



SSC JE Mechanical Engineering 23rd Jan 2018 Shift-1

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General Intelligence and Reasoning

Instructions

In the following question, select the related word pair from the given alternatives

Question 1

Red : Colour :: ? : ?

- A Sun : Heat
- B Earth : Planet
- C Land : Solid
- D Water : Drink

Answer: B

Question 2

Square : Four :: ? : ?

- A Rectangle : Five
- B Hexagon : Seven
- C Rhombus : Six
- D Triangle : Three

Answer: D

Question 3

Forest : Trees :: Book : ?

- A Pages
- B Bind
- C Writer
- D Pen

Answer: A

Question 4

TRAP : YWFU :: FROG : ?

- A KHLG
- B KWTL
- C WKLH
- D FGHL

Answer: C

Question 5

FAN : MZU :: LIP : ?

- A FGA
- B KRO
- C ANP
- D TSQ

Answer: B

Question 6

AM : FR :: LQ : ?

- A HQ
- B NP
- C QV
- D LS

Answer: C

Instructions

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

Question 7

46 : 24 :: 54 : ?

- A 30
- B 24
- C 20
- D 36

Answer: C

Question 8

11 : 24 :: 23 : ?

- A 42
- B 36
- C 54
- D 58

Answer: B

Question 9

5 : 15 :: 7 : ?

- A 28
- B 21

C 37

D 25

Answer: B

Instructions

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

Question 10

A Pen - Write

B Ball - Play

C Food - Eat

D Pencil - Stationery

Answer: D

Question 11

A Road

B Truck

C Car

D Scooter

Answer: A

Question 12

A Rice

B Wheat

C Maize

D Crop

Answer: D

Question 13

A GJM

B HKN

C MPS

D NQU

Answer: D

Question 14

A LQVA

B AFKQ

C CHMR

D MRWB

Answer: B

Question 15

A VRNJ

B CYUQ

C KGCX

D SOKG

Answer: C

Question 16

A 2 - 12

B 5 - 28

C 4 - 24

D 3 - 18

Answer: B

Question 17

A 11 - 13

B 13 - 17

C 17 - 19

D 11 - 15

Answer: D

Question 18

A 4 - 12

B 5 - 15

C 6 - 18

D 9 - 29

Answer: D

Instructions

For the following questions answer them individually

Question 19

Arrange the given words in the sequence in which they occur in the dictionary.

1. Series
2. Singing
3. Secure
4. Sickle
5. Secured

- A 35142
B 53142
C 35124
D 53124

Answer: A

Question 20

Arrange the given words in the sequence in which they occur in the dictionary.

1. Drive
2. Drown
3. Drain
4. Drink
5. Drama

- A 35421
B 35412
C 35214
D 35241

Answer: B

Question 21

Arrange the given words in the sequence in which they occur in the dictionary.

1. Price
2. Prize
3. Police
4. Paint
5. Prawn

- A 45123
B 45213
C 43521
D 43512

Answer: D

Question 22

A series is given with one term missing. Select the correct alternative from the given ones that will complete the series
AG, FM, KS, PY, ?

- A RM

B UE

C JQ

D YA

Answer: B

Question 23

A series is given with one term missing. Select the correct alternative from the given ones that will complete the series.
ALK, VGF, QBA, ?, GRQ

A KST

B ARP

C CXD

D LWV

Answer: D

Question 24

A series is given with one term missing. Select the correct alternative from the given ones that will complete the series.
KPD, QVJ, WBP, CHV, ?

A INB

B GXF

C ICM

D ZDQ

Answer: A

Question 25

In the following question, select the missing number from the given alternatives.
3, 7, 11, 63, 27, 215, ?, ?

A 47, 513

B 51, 511

C 51, 513

D 47, 511

Answer: B

Question 26

In the following question, select the missing number from the given alternatives.
18, 45, 112.5, ?, 703.125

A 217.5

B 262.25

C 281.25

D 273.75

Answer: C

Question 27

In the following question, select the missing number from the given alternatives.
30, 68, 130, 222, 350, ?

A 504

B 520

C 476

D 448

Answer: B

Question 28

Seg CD is shorter than Seg MN, Seg MN is shorter than Seg TR, Seg AB is shorter than Seg CD and Seg MN is shorter than Seg PQ.
Which segment is the shortest?

A CD

B MN

C PQ

D AB

Answer: D

Question 29

A is B's father's father's daughter-in-law's daughter. If B's father has no brother then how is A related to B?

A grand-daughter

B daughter

C mother

D sister

Answer: D

Question 30

From the given alternative words select the word which cannot be formed using the letters of the given word.
RECUPERATE

A acute

B trace

C price

D erupt

Answer: C

Question 31

If TUESDAY is coded as VWGUFCA, then how will COW be coded as?

- A EQY
- B XLD
- C BNV
- D DPX

Answer: A

Question 32

In a certain code language, 2369 means 'master class is fun', 9527 means 'act is class apart' and 1349 means 'we have fun class'. Find the code for 'fun'.

- A 2
- B 6
- C 3
- D 9

Answer: C

Question 33

In a certain code language, '+' represents '-', '-' represents 'x', 'x' represents '÷' and '÷' represents '+'. Find out the answer to the following question.

$$16 - 25 \times 40 \div 60 + 15 = ?$$

- A 14
- B 72
- C 55
- D 63

Answer: C

Question 34

If $72 \$ 20 = 46$ and $1 \$ 27 = 14$ then find the value of $10 \$ 44 = ?$

- A 34
- B 54
- C 27
- D 17

Answer: C

Question 35

If $A \$ B$ means A is son of B, $A \# B$ means A is brother of B and If $A * B$ means A is father of B, then what does $P \# Q \$ R * S$ mean?

- A P is father of S
- B P is father's father of S
- C P is brother of S
- D P is son of S

Answer: C

Question 36

Select the missing number from the given responses?

| | | |
|----------|-----------|-----------|
| 7 | 4 | 2 |
| 6 | ? | 5 |
| 1 | -6 | -3 |

- A 2
- B 11
- C 1
- D 10

Answer: D

Question 37

Which of the following terms follows the trend of the given list?

AAAAAABA, AAAAAAAB, BAAAAAAA, ABAAAAAA, AABAAAAA, _____.

- A AAAAAABA
- B AAABAAAA
- C AAAABAAA
- D AAAAABAA

Answer: C

Question 38

A Shopping mall worker loads his trolley and walks 50 m through an alley which is going North, then he turns to his left and walks 15 m, then he turns South and walks another 15 m, then he turns East and walks 25 m and then he turns south and walks 35 m. Where is he now with reference to his starting position?

- A 10 m West
- B 10 m East
- C 40 m East
- D 40 m West

Answer: B

Question 39

Two battle tanks start from the same point. Tank A travels 12 km South, then turns to its left and travels 7 km. Tank B travels 7 km South, then turns West and travels 9 km, then turns to its left and travels 5 km. Where is tank A with respect to tank B?

- A 16 km West
- B 2 km East
- C 2 km West
- D 16 km East

Answer: D

Question 40

In the question two statements are given, followed by two conclusions, I and II. You have to consider the statements to be true even if it seems to be at variance from commonly known facts. You have to decide which of the given conclusions, if any, follows from the given statements.

Statement I: No cats are dogs

Statement II: Some cats are carnivores

Conclusion I: All dogs are carnivores

Conclusion II: All carnivores are dogs

- A Only conclusion I follows
- B Only conclusion II follows
- C Both conclusions I and II follow
- D Neither conclusion I nor conclusion II follows

Answer: D

Question 41

In the question three statements are given, followed by three conclusions, I, II and III. You have to consider the statements to be true even if it seems to be at variance from commonly known facts. You have to decide which of the given conclusions, if any, follows from the given statements

Statement I: No bronze is copper

Statement II: Some alloy is bronze

Statement III: Some zinc is alloy

Conclusion I: Some zinc is bronze

Conclusion II: Some copper is zinc

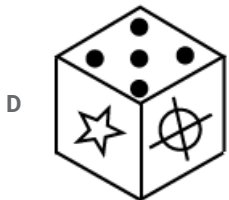
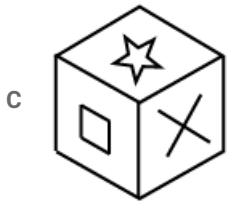
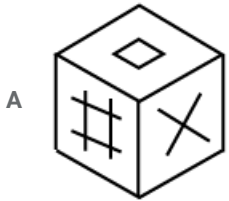
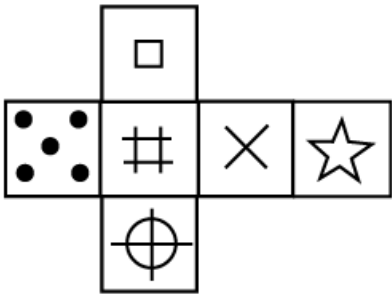
Conclusion III: some alloy is copper

- A Only conclusions I and II follow
- B Only conclusions II and III follow
- C All conclusions I, II and III follow
- D None of the conclusions follow

Answer: D

Question 42

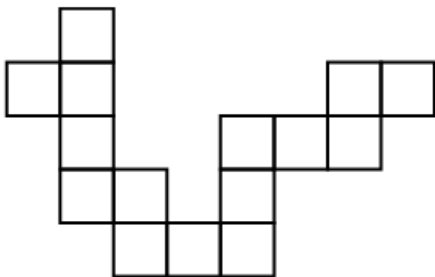
Which of the following cube in the answer figure can not be made based on the unfolded cube in the question figure ?

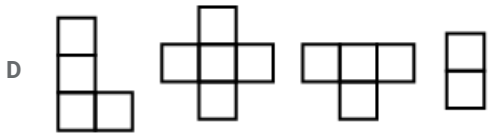
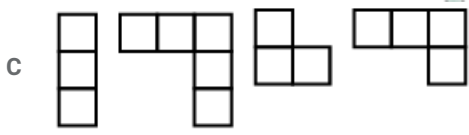
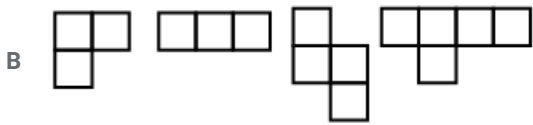
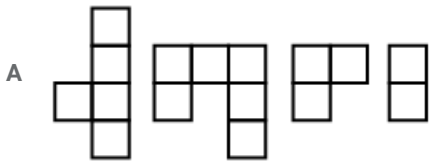


Answer: B

Question 43

Which of the following answer figure patterns can be combined to make the question figure?

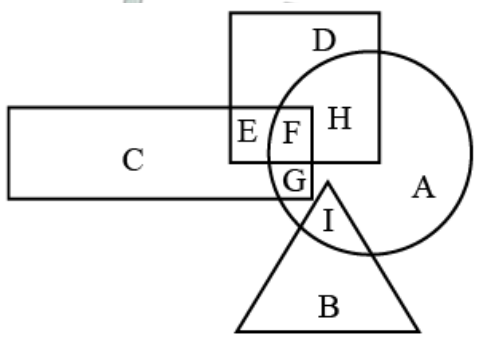




Answer: B

Question 44

In the following figure square represents astronauts, triangle represent swimmers, circle represents women and rectangle represents Indians. Which set of letter represents women who are either astronauts or swimmer ?

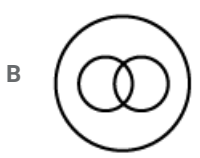
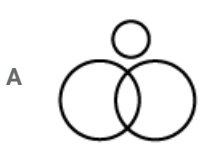


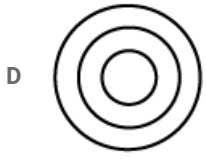
- A FHGI
- B DEIA
- C IBFG
- D FHI

Answer: D

Question 45

which of the following represents relationship between pencils and pens and writing instruments?

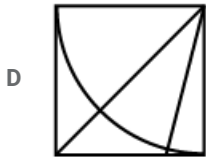
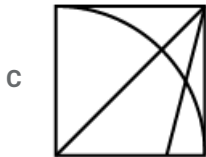
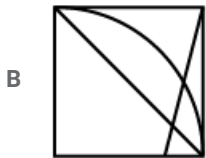
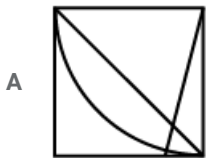
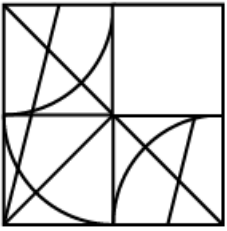




Answer: C

Question 46

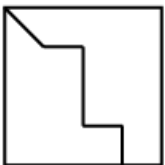
which of the following pattern will complete the pattern in the question figure?

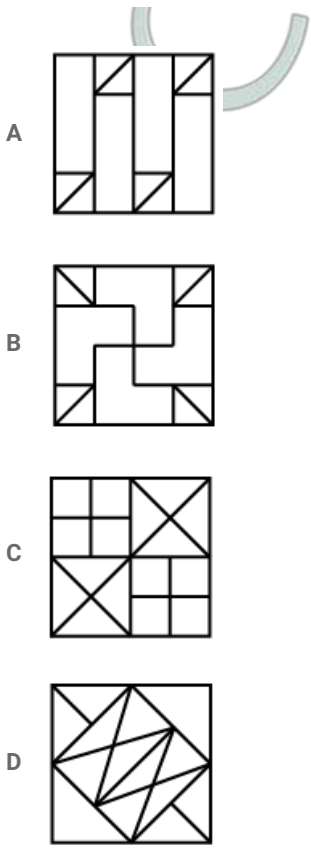


Answer: C

Question 47

From the given answer figures, select the one in which the question figure is hidden / embedded.

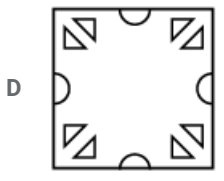
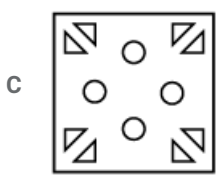
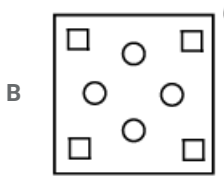
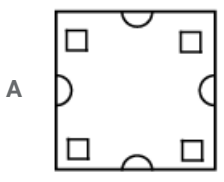
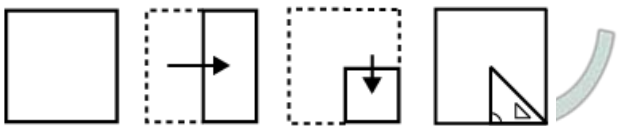




Answer: B

Question 48

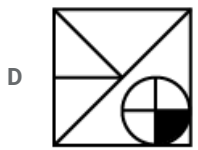
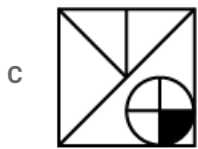
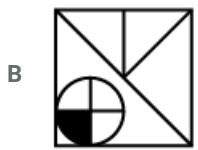
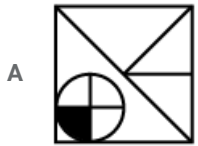
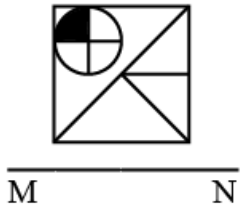
A piece of paper is folded and punched as shown below in the question figures .from the given answer figures ,indicate how it will appear when opened ?



Answer: D

Question 49

If the mirror is placed on the line MN, then which of the following answer figures in the right image of the given figure?



Answer: B

Question 50

A word is represented by only one set of numbers as given in any one of the alternatives. The set of numbers given in the alternatives are represented by two classes of alphabets as shown in the given two matrices. The column and rows of Matrix-1 are numbered from 0 to 4 and that of Matrix-II is numbered from 5 to 9. A letter from these matrices can be represented first by its row and next by its column. For c can be represented by 76,89 etc, similarly you have to identify set for the word 'SODA'

| Matrix I | | | | | |
|----------|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 |
| 0 | J | G | J | A | H |
| 1 | B | A | D | B | L |
| 2 | B | D | A | F | L |
| 3 | L | C | G | B | B |
| 4 | B | K | B | C | B |

| Matrix II | | | | | |
|-----------|---|---|---|---|---|
| | 5 | 6 | 7 | 8 | 9 |
| 5 | S | Q | R | T | X |
| 6 | S | T | T | U | O |
| 7 | T | W | W | S | T |
| 8 | Q | R | O | T | W |
| 9 | Q | P | T | S | X |

A 65,85,21,40

B 78,87,12,03

C 55,67,12,33

D 98,69,22,14

Answer: B

General Awareness

Instructions

For the following questions answer them individually

Question 51

By what name is the BRICS bank presently known?

- A BRICS Development Bank
- B Afro-Asia Development Bank
- C New Development Bank
- D No option is correct

Answer: C

Question 52

What does parallel economy mean?

- A Black Money
- B Parallel Business
- C Illegal Economy
- D No option is correct

Answer: A

Question 53

Who implements monetary policy in India?

- A NITI Aayog
- B RBI
- C Ministry of Finance
- D Parliament

Answer: B

Question 54

The ARDC is a branch of the NABARD. What is the full form of ARDC?

- A Agricultural Research and Development Corporation
- B Agriculture and River Development Cooperation
- C Agricultural Reform and Development Cooperation
- D Agricultural Refinance and Development Corporation

Answer: C

Question 55

Which of the following is a part of machinery that settles industrial disputes?

- A Labour Court
- B Industrial Tribunal
- C Work Committee
- D All options are correct

Answer: D

Question 56

In which year Nagaland was created as separate state?

- A 1961
- B 1962
- C 1963
- D 1964

Answer: C

Question 57

Which one of the following is responsible for the preparation and presentation of Union Budget?

- A Department of Economic Affairs
- B Department of Revenue
- C Department of Expenditure
- D No option is correct.

Answer: A

Question 58

Who presided over the inaugural meeting of the Constituent Assembly of India?

- A Dr Rajendra PrasadSardar Patel
- B Dr Sachchidanand Sinha
- C B R Ambedkar
- D Sardar Patel

Answer: B

Question 59

Which of the following was not adopted from the Maurya Dynasty in the emblem of Government of India?

- A Satyameva Jayate
- B Bull

- C Horse
- D Four Lions

Answer: A

Question 60

The first session of Constituent Assembly of India was held in which of the following cities?

- A Bombay
- B Madras
- C Calcutta
- D Delhi

Answer: D

Question 61

Which of the following is the best example of Vijaynagar Art?

- A Ajanta
- B Hampi
- C Puri
- D Sanchi

Answer: B

Question 62

Taxila was capital of which among the 16 Mahajanpadas?

- A Kosala
- B Kuru
- C Vajji
- D Gandhara

Answer: D

Question 63

Who was founder of Mughal Empire in India?

- A Babur
- B Humayun
- C Akbar
- D Jahangir

Answer: A

Question 64

Where did Vasco da Gama arrive in India in 1498?

- A Madras
- B Calcutta
- C Calicut
- D Bombay

Answer: C

Question 65

According to the treaty of Srirangapattanam, which of the following was ceded to the British?

- A Mysore
- B Hampi
- C Kannur
- D Malabar

Answer: D

Question 66

By what name is the Ganga known in Bangladesh?

- A Padma
- B Ganga
- C Damodar
- D Meghna

Answer: A

Question 67

Which of the following are not kharif crops?

- A Maize and Rice
- B Arhar and Soyabean
- C Wheat and Barley
- D Ragi and Groundnut

Answer: C

Question 68

How many seismic stations are required to locate the epicentre of an earthquake?

- A 3
- B 4

C 5

D 6

Answer: A

Question 69

Madhya Pradesh shares its border with how many States?

A 5

B 4

C 6

D 3

Answer: A

Question 70

Palghat joins which of the following states?

A Goa and Maharashtra

B Kerala and Karnataka

C Tamil Nadu and Kerala

D Mizoram and Manipur

Answer: C

Question 71

Which of the following authorities regulates NPS?

A IRDA

B PFRDA

C CAG

D SEBI

Answer: B

Question 72

Which of the following is a centrally sponsored scheme to empower adolescent girls?

A SAKSHAM

B ABLA

C SABLA

D BBBPS

Answer: C

Question 73

Which among the following has inscribed Kumbh Mela on the Representative List of Intangible Cultural Heritage of Humanity?

- A WHO
- B UNCTAD
- C ADB
- D UNESCO

Answer: D

Question 74

Who has been appointed as the General Manager of Board of Control for Cricket in India?

- A MV Sridhar
- B Saba Karim
- C Rahul Johri
- D Anurag Thakur

Answer: B

Question 75

FIFA World Cup 2022 will be held in which country?

- A Russia
- B Spain
- C Ukrain
- D Qatar

Answer: D

Question 76

The Idea of Justice" is written by _____.

- A Ravindra Singh
- B Mamta Banerjee
- C Amartya Sen
- D Abhinav Bindra

Answer: C

Question 77

Which author has been made Companion of Honour on December 12, 2017?

- A J. K. Rowling
- B Roald Dahl

C Charlotte Bronte

D Jane Austen

Answer: A

Question 78

31st Surajkund International Crafts Mela has begun at which of the following city?

A Faridabad

B Jaipur

C New Delhi

D Jaisalmer

Answer: A

Question 79

ONGC Videsh has got a two year extension to explore which country's Oil block-128 in the south China sea?

A Cambodia

B Vietnam

C Taiwan

D Philippines

Answer: B

Question 80

The 5th India-Sri Lanka joint training exercise "Mitra Shakti 2017" was held in which state of India?

A New Delhi

B Tamil Nadu

C Maharashtra

D West Bengal

Answer: C

Question 81

BIOS is a _____.

I. non-volatile firmware

II. Volatile firmware

III. Software stored on a small memory chip on motherboard

A Only I

B Only II

C Only I and III

D Only II and III

Answer: C

Question 82

Which of the following is TRUE?

- A Primary memory is non-volatile.
- B Secondary memory is volatile
- C ROM is non-volatile memory.
- D RAM is non-volatile memory

Answer: C

Question 83

Which of the following metal remains in liquid form at room temperature?

- A Cadmium
- B Mercury
- C Germanium
- D Tin

Answer: B

Question 84

Aqua regia is a mixture of _____.

- A dilute hydrochloric acid and concentrated nitric acid
- B dilute sulfuric acid and dilute hydrochloric acid
- C Concentrated sulfuric acid and dilute nitric acid.
- D concentrated hydrochloric acid and concentrated nitric acid

Answer: A

Question 85

In a concave mirror if object is placed at centre of curvature, then image will be _____.

- A virtual
- B erect
- C diminished
- D at the centre of curvature

Answer: D

Question 86

What is the mass of 4 mole of aluminium atoms?

- A 120 grams

- B 108 grams
- C 136 grams
- D 140 grams

Answer: B

Question 87

Which of the following particles were made to fall on a thin gold foil by Ernest Rutherford?

- A Gamma
- B Beta
- C Electron
- D Alpha

Answer: D

Question 88

Which of the following statement(s) is/are TRUE?

- I. Fuse is generally placed in series with the device.
- II. Fuse is generally placed in parallel with the device.
- III. Fuse wire has high melting point.

- A Only I
- B Only II
- C Only I and III
- D Only II and III

Answer: A

Question 89

A rectangular coil of copper wire is rotating in a magnetic field. The direction of the induced current changes once in each?

- A Two revolutions
- B One revolution
- C Half revolution
- D One fourth revolution

Answer: C

Question 90

Noise is measured in which unit?

- A Watt
- B Faraday
- C Pascal

D Decibel

Answer: D

Question 91

Which of the following vitamin helps in clotting of blood?

A Vitamin A

B Vitamin B

C Vitamin D

D Vitamin K

Answer: D

Question 92

During heavy exercise, breathing rate in an average adult person can increase upto _____ per minute

A 15

B 20

C 25

D 30

Answer: C

Question 93

Why is the colour of human blood red?

A Because of myoglobin

B Because of haemoglobin

C Because of immunoglobulin

D Because of heptoglobin

Answer: B

Question 94

Which of the following statement is INCORRECT?

A Oviparous animal does not give birth to young ones.

B Each sperm is a single cell

C External fertilisation takes place in frog

D Fertilisation is necessary even in asexual reproduction

Answer: D

Question 95

What is the cause of arise of myopia?

- A Excessive curvature of the eye lens.
- B Eye ball becomes too small.
- C Focal length of the eye lens becomes too long.
- D Lack of sleep

Answer: A

Question 96

Which of the following multiplies very slowly in comparison to others?

- A Bacteria
- B Virus
- C Fungi
- D Worms

Answer: D

Question 97

The accumulation of non-degradable chemicals progressively at each trophic level is called ____.

- A biological magnification
- B chemical magnification
- C residue magnification
- D No option is correct.

Answer: A

Question 98

Why Taj Mahal is suffering from "Marble Cancer"?

- A Because of sulphur dioxide
- B Because of nitrogen dioxide
- C Because of chlorofluorocarbon
- D Because of carbon dioxide

Answer: D

Question 99

Cancer treatment is done by which of the following noble gas?

- A Helium
- B Radon
- C Krypton

D Neon

Answer: B

Question 100

How many types of ecological pyramids are present in ecosystem?

A Two

B Three

C Four

D Five

Answer: B

General Engineering (Mechanical)

Instructions

For the following questions answer them individually

Question 101

Choose the option which does NOT belong to the category of simple machine

A Spring

B Screw

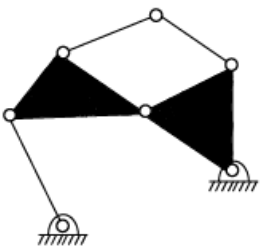
C Wedge

D Pulley

Answer: A

Question 102

what are the numbers of binary and ternary links in the following kinematic chain?



A 3 binary and 4 ternary joints

B 3 binary and 3 ternary joints

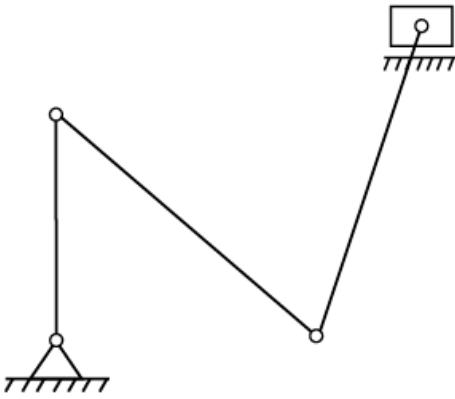
C 3 binary and 2 ternary joints

D 4 binary and 2 ternary joints

Answer: E

Question 103

How many degrees of freedom does the below mechanism have?



- A 0
- B 1
- C 2
- D 3

Answer: C

Question 104

Which of the following is TRUE for four bar mechanism?

- A All sliding pairs
- B One is sliding pair and other is turning pair.
- C All turning pairs.
- D None of these

Answer: C

Question 105

Which of the following is the CORRECT method for the conversion of spring controlled governor from unstable to stable?

- A Increasing the ball weight
- B Decreasing the spring stiffness
- C Decreasing the ball weight.
- D Increasing the spring stiffness.

Answer: D

Question 106

The power transmission takes place in shaft rotating at 400 rpm and this rotating shaft drives another shaft at 600 rpm. The smaller pulley has the diameter of 0.5 m. The centre distance between pulleys is 4m. If the angle of contact on the smaller pulley for the open belt drive is 1.8° then calculate the diameter of larger pulley (in m) and angle of contact (in rad)?

- A 0.50 and 2.00

- B 0.75 and 2.00
- C 0.50 and 3.08
- D 0.75 and 3.08

Answer: D

Question 107

Which of the following statement is CORRECT about the bull engine?

- A Obtained by fixing the cylinder or sliding pair.
- B Obtained by fixing the crank
- C Obtained by fixing the piston rod
- D None of these

Answer: A

Question 108

Which of the following condition is CORRECT about the inversion of a mechanism?

- A Conversion of higher pair to lower pair
- B Turning it upside down
- C Obtained by fixing different links in a kinematic chain
- D Obtained by reversing the input and output motion of the mechanism.

Answer: C

Question 109

Which of the following statement is INCORRECT about the dry clutch and wet clutch?

- A Heat dissipation is more difficult in dry clutch
- B Rate of wear is very less in wet clutches as compared to dry clutches
- C Torque transmitting capacity of dry clutch is less than wet clutch
- D Engagement in wet clutch is smoother than dry clutch

Answer: C

Question 110

Which of the following theory is/are used for the determination of torque quantities in cone clutch?

- A Uniform pressure theory
- B Uniform strain theory
- C Uniform stress theory
- D None of these

Answer: A

Question 111

Which of the following toothed wheels does not come under the classification according to the type of gearing?

- A External gearing
- B Internal gearing
- C Rack and pinion
- D Parallel gearing

Answer: D

Question 112

The profile of the gears is involute with 20°. If the length of the path of approach and length of path of recess are 28 mm and 25 mm respectively. What is the length of arc of contact? ($\cos 20^\circ = 0.94$)

- A 54
- B 54.4
- C 56
- D 56.4

Answer: D

Question 113

The governor in which the displacement of the sleeve is high for the small change of speed is known as _____

- A hunting
- B sensitive
- C stable
- D isochronous

Answer: B

Question 114

The point of contact which is common between the two pitch circles is known as _____

- A base point
- B addendum
- C dedendum
- D pitch point

Answer: D

Question 115

The tensile strength for the plate per pitch length of the outer row of the rivet is _____.

- A $p_t = \frac{(p-d)t\sigma_t}{2}$

B $p_t = 2(p - d)t\sigma_t$

C $p_t = (p - d)t\sigma_t$

D $p_t = 2(p - d)t^2\sigma_t$

Answer: C

Question 116

Choose the option which is **INCORRECT** about the term friction

- A Friction produces heat
- B It leads to the decrease in the velocity of object
- C It leads to the increase in the velocity of object
- D It can stop the moving object

Answer: C

Question 117

Which of the following formula is correct for calculating the angle of static friction ϕ_s

- A $\tan^{-1} \mu_s$
- B $\sin^{-1} \mu_s$
- C $\cos^{-1} \mu_s$
- D none of these

Answer: A

Question 118

Which of the following statement is **CORRECT** for the modulus of resilience?

- A It is the ratio of maximum stress energy and unit volume.
- B It is the ratio of maximum strain energy and unit volume
- C It is the ratio of proof resilience and unit volume
- D It is the ratio of proof resilience and unit area.

Answer: C

Question 119

Calculate the value of modulus of elasticity (N/mm^2), if the Poisson's ratio is 0.25 and modulus of rigidity of the material is 80 N/mm^2

- A 100
- B 200
- C 250
- D 300

Answer: B

Question 120

Which of the following is CORRECT option for validation of Hooke's law in simple tension test?

- A Ultimate stress
- B Breaking Point
- C Elastic Limit
- D Limit of proportionality

Answer: D

Question 121

A steel rod whose diameter is 2 cm and is 2m long experience heating from 30° to 150° . The coefficient of thermal expansion is $\alpha = 12 \times 10^{-4}/^{\circ}C$ and the rod has been restricted in its original position. The thermal stress developed is 288 MPa. What is the value of young modulus (GPa)

- A 50
- B 100
- C 150
- D 200

Answer: D

Question 122

Choose the INCORRECT conditions for the thermal stress in a body

- A It is the function of coefficient of thermal expansion.
- B It is the function of temperature rise.
- C It is the function of modulus of elasticity
- D It is the function of modulus of rigidity.

Answer: C

Question 123

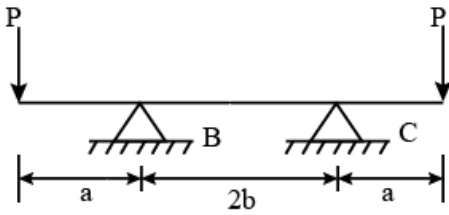
The formula of Eulers bucklings load is given as $\frac{\pi^2 EI}{4L^2}$. This is True which of the following columns?

- A Column with one end fixed and other end free
- B Column with one end fixed and other end hinged.
- C Column with both ends fixed
- D Column with both hinged ends.

Answer: A

Question 124

Describe the shape of the elliptical curve between the supports B and C for the beam as shown in the figure below?



- A A straight line
- B Elliptical
- C Parabolic
- D Circular

Answer: C

Question 125

The elongation (mm) in a steel bar having a square cross section of dimension $40\text{ mm} \times 40\text{ mm}$ is 2.5 mm and is subjected to an axial compressive load of P (kN). If the length of the bar is 4 m and modulus of elasticity is $E=250\text{ GPa}$. What is the value of P (kN)?

- A 100
- B 150
- C 200
- D 250

Answer: D

Question 126

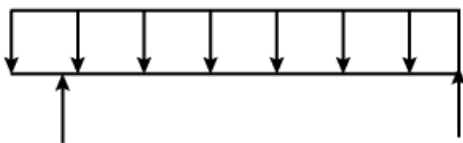
The property of a material states that it is rigid. The value of Poisson's ratio for this particle is _____.

- A 0
- B 1
- C 2
- D None of these

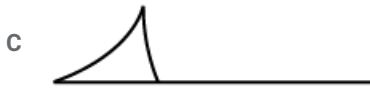
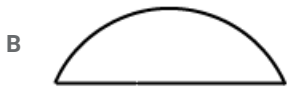
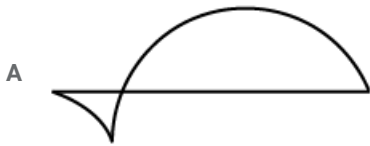
Answer: A

Question 127

Consider the loaded beam as shown in the figure below



choose the correct option for the bending moment diagram of the beam above

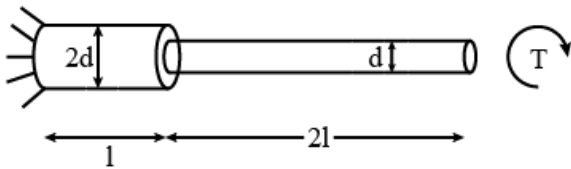


D None of these

Answer: A

Question 128

Calculate the total angle of twist for a stepped shaft which is subjected to the torque (T) as shown in the figure below ?



A $\frac{Tl}{\pi Gd^4}$

B $\frac{66Tl}{\pi Gd^4}$

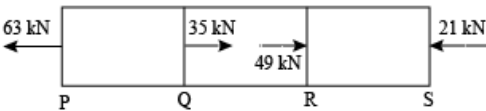
C $\frac{Tl}{66Gd^4}$

D $\frac{36Tl}{\pi Gd^4}$

Answer: B

Question 129

A cross sectional bar of area 700 mm^2 is subjected to an axial load as shown in the figure below .what is the value of stress (MPa) in the section QR?



A 30

B 40

C 50

D 60

Answer: B

Question 130

Choose the CORRECT equation which defines the relationship between the Young's Modulus (E), Bulk modulus (K) and Poisson's ratio (u)

A $E = 3K(1 - 2u)$

B $E = 3K(1 - u)$

C $K = 3E(1 - 2u)$

D $K = 3E(1 - u)$

Answer: A

Question 131

In a P-V diagram for pure substance, the constant temperature line in superheated region is _____.

A converging

B diverging

C intersecting

D parallel

Answer: B

Question 132

Which equation clearly defines the entropy change during the isothermal process for a system with m kg of gas at pressure P_1 and the volume V_1 , temperature T_1 and the entropy S_1 is heated to state points of pressure P_2 , Volume V_2 and temperature T_2 and Entropy S_2 ?

A $mc_v \ln \frac{T_2}{T_1}$

B $mc_p \ln \frac{T_2}{T_1}$

C $mR \ln \frac{V_2}{V_1}$

D $mc_v \left(\frac{n-\gamma}{n-1} \right) \ln \frac{T_2}{T_1}$

Answer: C

Question 133

The entropy change of the system and the surroundings during a process between two equilibrium states is _____.

A equal to zero

B greater than zero

C less than zero

D greater than or equal to zero

Answer: D

Question 134

A Carnot heat pump is used to maintain a room at a temperature of 300°C , the initial temperature of the room was 300°C . If the power requirement of the pump is 20 kW. What is the heat pumped (in kW) to the room?

- A 3
- B 17
- C 154
- D 174

Answer: E

Question 135

Which equation best represents the net entropy change (s) for an irreversible process?

- A $s = 0$
- B $s = 1$
- C $s < 0$
- D $s > 0$

Answer: D

Question 136

Which of the engine has a spark plug used for igniting the fuel?

- A Petrol engine
- B Diesel engine
- C Steam engine
- D Gas engine

Answer: A

Question 137

What happens to the efficiency, when the temperature of intake air is lowered in an I.C engine?

- A Increases
- B Decreases
- C Remains same
- D Increases to a certain limit, then decreases

Answer: E

Question 138

For a process which is non-flow (U is the internal energy, Q is the heat and W is the work done) the first law of thermodynamics states _____.

- A $\partial U = \partial Q - \partial W$
- B $\oint dQ + \oint dW = 0$

C $\oint dQ \neq \oint dW$

D $\partial U = \partial Q$

Answer: E

Question 139

Which equation represents the steady flow system?

A $H_1 + \frac{V_1^2}{2gJ} + \frac{Z_1}{J} + Q = \frac{V_2^2}{2gJ} + \frac{Z_2}{J} + Losses$

B $H_1 + \frac{V_1^2}{2gJ} + \frac{Z_1}{J} + Q = \frac{V_2^2}{2gJ} + \frac{Z_2}{J} + Losses + Workdone$

C $H_1 + \frac{V_1^2}{2gJ} + \frac{Z_1}{J} + Q = H_2 + \frac{V_2^2}{2gJ} + \frac{Z_2}{J} + Losses + Workdone$

D $H_1 + \frac{V_1^2}{2gJ} + \frac{Z_1}{J} = H_2 + \frac{V_2^2}{2gJ} + \frac{Z_2}{J} + Losses + Workdone$

Answer: C

Question 140

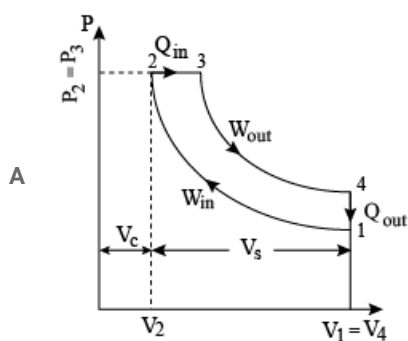
In a P-T diagram for pure substance, the melting line has highest inclination with respect to the positive horizontal axis representing temperature for which type of substance?

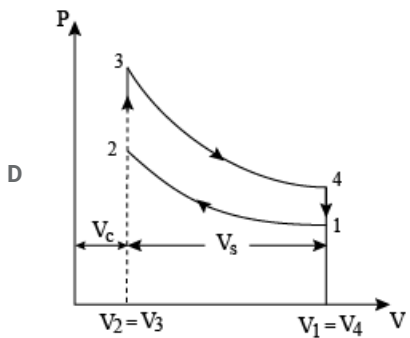
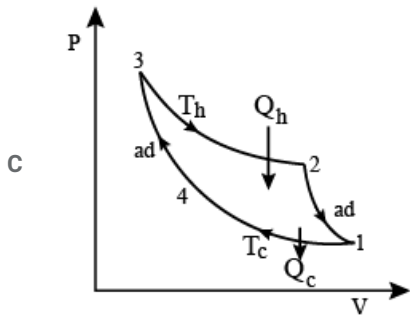
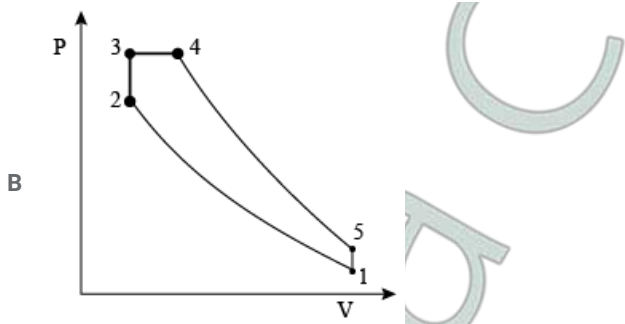
- A Substance that contracts on freezing
- B Substance that expands on freezing.
- C Substance that has same volume on freezing.
- D None of these

Answer: B

Question 141

Which of the following graphs represents working of an ideal Diesel cycle on p-V scale?





Answer: A

Question 142

The work done by a system is 45 kJ. If the internal energy of the system is decreased by 15 kJ. What is the heat received (in kJ) by the system?

- A -60
- B -30
- C 30
- D 60

Answer: C

Question 143

A reversible adiabatic in a T-S diagram is a _____.

- A point
- B vertical line
- C horizontal line
- D parabolic curve

Answer: B

Question 144

Specific enthalpy is an _____ of a system and its unit is _____

- A extensive property, kJ
- B extensive property, kJ/kg
- C intensive property, kJ
- D intensive property, kJ/kg

Answer: B

Question 145

The internal energy of the system is a function of temperature only $U=30+0.5t$ kJ. If the system does the work of 0.5 kJ/K. What is the increase in heat interaction per degree temperature?

- A -1
- B 0
- C 1
- D can not determined

Answer: A

Question 146

2500 kJ/min heat is supplied to a heat engine at 727°C . It rejects heat at 900 kJ/min at 223°C . This type of engine is _____

- A ideal
- B irreversible
- C impossible
- D practical

Answer: C

Question 147

What happens to the COP of a heat pump, when the temperature difference between source and sink is decreased?

- A Decreases
- B First decreases, then increases
- C First increases, then decreases
- D Increases

Answer: D

Question 148

If two Carnot engine CE1 and CE2 are connected in a series such that the heat rejected by CE1 is used as the input for the CE2 cycle with the intermediate temperature being the geometric mean of the extreme temperatures. Which of the following statement is TRUE for this efficiency of the Carnot engine?

- A $\eta_{CE1} > \eta_{CE2}$
- B $\eta_{CE1} < \eta_{CE2}$
- C $\eta_{CE1} = \eta_{CE2}$
- D Insufficient data

Answer: C

Question 149

What type of slopes does constant pressure line have in the superheated region of the Mollier diagram?

- A Positive slope
- B Negative slope
- C Zero slope
- D First positive than negative slope

Answer: A

Question 150

For a gas with n degree freedom , what will be the value of $\frac{C_p}{C_v}$?

- A $n + 1$
- B $n - 1$
- C $1 - \frac{2}{n}$
- D $1 + \frac{2}{n}$

Answer: D

Question 151

With which of the following age hardening is related?

- A Cast iron
- B Gun metal
- C Duralumin
- D German silver

Answer: C

Question 152

Monel metal is an alloy of

- A Cu and Cr
- B Ni and Cu
- C Ni and Cr
- D Cu, Ni and Cr

Answer: B

Question 153

_____ iron is the magnetic allotrope of iron.

- A α
- B β
- C γ
- D δ

Answer: A

Question 154

The bonding of a rubber sheet with a metal is done by

- A Welding
- B High frequency dielectric heating
- C Induction welding
- D Adhesive bonding

Answer: D

Question 155

Plain and butt welds may be used on materials upto approximately

- A 25 mm thick
- B 40 mm thick
- C 50 mm thick
- D 75 mm thick

Answer: A

Question 156

An optical gauge works on the principle of

- A reflection of light rays
- B polarisation of light rays
- C interference of light rays

D refraction of light rays

Answer: C

Question 157

Generally, the strongest form in which metals can be used as

A hot rolling

B cold rolling

C extrusion

D forging

Answer: B

Question 158

Thermite is a mixture of

A five aluminium and iron oxide in the ratio of 3:1

B five iron and aluminium oxide in the ratio of 3:1

C five aluminium and iron oxide in the ratio of 3:1, with traces of sulphur, phosphorus and manganese

D molten iron and aluminium, with the ratio depending upon the type of the surface to be welded

Answer: A

Question 159

The process of enlarging a hole is known as

A counter boarding

B counter sinking

C boring

D drilling

Answer: C

Question 160

Which of the following statements is true?

A Crater wear is predominant in ceramic tools

B Crater wear is predominant in carbon tool steel


C Crater wear is predominant in tungsten carbide tools

D Crater wear is predominant in high speed steel tools

Answer: C

Question 161

The bomb calorimeter is an apparatus to measure the

- 
- A calorific value of a gaseous fuel
 - B calorific value of solid and gaseous fuels
 - C calorimetric composition of any solid bomb material
 - D calorific value of a solid or liquid fuel

Answer: D

Question 162

In metric system the unit of heat is given as

- A CHU
- B BTU
- C kcal
- D Kelvin

Answer: C

Question 163

Centrifugal pump is an example of

- A isolated system
- B closed system
- C steady flow system
- D None of these

Answer: C

Question 164

A refrigeration system works on

- A second law of thermodynamics
- B first law of thermodynamics
- C zeroth law of thermodynamics
- D None of these

Answer: A

Question 165

Liquids have

- A No specific heat
- B different values of specific heat at same temperature
- C only one value of specific heat

D two distinct values of specific heat

Answer: C

Question 166

The volume of the universal gas constant (Ru) is equal to

A 848 m kgf.kg-mol / K

B 8.48 m kgf/kg-mol / K

C 84.8 m kgf/kg-mol / K

D 0.848 m kgf/kg-mol / K

Answer: A

Question 167

The solid fuel having the highest calorific value is

A wood

B lignite

C coke

D anthracite

Answer: D

Question 168

The heat transfer Q, the work done W and the change in internal energy U are all zero in the case of

A a rigid vessel containing steam at 150° C left in the atmosphere which is at 25oC

B 1 kg of gas contained in an insulated cylinder expanding as the piston moves slowly outwards.

C a rigid vessel containing ammonia gas connected through a valve to an evacuated rigid vessel, the vessel, the valve and the connecting pipes being well insulated and the valve being opened and after a time, condition through the two vessels becoming uniform

D 1 kg of air flowing adiabatically from the atmosphere into a previously evacuated bottle

Answer: C

Question 169

A reversible engine operates between temperatures T_1 and T_2 . The energy rejected by this engine is received by a second reversible engine at temperature T_2 and rejected to a reservoir at temperature T_3 If the efficiencies of the engines are same then, the relationship between T_1 , T_2 and T_3 is given by

A $T_2 = \frac{(T_1+T_3)}{2}$

B $T_2 = \sqrt{(T_1)^2 + (T_3)^2}$

C $T_2 = \sqrt{(T_1 * T_3)}$

D None of these

Answer: C

Question 170

Efficiency of a Carnot engine is 75%. If the cycle direction is reversed, COP of the reversed Carnot cycle is

- A 1.33
- B 0.75
- C 0.33
- D 1.75

Answer: E

Question 171

The channel section considered to have the highest efficiency is

- A Quadrant
- B Square
- C Trapezoid
- D Triangular

Answer: C

Question 172

Any liquid flow, obeys the following

- A Capillary action
- B Bernoulli's equation
- C Continuity equation
- D Newton's law of viscosity

Answer: C

Question 173

According to principle of floatation, the weight of liquid displaced as compared to the weight of the body is

- A more
- B less
- C same
- D depending upon the shape of the body

Answer: C

Question 174

The wetted perimeter for a pipe running full of water is equal to: Where d is the diameter of the pipe

- A $\frac{\pi d}{2}$

B $2\pi d$

C πd

D δ

Answer: B

Question 175

Metacentric height is the distance between

A CG of body and centre of pressure

B CG of body and the metacentre

C CG of body and centre of buoyancy

D None of these

Answer: B

Question 176

Surface tension is caused by the force of _____ at the free surface.

A Cohesion

B adhesion

C both cohesion and adhesion

D None of these

Answer: A

Question 177

The intensity of pressure in a liquid due its depth will, vary with depth:

A directly

B indirectly

C Both directly and directly

D None of these

Answer: A

Question 178

The metacentric height of sailing ships is

A 0.45 m to 1.25 m

B 1.5m to 3.5m

C 0.25 m to 0.35 m

D 5 m to 7.5m

Answer: A

Question 179

The discharge through a pipe can be measured with

- A a venturimeter
- B an orificemeter
- C a flow nozzle
- D All options are correct

Answer: D

Question 180

According to Nikuradse's the boundary behaves hydrodynamically smooth when

- A $\left(\frac{k}{\delta}\right) > 10$
- B $\left(\frac{k}{\delta}\right) > 0.25$
- C $\left(\frac{k}{\delta}\right) < 0.25$
- D $\left(\frac{k}{\delta}\right) < 8$

Answer: C

Question 181

The coefficient of friction in term or Reynold's number is

- A $\frac{16}{Re}$
- B $\frac{32}{Re}$
- C $\frac{8}{Re}$
- D $\frac{10}{Re}$

Answer: A

Question 182

The maximum velocity of an airplane in steady level flight will occur at an angle of attack of

- A 20.5°
- B 18.5°
- C 22.5°
- D 26.5°

Answer: A

Question 183

The wave produced due to surface tension in a shallow channel is known as

- A gravity wave
- B capillary wave
- C elastic wave
- D None of these

Answer: B

Question 184

Which one of the following is an axial flow turbine?

- A Pelton wheel
- B Francis turbine
- C Kaplan turbine
- D None of these

Answer: C

Question 185

The unit of turbine is equal to:

- A $\frac{P}{H^2}$
- B $\frac{P}{H}$
- C $\frac{P^3}{H^2}$
- D $\frac{P}{H^{5/2}}$

Answer: C

Question 186

Pseudo plastic is a fluid for which

- A dynamic viscosity decreases as the rate of shear increases
- B Newton's law of viscosity holds good
- C dynamic viscosity increases as the rate of shear increases
- D dynamic viscosity increases with the time for which shearing forces are applied

Answer: A

Question 187

Match the list I and list II and select the correct answer using the codes given below the list.

| List I | | List II | |
|--------|-----------------------|---------|-----------------|
| A | Lubrication | 1 | Capillary |
| B | Rise of sap in trees | 2 | Vapour Pressure |
| C | Formation of droplets | 3 | Viscosity |
| D | Cavitation | 4 | Surface tension |

A A-2; B-4; C-1; D-3

B A-3; B-4; C-1; D-2

C A-2; B-1; C-4; D-3

D A-3; B-1; C-4; D-2

Answer: D

Question 188

Centrifugal pumps have which of the following advantages?

1. Low initial cost
2. Compact, occupying less floor space
3. Easy handling of highly viscous fluids

A 1, 2 and 3

B 1 and 2

C 1 and 3

D 2 and 3

Answer: A

Question 189

What is the unit of dynamic viscosity of a fluid termed 'poise' equivalent to?

A $\frac{\text{dyne}}{\text{cm}^2}$

B $\frac{\text{gs}}{\text{cm}}$

C $\frac{\text{dyne-s}}{\text{cm}^2}$

D g-cm/sec

Answer: C

Question 190

Which one of the following conditions will linearize the Navier - Stokes equations to make it amenable for analytical solutions?

A Low Reynolds number ($Re \ll 1$)

- B High Reynolds number ($Re \gg 1$)
- C Low Mach Number ($M \ll 1$)
- D High Mach Number ($M \gg 1$)

Answer: A

Question 191

Which of the following advantages is/are possessed by a Kaplan turbine over a Francis turbine ?

1. Low frictional losses
2. Part load efficiency is considerably high
3. More compact and smaller in size

- A Only 1
- B 1 and 2
- C 2 and 3
- D 1,2 and 3

Answer: D

Question 192

The stream function $\psi = x^3 - y^3$ is observed for a two dimensional flow field. What is the magnitude of the velocity at point (1, -1)?

- A 4.24
- B 2.83
- C 0
- D -2.83

Answer: A

Question 193

Non uniform flow occurs when

- A the direction and magnitude of the velocity at all points are identical
- B the velocity of successive fluid particles, at any point, is the same at successive periods of time
- C the magnitude and direction of the velocity do not change from point to point in the fluid
- D velocity, depth, pressure etc., change from point to point in the fluid flow

Answer: D

Question 194

The length of divergent portion of venturimeter in comparison to convergent portion is

- A same
- B more
- C less

D more or less depending on capacity

Answer: B

Question 195

In order that flow takes place between two points in a pipeline, the differential pressure between these points must be more than

- A frictional force
- B viscosity
- C surface friction
- D All option are correct

Answer: D

Question 196

Head developed by a centrifugal pump depends on _____.

- A impeller diameter
- B speed
- C fluid density
- D Both impeller diameter and speed

Answer: D

Question 197

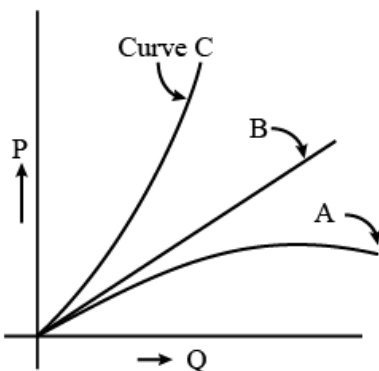
- Low specific speed of turbine implies it is

- A propeller turbine
- B Francis turbine
- C impulse turbine
- D None of these

Answer: C

Question 198

The figure below shows the relationship between power(P) and discharge (Q) for different vane exit angles of centrifugal pump .In the figure given below curve B holds good for?



- A vane exit angle of 90°
- B vane exit angle of less than 90°
- C vane exit angle of more than 90°
- D any vane exit angle

Answer: A

Question 199

The specific speed of a turbine is the speed of such a turbine, identical with a given turbine, which

- A develops unit power under unit head
- B develops unit power under unit discharge
- C develops unit speed under unit head
- D delivers unit discharge under unit head

Answer: A

Question 200

In reaction turbine

- A kinetic energy is appreciable as the fluid leaves the runner and enters draft tube
- B the vanes are partly filled
- C total energy of fluid is converted to kinetic energy in the runner
- D it is not exposed to atmosphere

Answer: E