, grinder, for example, has a clearly defined objective to grind and mix or shake the various items. Basically the mixer consists of a motor and a speed control unit but it has to be designed so as to serve with all attachments.

Operational Aspect:

After knowing the functional aspect of a product, it is relevant to consider the operational aspect. It is not important only that the product should function properly but it should also be easy to understand and simple to operate.

Sometimes the product has to be suitable for various operational conditions and very often it is subjected to varying degrees of expertise of workers or operators. With this trend for increased versatility of products, the products should be designed in such a way that by using basic attachments it should be possible to build a suitable combination for specific purposes.

Durability and Dependability:

The economic analysis of the cost of product is essential in view of the fact that durability and dependability are closely related with the selection of materials and workmanship. Since quality is the degree of perfection so it is not easy to define this characteristic, but durability and dependability are the factors that often determine quality of a product and thus have to be carefully considered by the designer.

Aesthetic Aspect:

Aesthetic aspect is concerned with the appearance and look of the product. Where the dependability, durability, functional scope and operational aspects of the product have already been defined aesthetic aspect is mainly concerned with final shape of the product. Depending upon the man's aesthetic taste gradual changes in appearance or the product are taking place.

107. The force requirement in a blanking operation of low carbon steel is 5 kN. The thickness of sheet is t and diameter of blanked part is d . For the same work material, if diameter of the blanked part is increased $1.5d$ and thickness is reduced to $0.8t$, the new blanking force (in kN) is _____.
- A. 6
B. 4.5
C. 290.7
D. 8

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Ans. A

Sol. In Blanking shear force (F) is given by:

$$F = \pi dt\tau$$

Where: d = diameter of the blank

t = thickness of blank

Thus, for a material:

$$F \propto dt$$

$$\frac{F'}{5} = \frac{1.5d \times 0.8t}{dt} \Rightarrow F' = 6 \text{ kN}$$

108. Which of the following is true for a black body?

A. $\alpha = 1$

B. $\rho = 0$

C. $\tau = 0$

D. All of the above

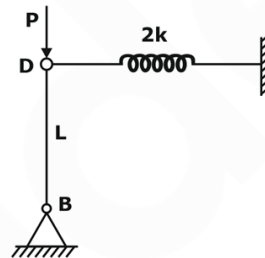
Ans. D

Sol. for a black body,

$$\rho = 0, \tau = 0 \text{ \& } \alpha = 1$$

So the correct option is (d).

109. A rigid bar attached to a spring is loaded as shown in the figure below. What is the critical load for buckling of the bar?



A. 2KL

B. 3KL

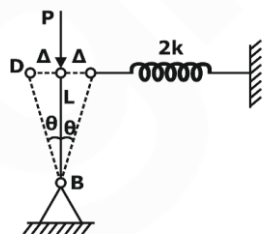
C. 4KL

D. KL

Ans. A

Sol. Due to load P,

Column will buckle either towards the spring or away as shown in figure.



Now,

Balance moment about point B

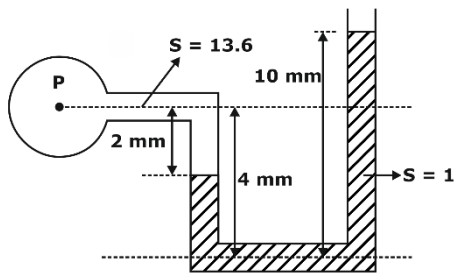
$$-P\Delta + (2k\Delta)L \Rightarrow P = 2kL$$

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110. The gauge pressure (as shown in figure) in 'cm' of water is



- A. 19.2
- B. 192
- C. 1.92
- D. 3.52

Ans. C

Sol.

$$P - \rho_{Hg}g \times \frac{2}{1000} + \rho_w g \times \frac{8}{1000} = 0$$

$$P - 13600g \times \frac{2}{1000} + 1000g \times \frac{8}{1000} = 0$$

$$P = 19.2g$$

$$\frac{P}{\rho_w g} = \frac{19.2g}{1000g} = 1.92 \times 10^{-2}m = 1.92cm$$

111. What is the change in self-weight deformation of a conical bar of weight density γ and Young's modulus E, if its end diameter is doubled?

- A. It gets doubled
- B. It reduces to half of earlier value
- C. It reduces to 1/4th of original
- D. No change

Ans. D

Sol. Deformation of conical bar due to self weight is given by

$$\delta = \frac{WL}{2AE} = \frac{\gamma L^2}{6E}$$

from the above equation, we can see that deformation is independent of end diameter whereas Self-weight deformations are quadratic function of the length of the member. thus no change will observed.

112. Which of the following is the correct sequence of steps in production planning

- A. Scheduling, Loading, Planning, Routing
- B. Scheduling, Planning, Loading, Routing
- C. Planning, Routing, Scheduling, Loading
- D. Routing, Scheduling, Planning, Loading

Ans. C

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Sol. In production planning, the sequence of steps are as follows

Planning → Routing → Scheduling → Loading

113. In order to have a low bypass factor of a cooling coil, the fin spacing and the number of tube rows should be

- A. Wide apart and high, respectively
- B. Wide apart and low, respectively
- C. Close and high, respectively
- D. Close and low, respectively

Ans. C

Sol. Low bypass factor signifies better cooling coil. If coils are closely spaced and number of tube rows are high, then maximum air will have contact with the coil for longer period. Hence efficiency improves.

114. Which of the following is correct regarding the transmission force, damping force and spring force?

- A. Transmitted force is the vector sum of damping force and spring force
- B. Damping force is the vector sum of transmitted and spring
- C. Spring force is the vector sum of transmitted and damping
- D. None of these

Ans. A

Sol. Transmitted force is the vector sum of damping force and spring force

115. Which of the following is the correct order of frequency of vibration for the given equations of vibrations?

a) $m\ddot{x} + c\dot{x} + Kx = 0$

b) $2m\ddot{x} + \frac{c}{2}\dot{x} + 2Kx = 0$

c) $\frac{m\ddot{x}}{3} + 10c\dot{x} + \frac{Kx}{3} = 0$

d) $m\ddot{x} + \frac{c}{10}\dot{x} + Kx = 0$

A. $a > b > c > d$

B. $a < b > d < c$

C. $c < a = d < b$

D. $c < a < b < d$

Ans. D

Sol. $\omega_n = \sqrt{\frac{k}{m}}$, same for all.

$$\xi = \frac{c}{2m\omega_n}$$

$$\xi_a = \frac{c}{2m\omega_n}$$

$$\xi_b = \frac{c/2}{2(2m)\omega_n} = \frac{1}{4} \xi_a$$

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$$\xi_c = \frac{10c}{2(m/3)\omega_n} = 30\xi_a$$

$$\xi_d = \frac{c/10}{2m\omega_n} = \frac{1}{10}\xi_a$$

$$\omega_d = \sqrt{1 - \xi^2}\omega_n$$

$$\Rightarrow \omega_d \downarrow \Rightarrow \xi \uparrow$$

For Eqn. a) $\xi = \xi_a$ For Eqn. b) $\xi = 0.25\xi_a$

For Eqn. c) $\xi = 30\xi_a$ For Eqn.d) $\xi = 0.1\xi_a$

Thus

order of ω_d : $c < a < b < d$

116. Which of the following welding process is generally used in mass production in industries?

- A. GTAW
- B. Friction welding
- C. Diffusion welding
- D. Resistance welding

Ans. D

Sol. • Resistance welding is process which uses electric resistance to melt the metal to be welded.

• Resistance welding is a very rapid process and makes much less distortion and is widely used as a mass production technique in industries.

117. In distributed NC machines, the satellite computers are used to _____.

- A. act as stand-by system
- B. serve a group of NC machines
- C. share the processing of large size NC programs
- D. network with another distributed NC set-up

Ans. C

Sol. DNC utilized a large mainframe computer connected to several NC machines, controlling the operation of all of them simultaneously.

○ A program for each NC machine is loaded into the mainframe computer and the computer feeds the instructions to each NC machine as needed.

118. A column of square cross section of side $100 \times 100 \text{ mm}^2$. Find the radius of gyration for column (in mm).

- A. 20.41
- B. 28.86
- C. 40.81
- D. 57.71

Ans. B

Sol.

$$\text{Radius of gyration (K)} = \sqrt{\frac{I_{\min}}{A}} = \sqrt{\frac{(100)^4}{12(100 \times 100)}}$$

Radius of Gyration = 28.86 mm

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119. The fixed cost and the variable cost of production of a product are Rs. 20000 and Rs. 50 per unit, respectively. The demand for the item is 500 units. To break even, the unit price of the items in Rs. should be

- A. 50
- B. 75
- C. 90
- D. 120

Ans. C

Sol. Given,

Fixed cost, $F = 20000\text{Rs.}$

Variable cost, $v = \text{Rs.}50$ per unit,

Demand = $x_{\text{BEP}} = 500$

$$x_{\text{BEP}} = \frac{F}{s - v} \Rightarrow 500 = \frac{20000}{s - 50}$$

$s = 90\text{Rs./unit}$

120. Which of the following exhibits maximum percentage in Corundum?

- A. MgO
- B. SiO_2
- C. Al_2O_3
- D. Steel

Ans. C

Sol. Corundum is a crystalline form of aluminium oxide typically containing traces of iron, titanium, vanadium and chromium. It is a rock-forming mineral

121. A cantilever beam of rectangular cross- section is 1m deep and 0.6m is replaced by rectangular beam of 0.6m deep and 1m thick, then the beam would

- A. Weakened to 0.36 times
- B. Weakened to 0.6 times
- C. Strengthened by to 0.6 times
- D. Strengthened by to 0.36 times

Ans. B

Sol. case - 1

$d = 1\text{m}, b = 0.6\text{m}$

case - 2

$d = 0.6\text{m}, b = 1\text{m}$

$$\sigma_{\text{per}} = \frac{M_R y}{I} = \frac{M_R}{\frac{I}{y}} = \frac{M_R}{z}$$

$M_R = z \times \sigma_{\text{per}}$

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where R is the characteristic gas constant and
T is the temperature in Kelvin that is 225 K here,
R for air is 0.287 kJ/kg.K =287J/kg-k

$$C = \sqrt{1.4 \times 287 \times 224} = 300.46$$

After calculating, we get 300.46 m/s which is closest to B

125. The supply at three sources is 50, 40 and 60 units respectively whilst the demand at the four destinations is 20, 30, 10 and 50 units. In solving this transportation problem
- A. A dummy source of capacity 40 units is needed
 - B. A dummy destination of capacity 40 units is needed
 - C. No solution exists as the problem is infeasible
 - D. None solution exists as the problem is degenerate

Ans. B

Sol. This is an unbalanced problem.

Sum of supply from three sources is 150 unit and the sum of demand at the destination is 110.

to solve unbalanced transportation problem, it first convert into balanced so, to solve the problem a dummy destination of capacity 40 unit is needed.

126. In the Laminar flow, if the velocity is double the head loss due to friction is
- A. Twice
 - B. Half
 - C. Four times
 - D. One-fourth time

Ans. A

Sol. for laminar flow,

$$h_f = \frac{32\mu\bar{u}L}{\rho g d^2} \Rightarrow h_f \propto \bar{u}$$

$$\frac{h_{f2}}{h_{f1}} = \frac{\bar{u}_2}{\bar{u}_1} \Rightarrow \frac{h_{f2}}{h_{f1}} = \frac{2\bar{u}_1}{\bar{u}_1} = 2$$

so on doubling the velocity of flow, head loss will be doubled.

127. The vacuum pressure of water is 5.2 m. The equivalent absolute pressure is
- A. 4.9 m
 - B. 5.1 m
 - C. 5.3 m
 - D. 15.5 m

Ans. B

Sol. The vacuum pressure of water is 5.2 m= negative gauge pressure

Local atmospheric pressure of water= 10.3 m of water

Equivalent absolute pressure= -5.2+10.3=5.1 m of water

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128. A shaft carrying a series of unbalanced masses in different planes needs to be dynamically balanced. What is the minimum number of arbitrary planes that can be chosen for sufficient placement of balancing masses?
- A. 3
B. 4
C. 2
D. 1

Ans. C

Sol. Minimum number of planes for dynamic balancing is 2

129. Find the availability when 100kW of heat is delivered from a heat source at 500K to the ambient temperature is 300K.
- A. 20 kW
B. 30 kW
C. 40 kW
D. 50 Kw

Ans. C

Sol. Availability is the maximum amount of the work that can be extracted form a given amount of heat

$$\eta = 1 - \frac{T_L}{T_H} = \frac{\text{Available energy}}{\text{heat supplied}}$$

$$1 - \frac{300}{500} = \frac{\text{Available energy}}{100}$$

Availability= 40kW

130. A large clearance volume in reciprocating compressor results in:
- A. Reduced volume flow rate
B. Increased volume flow rate
C. Lower suction pressure
D. Lower delivery pressure

Ans. A

Sol. The clearance volume reduces the capacity of the compressor and volume flow rate. as the clearance volume increases, swept volume decrease so the capacity of the compressor decreases.

131. Rate of change of acceleration with time is called
- A. Impact
B. Jerk
C. Force
D. None of the above

Ans. B

Sol. Jerk is defined as the rate of change of acceleration with time.

$$\text{velocity, } v = \frac{ds}{dt}$$

$$\text{acceleration, } a = \frac{dv}{dt} = \frac{d^2s}{dt^2}$$

$$\text{jerk, } j = \frac{da}{dt} = \frac{d^2v}{dt^2} = \frac{d^3s}{dt^3}$$

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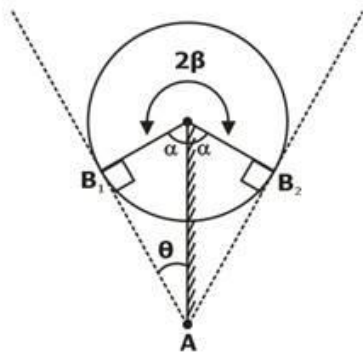


132. In a Crank and slotted lever mechanism, fixed length is 250 mm and length of Crank is 125 mm. What is the Quick Return Ratio.

- A. 1
- B. 2
- C. 1.5
- D. 2.5

Ans. B

Sol.



$$OA = 250 \text{ mm}$$

$$OB_1 = OB_2 = 125 \text{ mm}$$

In ΔOB_1A

$$\frac{OB_1}{OA} = \sin \theta$$

$$\frac{125}{250} = \sin \theta \Rightarrow \theta = 30^\circ$$

$$\therefore \alpha = (90 - \theta) = 60^\circ$$

$$\therefore 2\beta = 360 - (2\alpha) = 360 - (2 \times 60)$$

$$2\beta = 240$$

$$\beta = 120^\circ$$

$$\therefore \text{QRR} = \left(\frac{2\beta}{2\alpha} \right) = \frac{2 \times 120}{2 \times 60} = 2$$

133. Which statement about impulse turbine is true?

- A. Steam expands over blades
- B. Steam expands completely in stationary nozzels
- C. Steam expands partially over nozzle and turbine blades
- D. Steam expands over blades incompletely

Ans. B

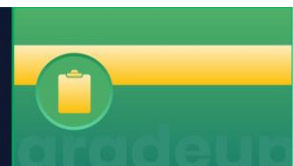
Sol. In an impulse turbine the steam expands completely in the stationary nozzles.

No pressure drop occurs over the moving Blade Runner.

During expansion steam attains a high velocity and impinges against the blades fixed on the rotor Periphery resulting in the impulsive force on the moving blades which sets the rotor rotating.

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137. Diamond Pyramid Hardness is related to:

- A. Brinell Hardness Test
- B. Vickers Hardness Test
- C. Rockwell Hardness Test
- D. None of above

Ans. B

Sol. The Brinell hardness test is an indentation hardness test that can provide useful information about metallic materials. The Vickers test is applied for metals and carries wide unit of hardness which is given by Vickers Pyramid Number or Diamond Pyramid Hardness. The Rockwell hardness test is used for finding hardness of ferrous and non ferrous metals.

138. The angular motion of a disc is given by $\theta = 4t^2 + 3t$. What will be the angular velocity at $t=2$ sec ?

- A. 19
- B. 16
- C. 6
- D. 21

Ans. A

Sol. Given,

$$\theta = 4t^2 + 3t, \quad t = 2\text{sec}$$

$$\frac{d\theta}{dt} = \frac{d}{dt}(4t^2 + 3t) = 8t + 3$$

$$\omega = \left. \frac{d\theta}{dt} \right|_{t=2} = 8 \times 2 + 3 = 19\text{rad / s}$$

139. In an arc welding process, welding speed is doubled. Assuming all other process parameters to be constant, the cross sectional area of the weld bead will _____.

- A. Increase by 25%
- B. Increase by 50%
- C. Reduce by 25%
- D. Reduce by 50%

Ans. D

Sol. In Arc welding, melting heat required is given by:

$$H_m = \frac{VI}{Av}$$

For all other parameters to be constant:

$$A \propto \frac{1}{v}$$

$$\frac{A_2}{A_1} = \frac{v_1}{v_2} = \frac{v_1}{2v_1}$$

$$A_2 = \frac{A_1}{2}$$

By doubling welding speed, area reduces by 50%

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140. A person travelling on a straight line moves with a uniform velocity V_1 for some time and with uniform velocity V_2 for same amount of time. The average velocity V is given by

A. $V = \frac{V_1 + V_2}{2}$

B. $V = \sqrt{V_1 V_2}$

C. $\frac{2}{V} = \frac{1}{V_1} + \frac{1}{V_2}$

D. $\frac{1}{V} = \frac{1}{V_1} + \frac{1}{V_2}$

Ans. A

Sol. Let the person travel in time interval t .

Distance covered at uniform velocity $S_1 = V_1 t$

Distance covered at uniform velocity $S_2 = V_2 t$

$$\text{Average velocity} = \frac{\text{total distance travelled}}{\text{Total time}} = \frac{S_1 + S_2}{t_1 + t_2}$$

$$V_{\text{avg}} = \frac{V_1 t + V_2 t}{t + t} = \frac{(V_1 + V_2)t}{2t} = \frac{V_1 + V_2}{2}$$

141. In a pure rolling the draft is increased by 100% and diameter of the roll is also increased by 100%, the bite angle will increase by _____ %.

A. 0

B. 1

C. 4

D. 2

Ans. A

Sol. Since the relation between the bite angle, draft and roller radius is given by:

$$\tan \theta = \sqrt{\frac{\Delta h}{R}}$$

Now given that:

$$\Delta h' = \Delta h + \frac{100}{100} \times \Delta h \Rightarrow \Delta h' = 2\Delta h$$

$$R' = 2R$$

$$\text{Thus, } \tan \theta' = \sqrt{\frac{\Delta h'}{R'}} = \sqrt{\frac{2\Delta h}{2R}} = \sqrt{\frac{\Delta h}{R}}$$

$$\tan \theta' = \tan \theta$$

$$\text{Thus, } \theta' = \theta$$

$$\% \text{ increase} = \frac{\theta' - \theta}{\theta} \times 100 = \frac{\theta - \theta}{\theta} \times 100 = 0\%$$

142. A copper bar of 25 cm length is fixed by means of supports at its ends. Supports can yield (total) by 0.01 cm. If the temperature of the bar is raised by 100 °C, then the stress induced in the bar for if $\alpha_c = 20 \times 10^{-6}/^\circ\text{C}$ and $E_c = 0.5 \times 10^5 \text{ MPa}$ will be

A. 20 MPa

B. 40 MPa

C. 80 MPa

D. 160 MPa

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Ans. C

Sol. Given,

$$L = 25\text{cm}, \Delta T = 100^\circ\text{C}$$

$$\alpha_c = 20 \times 10^{-6}/^\circ\text{C}, E_c = 0.5 \times 10^5$$

free expansion Allowed = 0.01cm

expansion due to temperature rise = $\alpha\Delta TL$

$$\Delta L = 20 \times 10^{-6} \times 100 \times 25 = 0.05\text{cm}$$

$$\text{expansion restricted} = 0.05 - 0.01 = 0.04\text{cm}$$

Stress-induced in the bar = stress developed due to resistance in free expansion due to temperature.

$$\sigma = \frac{\text{expansion restricted}}{\text{original length}} \times E = \frac{0.04}{25} \times 0.5 \times 10^5$$

$$\sigma = 80\text{MPa}$$

143. The code 'M 07' in NC machining process denotes _____.

- A. Spindle start (CCW)
- B. Coolant ON
- C. Coolant OFF
- D. Spindle start (CW)

Ans. B

Sol. Different M-codes and description is given below:

Code	Description
M03	Spindle start forward CW
M04	Spindle start reverse CCW
M05	Spindle stop
M06	Tool change
M07	Coolant ON – Mist coolant
M08	Coolant ON – Flood coolant
M09	Coolant OFF

144. Case hardening is the only method suitable for hardening:

- A. High alloy steel
- B. High carbon steel
- C. Low carbon steel
- D. High speed steel

Ans. C

Sol. Case hardening is the only method suitable for hardening low-carbon steel.

145. A round billet is extruded at a temperature of 675 °C. The billet diameter is 125 mm and diameter after extrusion is 50 mm. The extrusion force required if the extrusion constant is 56 N/mm², is _____ MN.

- A. 1.13
- B. 1.17
- C. 1.22
- D. 1.26

Ans. D

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Sol. Extrusion force is given by:

$$F = K A_o \ln\left(\frac{A_o}{A_f}\right)$$

Where: K = extrusion constant

A_o = original area of the billet

$$F = K \times \frac{\pi}{4} d_o^2 \times \ln\left(\frac{\frac{\pi}{4} d_o^2}{\frac{\pi}{4} d_f^2}\right)$$

$$F = \frac{\pi}{4} \times 125^2 \times 56 \times \ln\left(\frac{125^2}{50^2}\right)$$

$$F = 1.26 \text{ MN}$$

146. Two refrigerator are arranged in series with COP 2 and 4. What is the equivalent COP?

- A. 1.142
- B. 2.124
- C. 3.123
- D. 4.369

Ans. A

Sol. Given,

$$\text{COP}_1 = 2, \text{ COP}_e = 4$$

$$\text{COP}_e = \frac{\text{COP}_1 \times \text{COP}_2}{1 + \text{COP}_1 + \text{COP}_2} = \frac{2 \times 4}{1 + 2 + 4}$$

$$\text{COP}_e = 1.142$$

147. A fluid at temperature of 20° C flowing with a velocity of 199m/s. Its Mach number will be

- A. 0.65
- B. 0.8
- C. 0.6
- D. 0.7

Ans. C

Sol. Given,

$$V = 199\text{m/s}, \text{ speed of sound} = 333\text{m/s}$$

$$\text{Machnumber} = \frac{V}{C} = \frac{199}{333} = 0.597$$

148. If barometer pressure is 1 bar and partial pressure of air is 0.92 bar. Find the relative humidity, if saturation pressure of water vapour at same dry bulb temperature is 0.1 bar.

- A. 70 %
- B. 75%
- C. 80 %
- D. 85 %

Ans. C

Sol. Given,

$$\text{barometer pressure, } P = 1 \text{ bar}$$

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partial pressure of air, $P_a = 0.92\text{bar}$

saturation pressure of water vapour, $P_{vs} = 0.1\text{ bar}$

$$\text{Relative humidity, } \phi = \frac{P_v}{P_{vs}}$$

$$P = P_v + P_a \Rightarrow 1 = P_v + 0.92$$

$$P_v = 0.08\text{bar}$$

$$\phi = \frac{0.08}{0.1} = 0.8 = 80\%$$

149. For a PERT network, the optimistic time estimate, most likely time estimate and the pessimistic time estimates of an activity are 9 days, 11 days and 19 days respectively, the expected time of completion of the activity as per beta distribution is:

- A. 11 days
- B. 19days
- C. 14 days
- D. 12 days

Ans. D

Sol. Given,

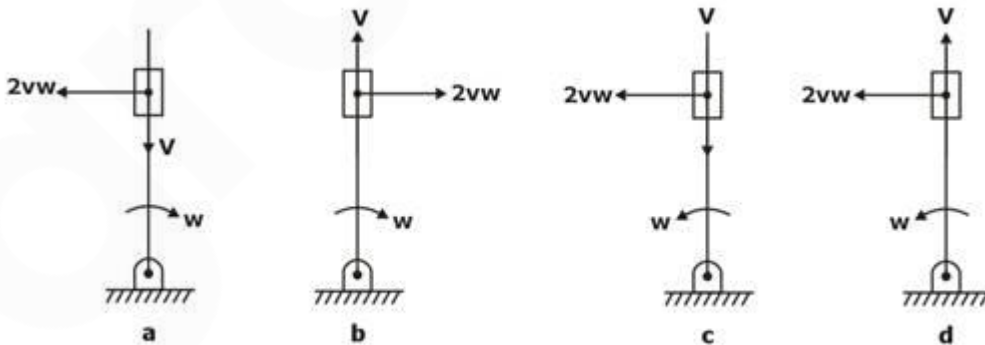
optimistic time, $T_o = 9$

most likely time $T_m = 11$

pessimistic time $T_p = 19$

$$T_E = \frac{T_o + 4T_m + T_p}{6} = \frac{9 + 4 \times 11 + 19}{6} = 12$$

150. Identify the incorrect option:

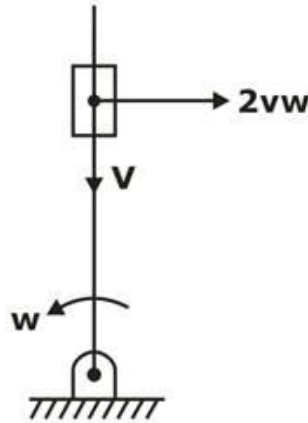


- A. a
- B. b
- C. c
- D. d

Ans. C

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Sol. in option C, Correct direction of Coriolis's component of acceleration will be opposite to that of the velocity of the link. (in case of slider moving inwards).



NOTE: To determine the direction of Coriolis's component of acceleration, rotate the sliding velocity vector (V) by 90° in the direction of the Angular velocity of link (w) if the slider is moving outwards & if slider is moving inwards then coriolis component will obtained by rotating velocity vector by 90° in the direction opposite of the Angular velocity of link (w)

151. Fluidity of melt increases with increase of which parameter _____.

- A. freezing range
- B. surface tension
- C. degree of superheat
- D. viscosity

Ans. C

Sol. **Fluidity:** It is an ability of metals and alloys to flow through the gating system filling the cavity of the casting mold and conforming its shape.

Affecting parameters:

(a) Viscosity: As viscosity and its sensitivity to temperature (viscosity index) increase, fluidity decreases.

(b) Surface tension: A high surface tension of the liquid metal reduces fluidity.

(c) Inclusions: As insoluble particles, inclusions can have a significant adverse effect on fluidity.

(d) Solidification pattern of the alloy: Fluidity is inversely proportional to the freezing range. Thus, the shorter the range (as in pure metals and eutectic), the higher the fluidity becomes.

(e) Degree of super heat: Higher the degree of superheat, higher will be fluidity.

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152. Loss of head due to sudden expansion of pipe is

A. $\frac{1}{2}(v_1 - v_2)^2$

B. $\frac{1}{4g}(V_1 - V_2)^2$

C. $\frac{v_2^2}{2g} \left(\frac{A_1}{A_2} - 1 \right)^2$

D. $\frac{v_2^2}{2g} \left(\frac{A_2}{A_1} - 1 \right)^2$

Ans. D

Sol.

head loss due to sudden expansion,

$$h_f = \frac{1}{2g}(v_1 - v_2)^2$$

We know, $A_1 v_1 = A_2 v_2$

$$\frac{v_1}{v_2} = \frac{A_2}{A_1}$$

$$h_f = \frac{v_2^2}{2g} \left(\frac{A_2}{A_1} - 1 \right)^2$$

153. A compressed gas from a container is used to inflate an inelastic flexible balloon originally folded completely flat to a volume of 0.8m^3 . If the barometer reads 760mm Hg, what is the amount of work done(in kJ) upon the atmosphere by the balloon?

A. zero

B. 81.06

C. 82.73

D. 81.43

Ans. B

Sol. Given,

$$V_1 = 0\text{m}^3, V_2 = 0.8\text{m}^3$$

$$P_{\text{atm}} = 101.325\text{kPa}$$

The work done will be the displacement work which is given by pdV ,

$$W_d = P_{\text{atm}} (V_1 - V_2) = 101.325 \times (0.8 - 0) = 81.06\text{kJ}$$

154. Sintering is done to

A. Decrease the porosity

B. Increase Brittleness

C. Decrease final strength

D. Increase porosity.

Ans. A

Sol. Sintering is the process whereby the green compacts are heated in a controlled atmosphere which results in decrease in porosity and brittleness which increases the final strength of the component.

155. What is the volumetric strain in the thin cylinder subjected to internal pressure having hoop stress of 200 MPa, modulus of elasticity, $E=200\text{ GPa}$ and poissons ratio= 0.25 ?

A. 2×10^{-2}

B. 2×10^{-3}

C. 1×10^{-3}

D. 1×10^{-2}

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Ans. B

Sol. Given,

Hoop stress = 200 MPa,

modulus of elasticity, $E=200$ GPa

poisson's ratio=0.25

$$\sigma_H = \frac{Pd}{2t} = 200\text{MPa}$$

$$\epsilon_v = \frac{Pd}{4tE} (5 - 4\mu) = \frac{1}{2E} \times \frac{Pd}{2t} (5 - 4 \times 0.25)$$

$$\epsilon_v = \frac{1}{2 \times 200 \times 10^3} \times 200 \times 4$$

$$\epsilon_v = 2 \times 10^{-3}$$

156. The value of Prandtl number for air is about

- A. 0.1
- B. 0.7
- C. 1.2
- D. 2.5

Ans. B

Sol. The value of Prandtl number for air is 0.71

So the correct option is (b).

157. A Screw will be over-hauling, if

- A. Friction angle is less than helix angle
- B. Friction angle is more than helix angle
- C. Friction angle is equal to helix angle
- D. none of these

Ans. A

Sol. By definition, If Screw has friction angle more than helix angle, it is said to be self locking, else it is known as over-hauling screw.

158. Efficiency of a Carnot engine is 80%. If the cycle direction is reversed, COP of the reversed Carnot cycle is

- A. 1.25
- B. 1.4
- C. 0.25
- D. 0.75

Ans. C

Sol. The relation between Cop of heat pump and the efficiency of an engine is given by

$$COP_{pump} = \frac{1}{\eta_E}$$

$$COP_{Ref} = COP_{pump} - 1$$

reversed carnot cycle is refrigeration cycle.

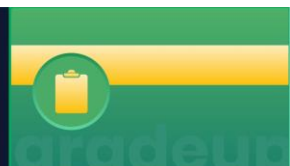
Thus,

$$COP_{Ref} = \frac{1}{\eta_E} - 1$$

$$COP_{Ref} = \frac{1}{0.8} - 1 = 0.25$$

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159. A body is freely falling under the action of gravity. It covers half the total distance in the last second of its fall. If it falls for n second, then value of n is

- A. 2
- B. $2 + \sqrt{2}$
- C. 3
- D. $2 - \sqrt{2}$

Ans. B

Sol. Total distance covered in n second,

$$H_n = \frac{1}{2}gn^2$$

Total distance covered in n-1 second,

$$H_{n-1} = \frac{1}{2}g(n-1)^2$$

Total distance covered in last second = $H_n - H_{n-1}$

$$= \frac{1}{2}gn^2 - \frac{1}{2}g(n-1)^2$$

$$= \frac{g}{2}(n^2 - (n-1)^2)$$

Now according to question:

$$\frac{H_n}{2} = H_{n-1}$$

$$\Rightarrow \frac{H_n}{2} = \frac{g}{2}(n^2 - (n-1)^2)$$

$$\Rightarrow \frac{gn^2}{4} = \frac{g}{2}(n^2 - (n-1)^2)$$

$$\Rightarrow \frac{n^2}{2} = (n^2 - (n-1)^2)$$

$$\Rightarrow n^2 - 4n + 2 = 0$$

solving we will get,

$$n = 2 + \sqrt{2}, 2 - \sqrt{2}$$

$2 - \sqrt{2}$ is less than 1, so rejected.

$$\therefore n = 2 + \sqrt{2}$$

160. Which of the following casting method is used for ornaments and toys of non - ferrous alloys?

- A. Slush casting
- B. Die casting
- C. Permanent mould casting
- D. Centrifugal casting

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Ans. A

Sol.

- The slush casting is a special application involving the used of permanent mould.
- It is used for casting low melting temperature alloys.
- This method is only adopted for ornaments and toys of non-ferrous alloys.

161. A hollow and solid shaft have same outer radii and the ratio of outer and inner radius of hollow shaft is 2:1. if both the shaft is made of different material ,then ratio of the torques of the hollow and solid shaft is

- A. 256:1
- B. 1:256
- C. 16:15
- D. 15:16

Ans. D

Sol. Given,

$T_{max} = \text{same}$,

diameter ratio for hollow shaft $D/d = 2$

outer diameter of both shaft is same

form the torsion equation

$$\frac{T}{J} = \frac{\tau_{max}}{R_0} = \frac{G\theta}{L}$$

$$T = \frac{J\tau_{max}}{R_0}$$

$$J_s = \frac{\pi}{32} D^4 \quad \& \quad J_H = \frac{\pi}{32} (D^4 - d^4)$$

$$\frac{T_s}{T_H} = \frac{J_s}{J_H} = \frac{\frac{\pi}{32} D^4}{\frac{\pi}{32} (D^4 - d^4)} = \frac{D^4}{(D^4 - d^4)}$$

$$\frac{T_s}{T_H} = \frac{D^4}{D^4 \left(1 - \frac{d^4}{D^4}\right)} = \frac{1}{\left(1 - \frac{d^4}{D^4}\right)} = \frac{1}{1 - \left(\frac{1}{2}\right)^4}$$

$$\frac{T_s}{T_H} = \frac{16}{15} \quad \text{or} \quad \frac{T_H}{T_s} = \frac{15}{16}$$

162. The dimension of angular momentum is

- A. $[M^1 L^2 T^{-1}]$
- B. $[M^1 L^1 T^{-1}]$
- C. $[M^1 L^1 T^{-2}]$
- D. $[M^1 L^2 T^{-2}]$

Ans. A

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Sol. Angular momentum = mvr

Where,

m = mass

v = velocity

r = distance from axis

So dimension = $MLT^{-1}L = ML^2T^{-1}$

163. Which of the following is the best suited for production of hollow pipes?

- A. Centrifugal casting
- B. Investment casting
- C. Continuous casting
- D. Hot chamber die casting

Ans. A

Sol.

- Centrifugal casting is used for making bigger size hollow symmetrical pipes.
- For producing a hollow part, the axis of rotation is placed at the center of the desired casting.
- It should be noted casting of hollow parts need no core in this process.

164. Steam with an initial enthalpy of 3000kJ/Kg enters a horizontal nozzle with a velocity of 100m/s . The heat lost from the nozzle is 10kW and the exit enthalpy of the steam is 2500kJ/Kg. If the mass flow rate is 0.1Kg/s, then the steam velocity at the nozzle exit is

- A. 800m/s
- B. 950m/s
- C. 900m/s
- D. 860m/s

Ans. C

Sol. Given,

initial enthalpy, $h_1 = 3000\text{kJ/Kg}$

velocity $V_1 = 100\text{m/s}$

$Q_{\text{lost}} = 10\text{kW}$

exit enthalpy $h_2 = 2500\text{kJ/Kg}$.

mass flow rate, $m = 0.1\text{Kg/s}$,

Using Steady-Flow Energy Equation for a nozzle,

$$h_1 + \frac{v_1^2}{2000} + q = h_2 + \frac{v_2^2}{2000}$$

Given, $Q = -10\text{kW} = -10/0.1 \text{ kJ/Kg}$ (Negative because heat is lost)

$Q = -100\text{kJ/kg}$

$$3000 + \frac{100^2}{2000} - 100 = 2500 + \frac{v_2^2}{2000}$$

$$v_2 = 900\text{m/s}$$

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165. A jet working under air as the fuel for its thermodynamic cycle, is flying at an altitude where the air density is one - third of normally the density of air at ground level. Find the ratio of A/F at this altitude with respect to the flying altitude.

- A. $\sqrt[3]{2}$
- B. $\sqrt[3]{3}$
- C. 3
- D. 9

Ans. C

Sol. By definition:

$$A/F \text{ ratio} = \frac{m_{air}}{m_{fuel}}$$

Since, the Mass of the fuel will remain same at all altitudes,

Thus,

$$\frac{(A / Fratio)_{ground}}{(A / Fratio)_{altitude}} = \frac{(m_{air})_{ground}}{(m_{air})_{altitude}}$$

$$\text{But, } \frac{(m_{air})_{ground}}{(m_{air})_{altitude}} = \frac{V \times \rho_{ground}}{V \times \rho_{altitude}} = \frac{1}{\left(\frac{1}{3}\right)} = 3$$

$$\frac{(A / Fratio)_{ground}}{(A / Fratio)_{altitude}} = 3$$

166. Tolerance are specified _____.

- A. to obtain desired fits
- B. because it is not possible to manufacture in size exactly
- C. to obtain high accuracy
- D. to have proper allowance

Ans. B

Sol.

- o Tolerance is a range of how far a true measurement can range from what is intended.
- o Physical tolerances specify the deviation from a specific dimension. Any dimension between any two points can have a tolerance.
- o Limits are a type of tolerance that specifies a different lower and upper deviation.

167. Which of the following equations is correct for Soderberg Criteria?

A. $\frac{\sigma_m}{S_{ut}} + \frac{\sigma_v}{S_e} = \frac{1}{FOS}$

B. $\frac{\sigma_m}{S_{yt}} + \frac{\sigma_v}{S_{ut}} = \frac{1}{FOS}$

C. $\frac{\sigma_m}{S_{yt}} + \frac{\sigma_v}{S_e} = \frac{1}{FOS}$

D. $\frac{\sigma_m}{S_{ut}} + \frac{\sigma_v}{S_{yt}} = \frac{1}{FOS}$

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Ans. C

Sol. Soderberg criterion is given as

$$\frac{\sigma_m}{S_{yt}} + \frac{\sigma_v}{S_e} = \frac{1}{FOS}$$

where FOS is factor of safety.

it gives the safest design and generally used for ductile material.

168. One normal stress will give _____ normal strain(s) whereas one shear stress will give _____ shear strain (s)?

- A. 3, 3
- B. 3, 2
- C. 2, 3
- D. 3, 1

Ans. D

Sol. One normal stress gives three normal strains (Two accompanying strains in perpendicular directions) whereas one shear stress gives only one shear strain (Change in initial right angle for a face)

169. The efficiency of the Otto cycle for the same compression ratio will be maximum when working fluid is

- A. Air
- B. Helium
- C. Carbon Dioxide
- D. Oxygen

Ans. B

Sol. The efficiency of the Otto cycle is function of the specific heat ratio

$$\eta = 1 - \frac{1}{r^{\gamma} - 1}$$

with increase in the specific heat ratio efficiency of the otto cycle increases. The highest specific heat ratio is of Helium i.e. 1.66 thus it will give highest efficiency.

170. What is the process in which a flat shape is cut out from a sheet, the cut out portion being the desired part, called?

- A. Blanking
- B. Piercing
- C. Notching
- D. Perforating

Ans. A

Sol. In Blanking cut out piece is used as the desired product and the remaining sheet is scrap. Circular disc, rectangular block etc. are the desired product in Blanking.

171. The velocity distribution in a turbulent boundary layer is given by $u/v = (\gamma/\delta)^{1/7}$. The displacement thickness will be

- A. $\delta/7$
- B. δ
- C. $7\delta/8$
- D. $\delta/8$

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Ans. C

Sol. given velocity profile

$$\frac{u}{v} = \left(\frac{y}{\delta}\right)^{\frac{1}{7}}$$

from the definition of displacement thickness

$$\delta^* = \int_0^{\delta} \frac{u}{v} dy \Rightarrow \int_0^{\delta} \left(\frac{y}{\delta}\right)^{\frac{1}{7}} dy$$

$$\delta^* = \frac{1}{\delta^{\frac{1}{7}}} \left[\frac{y^{\frac{1}{7}+1}}{\frac{1}{7}+1} \right]_0^{\delta} = \frac{1}{\delta^{\frac{1}{7}}} \frac{\delta^{\frac{1}{7}+1}}{\frac{1}{7}+1}$$

$$\delta^* = \frac{7}{8} \delta$$

172. A pitot tube is used to measure the velocity of water in a pipe. The stagnation pressure head is 10 m and the static pressure head is 5 m. The velocity of flow is closest to

- A. 8 m/s
- B. 10 m/s
- C. 12 m/s
- D. 15 m/s

Ans. B

Sol. given,

$$P_{\text{stagnation}} = 10\text{m}, P_{\text{static}} = 5\text{m}$$

$$\frac{P_{\text{stagnation}}}{\rho g} = \frac{P_{\text{static}}}{\rho g} + \frac{v^2}{2g}$$

$$10 = 5 + \frac{v^2}{2g}$$

$$v = 10\text{m/s}$$

173. Using the Taylor equation $VT^n = C$, what will be the percentage change in cutting speed when cutting time increases four times?

[Take: $n = 0.5$ and $c = 400$]

- A. 50%
- B. -50%
- C. 100%
- D. -100%

Ans. B

Sol. Taylor's tool life equation is given by:

$$VT^n = C$$

$$\text{Given: } T_2 = 4T_1$$

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$$V_1 T_1^{0.5} = V_2 T_2^{0.5}$$

$$V_1 = V_2 \left(\frac{4T_1}{T_1} \right)^{0.5} \Rightarrow V_2 = 0.5V_1$$

$$\% \text{ change} = \frac{V_2 - V_1}{V_1} \times 100$$

$$\% \text{ change} = \frac{0.5V_1 - V_1}{V_1} \times 100 = -50\%$$

174. Cetane number of alpha methyl naphthalene is assigned the value of :

- A. 0
- B. 15
- C. 55
- D. 100

Ans. A

Sol.

- n-hexadecane(also called cetane, n-C₁₆H₃₄), which has very good ignition quality, was assigned the cetane number of 100;
- 1-methylnaphthalene, which has a poor ignition quality, was assigned a cetane number of zero.

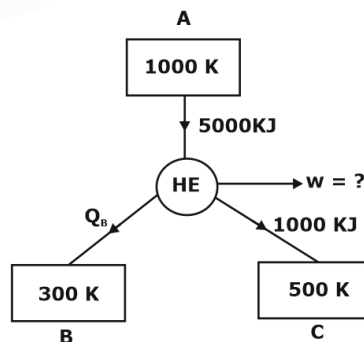
175. If two bodies are in thermal equilibrium with the third body then the two bodies are also in thermal equilibrium with each other. This is the principle of

- A. Zeroth law of thermodynamics
- B. First law of thermodynamics
- C. Second law of thermodynamics
- D. Third law of thermodynamics

Ans. A

Sol. According to Zeroth law of thermodynamics, if two bodies are in thermal equilibrium with a third body then the two bodies are also in thermal equilibrium with each other.

176. Figure below shows a system undergoing a reversible cycle during which it exchanges heat with 3 thermal reservoirs. Find the developed work



- A. 3100KJ
- B. 2900KJ
- C. 3300KJ
- D. 2700KJ

Ans. A

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Sol. From Clausius inequality, $\oint \frac{\delta Q}{T} = 0$

$$\frac{5000}{1000} - \frac{1000}{500} - \frac{Q_B}{300} = 0$$

$$Q_B = 900\text{KJ}$$

From conservation of energy,

$$W = 5000 - (1000+900)$$

$$W = 3100\text{KJ}$$

177. In a cotter joint, the width of the cotter at the centre is 50 mm and its thickness is 12 mm. The load acting on the cotter is 60 kN. What is the shearing stress developed in the cotter?

- A. 120 N/mm²
- B. 100 N/mm²
- C. 75 N/mm²
- D. 50 N/mm²

Ans. D

Sol. Given,

$$P = 60\text{kN, thickness, } t = 12\text{mm}$$

$$\text{width} = 50\text{mm}$$

In cottar joint, Cottar is sheared from two surface.

thus, Shearing stress developed in cotter joint is based on double shear of cotter joint.

$$\text{Area} = 50 \times 12$$

$$\text{sheared area} = 2 \times \text{Area} = 2 \times 50 \times 12$$

$$\tau = \frac{P}{A_{\text{sheared}}} = \frac{60 \times 10^3}{2 \times 50 \times 12} = 50\text{N} / \text{mm}^2$$

$$\tau = 50\text{ MPa}$$

178. The purpose of annealing is to

- A. Induce stress
- B. Harden the surface
- C. Induce hardness
- D. Remove stresses

Ans. D

Sol. The main purpose of annealing heat treatment is to soften the steel, regenerate overheated steel structures or just remove internal tensions.

179. A block is subjected to an all-round shear stress of magnitude 10MPa in 2D. What is the maximum compressive stress generated in the block at any section?

- A. 15MPa
- B. 14.14MPa
- C. 10MPa
- D. 20MPa

Ans. C

Sol. Here,

$$\sigma_x = \sigma_y = 0$$

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$$\tau_{xy} = 10\text{MPa}$$

$$\sigma_1, \sigma_2 = \frac{\sigma_x + \sigma_y}{2} \pm \sqrt{\left(\frac{\sigma_x - \sigma_y}{2}\right)^2 + \tau_{xy}^2}$$

$$\sigma_1, \sigma_2 = \tau_{xy}$$

Thus, maximum compressive stress will be = $\tau_{xy} = 10\text{MPa}$

180. For air at a given temperature, as the relative humidity is increased isothermally,
- A. The wet bulb temperature and specific enthalpy increase
 - B. The wet bulb temperature and specific enthalpy decrease
 - C. The wet bulb temperature increases and specific enthalpy decrease s
 - D. The wet bulb temperature decreases and specific enthalpy increases

Ans. A

Sol. At a given temperature, if relative humidity is increased isothermally then wet bulb temperature and specific enthalpy both increases

181. Which of the following is true as per Gibb's Phase rule?

- A. $P + F + C = 2$
- B. $P - F - C = 2$
- C. $P + C - F = 2$
- D. $P + F - C = 2$

Ans. D

Sol. According to Gibb's phase rule,

$$P + F = C + 2$$

Where,

C = number of chemical components

P = number of phases

F = degree of freedom

182. A kangaroo is capable of jumping to a vertical height of 3m. The take off speed of the kangaroo is

- A. 5.35 m/s
- B. 6.37 m/s
- C. 7.67 m/s
- D. 9.23 m/s

Ans. C

Sol. Using equation of motion

$$v^2 = u^2 + 2as$$

Where,

v = final velocity

u = initial velocity

a = acceleration

s = displacement

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$$\Rightarrow 0 = u^2 - 2 \times 9.81 \times 3$$

$$\Rightarrow u^2 = 58.86$$

$$\Rightarrow u = \sqrt{58.86} = 7.67 \text{ m/s}$$

183. 1 Torr is equivalent to

- A. 1 mm of Hg
- B. 14.7 psi
- C. 760 mm of Hg
- D. 1 Pa

Ans. A

Sol. 1 Torr = 1 mm of Hg; Torr is the unit of pressure and is name after 'Torricelli'.

184. For a preloaded structure, DOF is :

- A. 1
- B. 0
- C. >1
- D. Negative

Ans. D

Sol. Preloaded structures are also known as superstructures and DOF of such structures is negative.

185. Number of slip systems in FCC and HCP are_____ respectively.

- A. 3 and 12
- B. 12 and 3
- C. 48 and 3
- D. 48 and 12

Ans. B

Sol. The combination of a slip plane and slip direction is known as slip system.

FCC has 12 , HCP has 3 slip systems.

186. A jet of water discharging from a 80 mm diameter orifice has a diameter of 64 mm at its vena-contracta. The coefficient of contraction is

- A. 0.80
- B. 0.46
- C. 0.64
- D. 0.75

Ans. C

Sol. The coefficient of contraction is defined as the ratio of the area of the jet at vena-contracta to the area of the orifice.

$$\text{coefficient of contraction} = \frac{A_{\text{venacontracta}}}{A_{\text{orifice}}} = \frac{d_c^2}{d_0^2}$$

$$\text{coefficient of contraction} = \frac{64^2}{80^2} = 0.64$$

187. In drawing operation the initial diameter of the blank is given as 100 mm and the final diameter is 50 mm. if $\sigma_0 = 500$ MPa, then load required for operation will be _____.

- A. 1360.74 kN
- B. 1231.89 kN
- C. 547.34 kN
- D. 425.88 kN

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Ans. A

Sol. Given:

$$d_i = 100 \text{ mm}$$

$$d_f = 50 \text{ mm}$$

$$\sigma_0 = 500 \text{ MPa}$$

The drawing force is given by:

$$F_d = A_f \times \sigma_d = \frac{\pi}{4} d_f^2 \times \sigma_0 \times \ln\left(\frac{A_o}{A_f}\right)$$

$$F_d = \frac{\pi}{4} \times (0.05)^2 \times 500 \times 10^6 \times \ln\left(\frac{\frac{\pi}{4} \times 0.1^2}{\frac{\pi}{4} \times 0.05^2}\right)$$

$$F_d = 1.36099 \times 10^6 \text{ N} = 1360.99 \text{ kN}$$

188. The attitude of customer who keeps on changing queue in hope to get service faster is called

A. Jockey

B. Balking

C. Reneging

D. Cheater

Ans. A

Sol. Balking: customer does not join the queue and leave the system

Reneging: customer join the queue for short duration and leave the system

Cheater: customer takes illegal means to get service faster

189. Which of the following psychometric properties is not shown as straight inclined lines on the psychometric chart?

A. Wet bulb temperature

B. Enthalpy

C. Specific volume

D. Relative humidity

Ans. D

Sol. Relative humidity lines are curves on the psychometric chart.

Enthalpy, specific volume lines and wet bulb temperature line all are inclined on psychometric chart.

190. In an isentropic flow of air ($k=1.4$) the stagnation temperature is 600 K. If the temperature is 400 K at a section, then the Mach number of the flow will be?

A. 1.88

B. 1.58

C. 2.34

D. 2.58

Ans. B

Sol. Given,

$$\gamma = 1.4$$

stagnation temperature, $T_0 = 600\text{K}$, $T = 400\text{K}$

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As we know that

$$\frac{T_0}{T} = 1 + \left(\frac{\gamma - 1}{2}\right) M^2$$

$$\frac{600}{400} = 1 + \left(\frac{1.4 - 1}{2}\right) M^2$$

$$M = 1.58$$

191. Which of the below wear mechanisms is primarily responsible for flank wear during metal cutting?

- A. Diffusion
- B. Chemical Reaction
- C. Abrasion
- D. Adhesion

Ans. C

Sol.

- Wear on the flank face (relief or clearance face) of the cutting tool is called flank wear.
- Flank Wear is most commonly caused due to abrasive wear of the cutting edge against the machined surface.
- It mainly occurs due to high cutting speed and results in increased surface roughness of the final product.

192. A Hexagonal unit cell satisfies which of the following equations?

- A. $a=b \neq c$, $\alpha=\beta=90$ degree, $\gamma=120$ degree
- B. $a \neq b=c$, $\alpha=\beta=\gamma=90$ degree
- C. $a=b \neq c$, $\alpha=\beta=\gamma=90$ degree
- D. $a=b=c$, $\alpha \neq \beta=\gamma=90$ degree

Ans. A

Sol. Hexagonal have two sides equal and two angles equal to 90 degrees and one angle equal to 120 degrees.

193. Errors are generally distributed in accordance with the Gaussian distribution is

- A. controllable errors
- B. calibration errors
- C. random errors
- D. avoidable errors

Ans. C

Sol. The probability distribution for a random error that is as likely to move the value in either direction is called a Gaussian distribution.

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194. A real gas obeys $P(v - b) = RT$, then which of the following relations is true?

A. $\left(\frac{dU}{dV}\right)_T = \infty$

B. $\left(\frac{dU}{dT}\right)_T = 1$

C. $\left(\frac{dU}{dV}\right)_T = 0$

D. $\left(\frac{dU}{dV}\right)_T = -\frac{1}{p^2}$

Ans. C

Sol. Since $P(V-b) = RT$

$$P = \frac{RT}{V-b}$$

$$\left(\frac{dP}{dT}\right)_V = \frac{R}{V-b}$$

Since: $\left(\frac{\partial U}{\partial V}\right)_T = T\left(\frac{\partial P}{\partial T}\right)_V - P = \frac{RT}{V-b} - \frac{RT}{V-b}$

$$\therefore \left(\frac{\partial U}{\partial V}\right)_T = 0$$

195. The capillary rise at 20°C in clean glass tube of 1 mm diameter containing water is if surface tension of water 73.6dyne/cm.

A. 15 mm

B. 50 mm

C. 20 mm

D. 30 mm

Ans. D

Sol. Given,

diameter = 1mm containing water is if

surface tension of water, $\sigma = 73.6\text{dyne/cm} = 7.36 \times 10^{-2} \text{ N/m}$

$$h = \frac{4\sigma \cos \theta}{\rho g d} = \frac{4 \times 7.36 \times 10^{-2} \cos 0^\circ}{1000 \times 9.81 \times 1 \times 10^{-3}}$$

$$h = 0.03\text{m} = 30\text{mm}$$

196. Electrochemical machining is a process widely used as a non conventional machining operation. What is the mechanism of material removal for electrochemical machining process _____?

A. Erosion

B. shear

C. ionic dissolution

D. fusion and vaporisation

Ans. C

Sol. • ECM is process which works on the electrolysis principle and the mode of material removal is ionic dissolution.

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197. In a Vapour compression refrigeration, the desired condensing temperature for higher COP while making ice must be :
- A. Much below the critical temperature of the refrigerant
 - B. Near the critical temperature of the refrigerant
 - C. Above the critical temperature of the refrigerant
 - D. Can of any value, as it does not affects the COP

Ans. A

Sol. The desired condensing temperature in a VCRS for higher COP must be much below the critical temperature of the refrigerant so that the most of the heat rejection takes place from phase change of refrigerant.

198. Two metal strips are glued together to form a cantilever beam. The material with high coefficient of thermal expansion is on the top surface while the one with lower coefficient of expansion is on the bottom surface. What will be the deflected shape of the beam when heated?
- A. Concave downwards
 - B. Concave upwards
 - C. Will remain straight
 - D. Insufficient data.

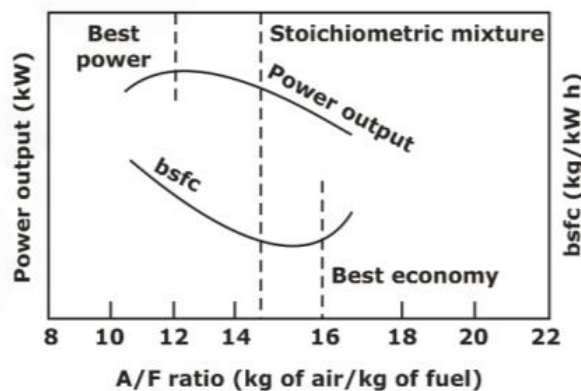
Ans. B

Sol. The material with higher coefficient of thermal expansion will try to expand more than the other one. Hence, the beam will bend upwards. This principle employed in bimetallic thermometer.

199. For maximum power generation the air fuel ratio for a petrol engine is
- A. 16:1
 - B. 12:1
 - C. 15:1
 - D. 20:1

Ans. B

Sol. power characteristics curve of fuel



From the above figure, we can see that for maximum power output, Air to fuel ratio is to be 12:1

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200. The initial velocity of an object is 10 m/s. Acceleration $a = 0.1V$ where V is the instantaneous velocity of the body. What will be the velocity after 10 seconds?

- A. 14.23 m/s
- B. 27.18 m/s
- C. 10.12 m/s
- D. 50 m/s

Ans. B

Sol. Given,

$$V_1 = 10 \text{ m/s.}$$

$$\text{Acceleration, } a = 0.1V$$

$$\text{time, } t = 10 \text{ seconds}$$

$$a = \frac{dV}{dt} \Rightarrow 0.1V = \frac{dV}{dt}$$

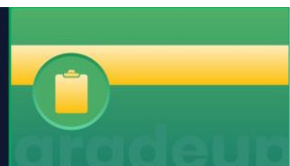
$$0.1dt = \frac{dV}{V} \Rightarrow \int_0^{10} 0.1dt = \int_{10}^{V_2} \frac{dV}{V}$$

$$0.1(10 - 0) = \ln \frac{V_2}{10}$$

$$\frac{V_2}{10} = e^1 = V_2 = 27.18 \text{ m/s}$$

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Upcoming Mini Mock Challenge in June Month

SSC JE

Mechanical Engineering

Exam	Live Date	Syllabus	No. of Questions	Time
SSC JE Mini Mock Test-1	06 June 2020	Full Syllabus (Tech. (30 Q's) & Non-Tech. (20 Q's))	50	30
SSC JE Mini Mock Test-2	13 June 2020	Full Syllabus (Tech. (30 Q's) & Non-Tech. (20 Q's))	50	30
SSC JE Mini Mock Test-3	20 June 2020	Full Syllabus (Tech. (30 Q's) & Non-Tech. (20 Q's))	50	30
SSC JE Mini Mock Test-4	27 June 2020	Full Syllabus (Tech. (30 Q's) & Non-Tech. (20 Q's))	50	30

