



SSC JE Mechanical Engineering 23rd Jan 2018 Shift-2

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General Intelligence and Reasoning

Instructions

For the following questions answer them individually

Question 1

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

Heart : Organ :: ? : ?

- A Bus : Vehicle
- B Car : Road
- C Ship : Sea
- D Train : Rail

Answer: A

Question 2

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

Big : Small :: Solid : ?

- A Metal
- B Liquid
- C Smoke
- D Cold

Answer: B

Question 3

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

Calculator : Calculations :: Scale : ?

- A Inches
- B Centimeters
- C Measure
- D Steel

Answer: C

Question 4

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

MUFT : PXIW :: GONE : ?

- A HMRL
- B JSPA
- C JRQH
- D HQRF

Answer: C

Question 5

In the following question, select the related letters from the given alternatives.
PINK : TMRO :: SOLD : ?

- A HQT X
- B WSP H
- C HAQ V
- D AQB H

Answer: B

Question 6

In the following question, select the related letters from the given alternatives.
SW : VA :: LT : ?

- A NY
- B LA
- C OX
- D OL

Answer: C

Question 7

In the following question, select the related number pair from the given alternatives.
19 : 363 :: ? : ?

- A 16 : 259
- B 13 : 171
- C 14 : 199
- D 14 : 195

Answer: B

Question 8

In the following question, select the related number from the given alternatives.
42 : 105 :: 38 : ?

- A 111
- B 135
- C 95
- D 83

Answer: C

Question 9

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

24 : 39 :: 49 : ?

- A 68
- B 64
- C 69
- D 79

Answer: B

Question 10

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

- A Liver
- B Intestine
- C Organ
- D Lungs

Answer: C

Question 11

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

- A Black
- B Yellow
- C Rainbow
- D Pink

Answer: C

Question 12

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

- A Arteries
- B Veins
- C Hand
- D Bones

Answer: C

Question 13

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

- A RLF

B MGA

C EYR

D HBV

Answer: C

Question 14

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

A IR

B KP

C GT

D OV

Answer: D

Question 15

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

A XTQMJ

B FBYUR

C GCZVS

D TPMIE

Answer: D

Question 16

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

A 4 - 21

B 7 - 54

C 6 - 41

D 3 - 16

Answer: D

Question 17

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

A 11 - 17

B 23 - 31

C 43 - 59

D 41 - 47

Answer: C

Question 18

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

- A 12 - 156
- B 13 - 182
- C 14 - 210
- D 15 - 230

Answer: D

Question 19

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

1. Shocking
2. Shiver
3. Shelter
4. Shorten
5. Shudder

- A 23145
- B 32145
- C 14523
- D 41523

Answer: B

Question 20

According to dictionary, which of the following word will come at LAST position?

1. Operation
2. Orderly
3. Openly
4. Opulent
5. Oral

- A Oral
- B Orderly
- C Opulent
- D Operation

Answer: B

Question 21

From the given alternatives, according to dictionary, which word will come at THIRD position?

- A Passage
- B Pastime
- C Patience

D Pathetic

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.

AGM, FLR, KQW, PVB, ?

A UAG

B VLC

C CGN

D PNO

Answer: A

Question 23

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

FROM, CNLI, ZJIE, WFFA, ?

A ACNG

B TCCX

C TBCW

D FRIP

Answer: C

Question 24

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

TRO, PNK, LJG, ?, DBY

A FBC

B FNB

C FRN

D HFC

Answer: D

Question 25

In the following question, select the missing number from the given series.

11, 16, 21, 13, 19, 25, 15, 22, 29, ?, 25

A 18

B 17

C 19

D 21

Answer: B

Question 26

In the following question, select the missing number from the given series.
2112, 2328, 2671, 3183, ?, 4912

A 3826

B 3742

C 3912

D 3992

Answer: C

Question 27

In the following question, select the missing number from the given series.
21, 22, 34.5, 71, 180, 543, ?

A 1864

B 2234

C 2336

D 1904

Answer: D

Question 28

M is 2 years older than P. L is 2 years older than O. O's age is the average of the ages of L and N, P's age is the average of the ages of L and M and L's age is the average of P and O. Who is the youngest?

A L

B M

C N

D O

Answer: C

Question 29

X said to Y that your mother's father-in-law's wife is mother-in-law of my father.
How are X and Y related?

A X is sister's husband of Y

B X is child of Y's father's sister

C Y is father's brother of X

D Y is sister's husband of X

Answer: B

Question 30

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

GEOGRAPHIC

- A cheap
- B rogue
- C price
- D graph

Answer: B

Question 31

If BANQUET is coded as ZYLOSCR, then how will NEW be coded as?

- A MVD
- B MDV
- C LCU
- D OFX

Answer: C

Question 32

In a certain code language, 9124 means 'run around the block', 2548 means 'don't block the path' and 4763 means 'chock a block full'. Find the code for 'the'.

- A 1
- B 9
- C 2
- D 4

Answer: C

Question 33

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

$$90 \times 10 \div 25 - 5 + 50 = ?$$

- A 81
- B 84
- C 100
- D 48

Answer: B

Question 34

If $11 @ 7 = 2$, $18 @ 0 = 9$ and $22 @ 20 = 1$, then find the value of $16 @ 10 = ?$

- A 6
- B 160
- C 26
- D 3

Answer: C

Question 35

If $A * B$ means A is father of B, $A + B$ means A is sister of B and If $A \% B$ means A is daughter of B, then what does $C * D \% E + F$ mean?

- A C is F's husband
- B C is F's wife's brother
- C C is father of F
- D C is F's sister's husband

Answer: D

Question 36

Select the missing number from the given responses.

8	10	2
9	?	8
17	19	10

- A 1
- B 9
- C -1
- D -9

Answer: B

Question 37

Which of the following terms follows the trend of the given list?
CABABABAB, ACBABABAB, ABCABABAB, ABACBABAB, ABABCABAB, _____.

- A ABABABACB
- B ABABABCAB
- C ABABACBAB
- D ABABABABC

Answer: C

Question 38

A ship starts from the port and sails 43 miles East, then it turns South and sails 17 miles, then it turns West and sails 25 miles, then it turns to its right and sails 17 miles. Where is it with respect to the port from where it started?

- A 18 miles West
- B 68 miles East
- C 18 miles East
- D 68 miles West

Answer: C

Question 39

Two planes start from the same strip. Plane P flies 15 miles West, then turns left flies 22 miles and lands. In the meanwhile plane Q flies 7 miles South, then flies 11 miles East, then turns to its right, flies 15 miles and lands. Where is plane Q with respect to plane P?

- A 26 miles East
- B 26 miles West
- C 4 miles East
- D 4 miles West

Answer: A

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: All officers are mothers

Statement II: Some doctors are mothers

Conclusion I: All doctors are mothers

Conclusion II: Some mothers are officers

- 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: B

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: All desert is jungle

Statement II: All sand is desert

Statement III: No trees are jungle

Conclusion I: No trees are desert

Conclusion II: No sand is trees

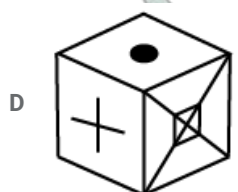
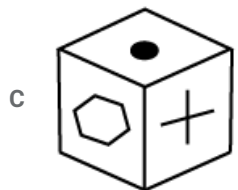
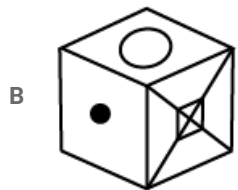
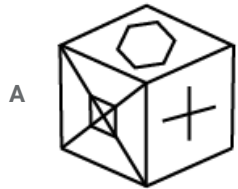
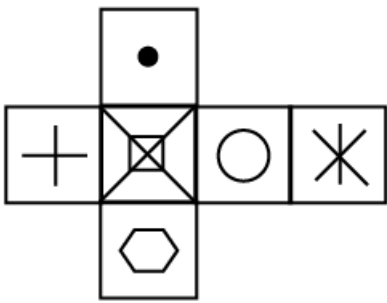
Conclusion III: All jungle is sand

- A Only conclusion I follows
- B Only conclusion II follows
- C Only conclusions I and II follow
- D None of the conclusions follow

Answer: C

Question 42

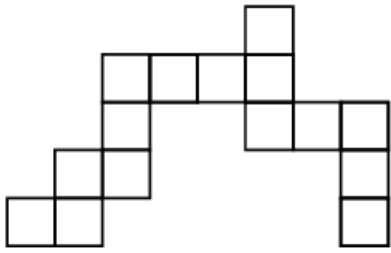
Which of the following cube in the answer figure cannot be made based on the unfolded cube in the question figure ?



Answer: C

Question 43

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

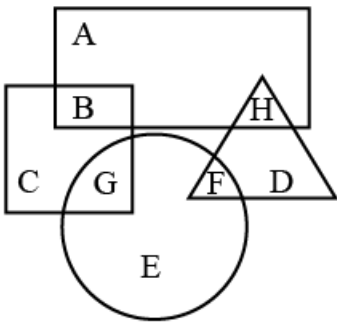


- A
- B
- C
- D

Answer: A

Question 44

In the following figure, square represents Artists, triangle represents Military officers, circle represents Collectors, and rectangle represents Fathers. Which set of letters represents collectors who are either military officers or fathers ?

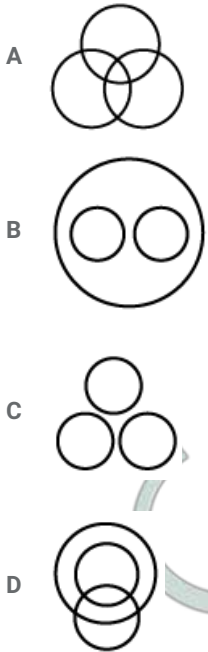


- A H
- B B
- C G
- D F

Answer: D

Question 45

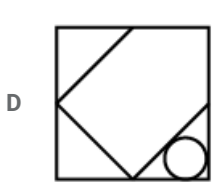
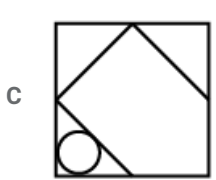
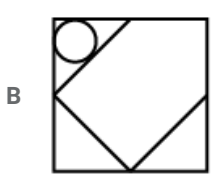
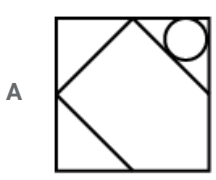
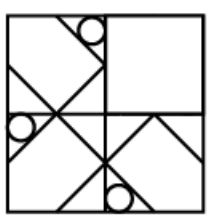
Which of the following venn diagrams represents the relationship between Women, Mothers and Teachers ?



Answer: D

Question 46

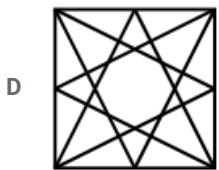
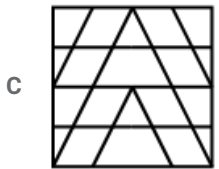
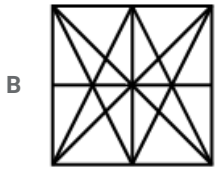
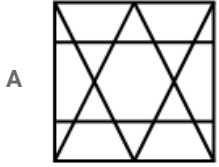
Which of the following figure will complete the pattern in the question figure ?



Answer: D

Question 47

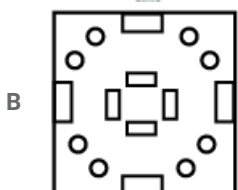
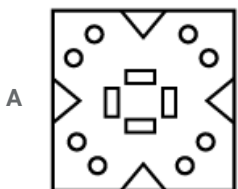
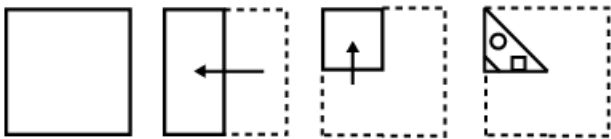
From the given answer figures, select the one in which the question figure is hidden/embedded.

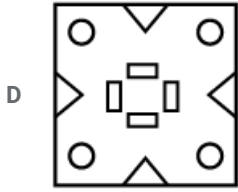
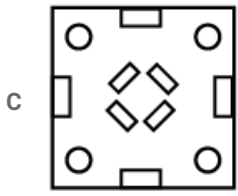


Answer: C

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.

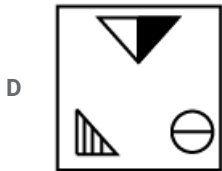
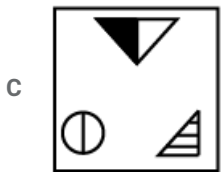
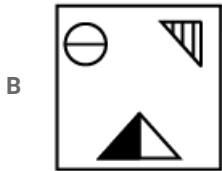
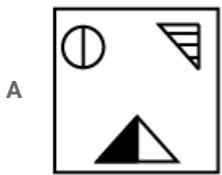
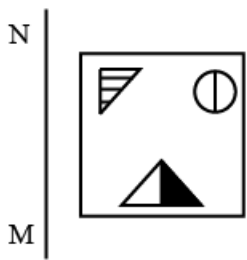




Answer: A

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: A

Question 50

A word is represented by only one set of numbers as given in any one of the alternatives. The sets of numbers given in the alternatives are represented by two classes of alphabets as shown in the given two matrices. The columns and rows of Matrix-I are numbered from 0 to 4 and that of Matrix-II are numbered from 5 to 9. A letter from these matrices can be represented first by its row and next by its column, for example 'H' can be represented by 21, 43 etc and 'R' can be represented by 96, 87 etc. Similarly, you have to identify the set for the word 'POEM'.

Matrix I					
	0	1	2	3	4
0	A	A	L	A	B
1	C	A	F	B	C
2	J	H	F	B	K
3	F	J	A	M	L
4	I	B	B	H	E

Matrix II					
	5	6	7	8	9
5	Q	U	Y	N	Z
6	N	R	V	O	Z
7	P	N	Q	W	Q
8	X	N	R	V	V
9	X	R	V	T	O

- A 76,69,01,33
- B 56,88,23,41
- C 89,56,44,02
- D 75,68,44,33

Answer: D

General Awareness

Instructions

For the following questions answer them individually

Question 51

Depreciation of fixed assets is an example of _____.

- A deferred revenue expenditure
- B capital expenditure
- C capital gain
- D revenue expenditure

Answer: B

Question 52

Which one of the following is not a feature of monopolistic competition?

- A Large number of buyers and sellers in the market
- B Differentiated products constitute the market
- C Product in the market is homogeneous
- D Selling costs are used for sale promotion

Answer: C

Question 53

What is the maximum loan amount permissible under the MUDRA Yojana?

- A Rs. 50,000
- B Rs. 1 lakh
- C Rs. 5 lakh
- D Rs. 10 lakh

Answer: D

Question 54

As per a latest classification of countries by the World Bank India now belongs to which of the following category?

- A Upper-lower income country
- B Lower-middle income country
- C Middle-middle income country
- D Lower-upper income country

Answer: B

Question 55

As per census 2011, which state had the lowest sex ratio?

- A Punjab
- B Haryana
- C Uttar Pradesh
- D Bihar

Answer: B

Question 56

Pluralist Theory of Sovereignty emphasizes the importance of which of the followings?

- A Association
- B Monarch
- C State
- D Government

Answer: A

Question 57

In which of the following countries the system of judicial review was originated?

- A France
- B Germany

C USA

D Britain

Answer: C

Question 58

Under which article of the Indian Constitution is the District Planning Commission constituted?

A Article 243 ZD

B Article 244 ZD

C Article 242 ZD

D Article 243 ZE

Answer: A

Question 59

Which kind of majority is required for constitutional amendment in forming a new state?

A Simple

B Two-third

C Three-fourth

D Two-third plus ratification by half of all states

Answer: A

Question 60

Which officer of the Government of India has the right to take part in the proceedings of parliament of India even though he is not a member?

A Vice-President

B Attorney General of India

C Comptroller and Auditor General

D Election Commission

Answer: B

Question 61

The term 'Stupa' is associated with which of the following event of Gautam Buddha's life?

A Death

B First Sermon

C Birth

D Renunciation

Answer: A

Question 62

Who was the last ruler of the Gupta Dynasty?

- A Puru Gupta
- B Vishnu Gupta
- C Skanda Gupta
- D Kumar Gupta

Answer: B

Question 63

Where was Guru Govind Singh educated and learnt Persian?

- A Lahore
- B Amritsar
- C Patna
- D Anandpur Sahib

Answer: D

Question 64

Which of the following was the precursor of Indian National Congress?

- A Servents of Indian Society
- B Indian Association
- C Indian National Union
- D Indian League

Answer: B

Question 65

During which governor general's time was the annexation of Sindh in British State done?

- A Lord Dalhousie
- B Lord Chelmsford
- C Lord Ellenborough
- D Lord Hastings

Answer: C

Question 66

What is the second most abundant element on Earth's crust?

- A Carbon
- B Silicon
- C Oxygen
- D Hydrogen

Answer: B

Question 67

What is called a shallow stretch of river that may be crossed on feet.?

- A Ford
- B Atoll
- C Reef
- D Lagoon

Answer: A

Question 68

Which among the following is a cold-dry wind?

- A Hurricane
- B Tornado
- C Bora
- D Cyclone

Answer: C

Question 69

The man-made reservoir Gobind Sagar located in Bilaspur is situated in which of the following states?

- A Uttarakhand
- B Uttar Pradesh
- C Punjab
- D Himachal Pradesh

Answer: D

Question 70

Which among the following rivers does not flow from East to West?

- A Narmada
- B Tapti
- C Cauvery

D Mahi

Answer: C

Question 71

Which of the following historical monument has been chosen as a "Swachh Bharat Icon" by the Union Government on November 21, 2017.

A Haveli Dharampur

B Charminar

C Amaravati

D Vishwa Bharati

Answer: B

Question 72

As per a recent announcement, where will India's first Electronic Manufacturing Cluster (EMC) come up?

A Andhra Pradesh

B Maharashtra

C Rajasthan

D West Bengal

Answer: A

Question 73

Which of the following is a multilevel global campaign to spread awareness about importance of girl's education?

A Girl Rising

B Most Important Part of Our Life: Girls

C Save Girls: Educate Girls

D Education of Girls

Answer: A

Question 74

Which country will host the Summer Olympics 2020?

A Qatar

B Tokyo

C Rome

D Jakarta

Answer: B

Question 75

Which of the following sportsperson is not correctly matched with their respective discipline?

- A Jitu Rai : Shooting
- B P.V. Sindhu : Badminton
- C Sakshi Malik : Boxing
- D Deepa Karmakar : Gymnastic

Answer: C

Question 76

"A Better India : A Better World" is written by _____.

- A Arun Jaitley
- B Aamer Hussein
- C N. R. Narayan Murthy
- D C. Raja Mohan

Answer: C

Question 77

Which among the following has won the Nobel Prize for Chemistry in October 2017?

- A Jacques Dubochet
- B Joachim Frank
- C Richard Henderson
- D All options are correct.

Answer: D

Question 78

On birth anniversary of social reformer Basavana how many volumes of Vachana were released by Narendra Modi in April, 2017?

- A 21
- B 20
- C 23
- D 25

Answer: C

Question 79

In May 2017, with which country India has signed an agreement on Maritime Security?

- A Sri Lanka
- B Bangladesh
- C Mauritius
- D China

Answer: C

Question 80

Which neighbouring country of India measures prosperity by gauging its citizens' happiness level?

- A Pakistan
- B Nepal
- C Sri Lanka
- D Bhutan

Answer: D

Question 81

In which communication mode, data can be transmitted in both directions at same time?

- A Simplex
- B Full duplex
- C Half duplex
- D Multiplex

Answer: B

Question 82

The computer program that converts assembly language to machine language is called _____.

- A Compiler
- B Interpreter
- C Assembler
- D Comparator

Answer: C

Question 83

Which is a base metal of amalgam alloy?

- A Aluminium
- B Mercury

C Copper

D Zinc

Answer: B

Question 84

Which of the following is the structure of graphite?

A Rigid three-dimensional

B Hexagonal

C like Football

D No option is correct.

Answer: B

Question 85

A wooden spoon is dipped in a cup of ice cream. Its other end will _____.

A become cold by the process of conduction

B become cold by the process of convection

C become cold by the process of radiation

D not become cold

Answer: D

Question 86

Which acid is the most abundant acid found in grapes?

A Oxalic acid

B Ascorbic acid

C Tartaric acid

D Formic acid

Answer: C

Question 87

The splitting of white light into its component colours is called _____.

A diffraction

B refraction

C dispersion

D scattering

Answer: C

Question 88

Which of the following statements are CORRECT ?

- I. Change in magnetic field produces induced current.
- II. Flow of current in a conductor produces magnetic field.
- III. Magnetic field related to coil can be produced by motion between conductor and coil.

- A Only I and II
- B Only I and III
- C Only II and III
- D All statements are correct.

Answer: D

Question 89

Which gas is used as a fuel in a rocket?

- A Radon
- B Hydrogen
- C Chlorine
- D Nitrogen

Answer: B

Question 90

Which of the following is good insulator?

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

Answer: D

Question 91

Which is the most abundant Vitamin found in carrot?

- A Vitamin A
- B Vitamin B
- C Vitamin C
- D Vitamin D

Answer: A

Question 92

How the rate of absorption of water through roots can be increased?

- A Keeping the plants in the shade
- B Keeping the plants in the dim light
- C Keeping the plants under the fan
- D Covering the plants with a polythene bag

Answer: C

Question 93

A spore producing plant is _____.

- A rose
- B bread mould
- C potato
- D ginger

Answer: B

Question 94

Which chromosome is responsible for manliness in man?

- A XO
- B YO
- C XX
- D XY

Answer: D

Question 95

The human eye forms the image of an object at its _____.

- A cornea
- B iris
- C pupil
- D retina

Answer: D

Question 96

Which of the following is NOT a multicellular organism?

- A Fungi
- B Spirogyra
- C Hydra

D Paramecium

Answer: D

Question 97

Which disease is caused by cadmium metal pollution?

A Minamata

B Itai-Itai

C Asthma

D Dermatitis

Answer: B

Question 98

Which of the following is an organic gas?

A Carbon dioxide

B Carbon monoxide

C Ethylene dichloride

D Nitrogen dioxide

Answer: C

Question 99

Basel Protocol is related to which of the following?

A Ozone layer

B Burning of forests

C Sea water pollution

D Trans-boundary hazardous dumping

Answer: D

Question 100

Which of the following is parasitic food chain?

A Trees → Fruits eating birds → Lice and bugs

B Grass → Rabbit → Fox → Tiger

C Grass → Grasshopper → Frog → Snake → Hawk

D Phytoplankton → Zooplankton → Fish → Hawk

Answer: A

Instructions

For the following questions answer them individually

Question 101

The number of joints (j) which constitutes a kinematic chain can be expressed in terms of number of links (l) as _____.

A $j = \frac{3}{4}l - 2$

B $j = \frac{3}{2}l + 2$

C $j = \frac{3}{2}l - 2$

D $j = l - \frac{2}{3}$

Answer: C

Question 102

Which of the following will lead to the formation of higher pair?

A Sliding pair

B Turning pair

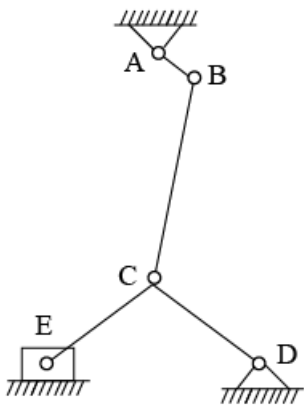
C Rolling pair

D None of these

Answer: C

Question 103

What is the degree of freedom of the mechanism shown below?



A 1

B 2

C 3

D 4

Answer: A

Question 104

Which of the following statement is TRUE regarding work done per cycle?

- A Work done per cycle is directly proportional to the mean torque
- B Work done per cycle is directly proportional to the angle turned in one revolution
- C Work done per cycle is inversely proportional to the angle turned in one revolution
- D Both Work done per cycle is directly proportional to the mean torque and Work done per cycle is directly proportional to the angle turned in one revolution

Answer: D

Question 105

The angular acceleration and the moment of inertia of the flywheel is 0.6 rad/s^2 and 2500 kg.m^2 respectively. What is the kinetic energy (in kN-m) of the flywheel after 10 seconds from the start?

- A 45
- B 450
- C 4.5
- D 4500

Answer: A

Question 106

The power transmission takes place from a pulley of diameter 1 m running at the speed of 250 rpm to a pulley of 2.50 m diameter by means of a belt. Determine the speed (in rpm) of the driven pulley?

- A 110
- B 150
- C 100
- D 625

Answer: C

Question 107

The scotch yoke mechanism is the inversion of

- A four bar link chain
- B double slider crank chain
- C single slider crank chain
- D None of these

Answer: B

Question 108

Which of the following is NOT the inversion of single slider crank chain?

- A Pendulum pump
- B Whitworth quick return motion mechanism

- C Oscillating cylinder engine
- D Elliptical trammel

Answer: D

Question 109

Which of the following theory is used in the design of clutches, when the friction linings get worn out?

- A Uniform pressure theory
- B Uniform wear theory
- C Uniform friction theory
- D None of these

Answer: B

Question 110

The equation for the calculation of torque transmitting capacity in the conical clutch as per uniform wear theory is _____.

- A $M_t = \frac{\mu P}{4 \sin \alpha} (D + d)$
- B $M_t = \frac{\mu P}{4 \sin \alpha} (D - d)$
- C $M_t = \frac{\mu P}{\sin \alpha} (D - d)$
- D $M_t = \frac{2\mu P}{\sin \alpha} (D - d)$

Answer: A

Question 111

Which of the following statement is TRUE about the length of arc of contact?

- A Inversely proportional to the module
- B Varies directly to the length of the path of contact
- C Inversely proportional to the circular pitch
- D All option are correct

Answer: B

Question 112

The profile of gears having module of 12 mm and length of arc of contact is 60 mm. What is the contact ratio of the gear profile?

- A 2
- B 1.2
- C 1.6
- D 5

Answer: C

Question 113

Which of the following is NOT the type of loaded type governor?

- A Dead weight governor
- B Spring controlled governor
- C Watt governor
- D Porter governor

Answer: C

Question 114

The types of failure involved in the analysis of the riveted joints are?

- (1) Shear failure of rivet
- (2) Tensile failure of the plate
- (3) Crushing failure of the plate

- A (1) and (2) only
- B (2) and (3) only
- C (1) (2) and (3)
- D (1) and (3) only

Answer: C

Question 115

Which of the following options is correct about the motion of the follower?

- A Uniform velocity
- B Simple harmonic motion
- C Uniform acceleration
- D All options are correct

Answer: D

Question 116

When a body is said to be in dynamic equilibrium?

- A When the body is moving with non uniform accelerations.
- B When the body is in uniform motion along a circular path.
- C When the body is in uniform motion along a straight line.
- D When the body is moving with instantaneous velocity.

Answer: C

Question 117

Which of the following term can also be used to state the dynamic equilibrium?

- A Translatory equilibrium
- B Static equilibrium
- C Kinetic equilibrium
- D Rotational equilibrium

Answer: C

Question 118

What is the direction of application of friction force with respect to the direction of motion of an object?

- A Same
- B Perpendicular
- C Opposite
- D Downward

Answer: C

Question 119

What is the S.I unit of Poisson's ratio?

- A kN/mm^2
- B N/mm^2
- C mm
- D Unitless

Answer: D

Question 120

Maximum principal stress theory was postulated by _____.

- A ST Venant
- B Mohr
- C Rankine
- D Tresca

Answer: C

Question 121

The equivalent length of the column, when both the ends are hinged is _____.

- A l
- B $\frac{l}{2}$
- C $\frac{l}{4}$

D $2l$

Answer: A

Question 122

The expression for the slenderness Ratio ratio of the columns is given as _____.

A $\left(\frac{l_e}{K_{min}}\right)^2$

B $\left(\frac{2l_e}{K_{min}}\right)^2$

C $\left(\frac{l_e}{K_{min}}\right)$

D $\left(\frac{2l_e}{K_{min}}\right)$

Answer: C

Question 123

The expression for the Rankine's crippling load is given as _____.

A $P = \frac{\sigma_c A}{1 - K\left(\frac{l_e}{K}\right)^2}$

B $P = \frac{\sigma_c A}{1 + K\left(\frac{l_e}{K}\right)^2}$

C $P = \frac{\sigma_c A}{1 - 2K\left(\frac{l_e}{K}\right)^2}$

D $P = \frac{\sigma_c A}{1 + 2K\left(\frac{l_e}{K}\right)^2}$

Answer: B

Question 124

What is the ratio of the Euler's buckling loads of column having (i) both ends fixed and (ii) one end fixed and other end free is?

A 4 : 1

B 16 : 1

C 1 : 4

D 2 : 1

Answer: B

Question 125

The thin walled cylindrical vessel has the wall thickness t and diameter d is subjected to the gauge pressure of p . If the diameter of the vessel is doubled, then what is the ratio of hoop stress as compared to initial value?

A 1 : 1

B 2 : 1

C 1 : 2

D 1 : 4

Answer: C

Question 126

A metal pipe is subjected to internal pressure of 10 kgf/cm^2 . If the permissible tensile stress in the metal is 200 kgf/cm^2 and the thickness of the pipe is 2.5 cm. What is the diameter of the metal pipe?

A 10

B 100

C 200

D 20

Answer: B

Question 127

A power transmission shaft of diameter d rotating at the speed of N rpm. The power P is related to diameter d and N as_____.

A $P \propto (Nd^3)$

B $P \propto (Nd^3)^{\frac{1}{2}}$

C $P \propto (Nd^3)^{\frac{2}{3}}$

D $P \propto (Nd^3)^{\frac{1}{3}}$

Answer: A

Question 128

Which is the correct option for the stress experienced by the shaft when the power transmission in shaft takes place through the gears?

A Varying bending and constant torsional stresses

B Constant bending and varying torsional stresses

C Torsional stress

D Bending stress only

Answer: A

Question 129

A beam of diameter 75 mm has a span length of 10 m is subjected to uniform distributed load of w kN/m. The maximum value of bending stress produced is 6.75 kN-m. What is the value of distributed load, if the beam is simply supported?

A 1.5

B 0.54

C 2

D 5.4

Answer: B

Question 130

A steel bar of dimension 10 mm x 1 mm x 1 mm is free to expand is heated from 15°C to 25°C What stress shall be developed?

- A Tensile stress
- B No stress
- C Shear stress
- D Compressive stress

Answer: B

Question 131

For a pure substance in gaseous phase to be liquefied, the gas has to undergo initial cooling below the _____.

- A critical state
- B saturated liquid line
- C saturated vapor line
- D triple point line

Answer: A

Question 132

What is the CORRECT order of decrease in entropy?

- (a) solid phase
- (b) Liquid phase
- (c) Gaseous phase

- A $(a) > (b) > (c)$
- B $(c) > (b) > (a)$
- C $(c) > (a) > (b)$
- D $(a) > (c) > (b)$

Answer: B

Question 133

The entropy always increases for an isolated system and when the equilibrium is reached, it is _____.

- A maximum
- B same as the initial starting state
- C more than initial starting state
- D zero

Answer: A

Question 134

A Carnot engine operates between T_1 and T_2 . If there is an increase in source temperature by t and a decrease in sink temperature by t . How is the efficiency in both cases is related?

- A $\eta_1 > \eta_2$
- B $\eta_1 < \eta_2$
- C $\eta_1 = \eta_2$
- D None of these

Answer: B

Question 135

In a surrounding, the amount of irreversibility of a process undergone by a system is determined by _____.

- A entropy change of the system
- B entropy change of the surrounding
- C entropy increase of the universe
- D entropy decrease of the universe

Answer: C

Question 136

In an Otto cycle, r is the compression ratio and γ is the adiabatic index. Which relation defines the air standard efficiency?

- A $\eta = 1 - \frac{1}{r^{\gamma-1}}$
- B $\eta = 1 - \frac{1}{r^\gamma}$
- C $\eta = 1 - \frac{1}{r^{\gamma+1}}$
- D $\eta = 1 - \frac{1}{r^{\gamma+1}}$

Answer: A

Question 137

For the same operating maximum pressure and temperature, which cycle will have the highest efficiency?

- A Diesel cycle
- B Dual cycle
- C Otto cycle
- D None of these

Answer: A

Question 138

The mean effective pressure of Otto cycle is given by _____.

A
$$p_m = \frac{p_1 r_k (r_p - 1) (r_k^{\gamma-1} - 1)}{(\gamma - 1) (r_k - 1)}$$

B
$$p_m = \frac{p_1 r_k (r_p - 1) (r_k^{\gamma+1} - 1)}{(\gamma + 1) (r_k - 1)}$$

C
$$p_m = \frac{p_1 r_k (r_p + 1) (r_k^{\gamma-1} - 1)}{(\gamma - 1) (r_k + 1)}$$

D
$$p_m = \frac{p_1 r_k (r_p - 1) (r_k^{\gamma+1} - 1)}{(\gamma - 1) (r_k - 1)}$$

Answer: A

Question 139

What is the state at which phase change occurs without a change in pressure and temperature is known as?

- A Critical state
- B Saturation state
- C Equilibrium state
- D None of these

Answer: A

Question 140

What value of the dryness fraction (in %) represents the dry saturated state of vapour?

- A 0
- B 25
- C 50
- D 100

Answer: D

Question 141

Which factor contributes to the efficiency of the Otto cycle?

- A Compression ratio
- B Operating pressure
- C Operating temperature
- D None of these

Answer: A

Question 142

If a Carnot refrigerator has a COP of 6. What is the ratio of the lower to the higher absolute temperature?

- A 1 - 6
- B 7 - 8

C 6 - 7

D 1 - 7

Answer: C

Question 143

Which of the below stated are properties of a PMM-2?

- (1) When net work is equal to the heat absorbed and work efficiency is 100%.
- (2) Heat is exchanged from one heat reservoir only.
- (3) It violates Kelvin-Planck statement.
- (4) It is a hypothetical machine.

A (1), (2) and (4)

B (1), (3) and (4)

C (2), (3) and (4)

D (1), (2), (3) and (4)

Answer: D

Question 144

Tonnes of refrigeration mean _____.

A the weight of the machine is one tonne.

B the weight of the refrigerant is one tonne.

C the rate of the heat extraction is one tonne.

D None of these

Answer: C

Question 145

What is the ratio W/Q (W = work transfer from cycle, Q = heat transfer to the cycle) known as?

A Air standard efficiency

B Specific consumption

C Specific work transfer

D Work ratio

Answer: A

Question 146

What processes does Carnot cycle consist of?

A Two isothermal and two adiabatic processes

B Two isothermal and two constant volume processes

C Two isothermal and two constant pressure processes

D Two constant pressure and two constant volume processes.

Answer: A

Question 147

What is the temperature at which a system goes under a reversible isothermal process without heat transfer?

- A Absolute zero temperature
- B Critical temperature
- C Reversible temperature
- D Boiling temperature

Answer: A

Question 148

How is the thermal efficiency of an I.C engine related to compression ratio?

- A Increase
- B Decrease
- C May increase or decrease
- D Remains same

Answer: C

Question 149

All the processes in an air standard cycle are assumed to be _____.

- A adiabatic
- B irreversible
- C isothermal
- D reversible

Answer: D

Question 150

Water flows through a turbine in which due to friction there is a temperature rise from $30^{\circ}C$ to $35^{\circ}C$. If there is no heat transfer taking place during the process. What is the change in the entropy of water?

- A 0.077
- B 0.079
- C 0.406
- D 0.496

Answer: B

Question 151

In 18-4-11 HSS (high speed steel) the percentage of chromium is

- A 1%
- B 4%
- C 8%
- D 20%

Answer: B

Question 152

The pH value of neutral solution is

- A Equal to 7
- B Less than 7
- C Greater than 7
- D None of these

Answer: A

Question 153

_____ is better suited for lighter duty bearings.

- A Phosphor Bronze
- B Plastics
- C White metal
- D Monel metal

Answer: A

Question 154

_____ is not the neutral refractory material.

- A Graphite
- B Kanelite
- C Chromite
- D Dolomite

Answer: B

Question 155

_____ structure has maximum hardness.

- A Troostite
- B Pearlite
- C Martensite

D Sorbite

Answer: C

Question 156

_____ has least coefficient of expansion

A Manganin

B Invar

C Constantan

D Duralumin

Answer: B

Question 157

_____ is the essential gradient of any hardened steel.

A Carbon

B Pearlite

C Austenite

D Martensite

Answer: A

Question 158

_____ structure can be studied by naked eye.

A Atomic

B Grain

C Micro

D Macro

Answer: B

Question 159

_____ is used for bearing liner.

A Brass

B Bronze

C Gun metal

D Babbitt metal

Answer: D

Question 160

_____ is the most important element which controls the physical properties of steel.

- A Carbon
- B Chromium
- C Vanadium
- D Tungsten

Answer: A

Question 161

Practical fluids

- A are viscous
- B possess surface tension
- C are compressible
- D possess all the above properties

Answer: D

Question 162

Property of a fluid by which its own molecules are attracted is called

- A adhesion
- B cohesion
- C viscosity
- D compressibility

Answer: B

Question 163

For very great pressures, viscosity of most gases and liquids

- A remains same
- B increases
- C decreases
- D shows erratic behavior

Answer: B

Question 164

The bulk modulus of elasticity

- A has the dimensions of 1/ pressure
- B increases with pressure
- C is large when fluid is more compressible

D is independent of pressure and viscosity

Answer: B

Question 165

Which of the following statements is not true?

- A fluids are capable of flowing
- B fluids conform to the shape of the containing vessels
- C when in equilibrium, fluids cannot sustain tangential forces
- D when in equilibrium, fluids can sustain shear forces

Answer: D

Question 166

The conditions of the stable equilibrium of a floating body are

- A the meta-centre should lie above the centre of gravity
- B the centre of buoyancy and the centre of gravity must lie on the same vertical line
- C a righting couple should be formed
- D All options are correct

Answer: D

Question 167

A piece of metal of specific gravity 13.6 is placed in mercury of specific gravity 13.6, what fraction of its volume is under mercury?

- A the metal piece will simply float over the mercury
- B the metal piece will be immersed in mercury by half
- C whole of the metal piece will be immersed with its top surface just at mercury level
- D metal piece will sink to the bottom

Answer: C

Question 168

If the surface of the liquid is convex, then

- A cohesion pressure is negligible
- B cohesion pressure is decreased
- C cohesion pressure is increased
- D None of these

Answer: C

Question 169

Liquids transmit pressure equally in all the directions. This is according to

- A Boyle's law
- B Archimedes law
- C Pascal's law
- D Newton's formula

Answer: C

Question 170

Mercury is often used in barometer because:

- A. It is the best liquid
- B. The height of barometer will be less
- C. Its vapor pressure is so low that it may be neglected

- A Only A
- B Only B
- C Both A and B
- D Neither A nor B

Answer: C

Question 171

The losses due to sudden contraction are expressed by

- A] $\frac{V_1^2 - V_2^2}{2g}$ B] $\frac{V_2^2 - V_1^2}{2g}$ C] $\frac{(V_1 - V_2)^2}{g}$ D] $\frac{(V_1 - V_2)^2}{2g}$

- A A Only
- B B Only
- C C Only
- D None of these

Answer: D

Question 172

Cipolletti notch is designed as trapezoid with its sides sloping at 1 horizontal and

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

Answer: D

Question 173

The flow in venturi flume takes place at

- A atmospheric pressure

B at pressure greater than atmospheric pressure

C vacuum

D high pressure

Answer: A

Question 174

A hydraulic ram acts like

A a centrifugal pump

B a rotary pump

C a reciprocating pump

D an impulse pump

Answer: D

Question 175

The rise of liquid along the walls of a revolving cylinder as compared to depression at the center with respect to initial level is

A same

B more

C less

D more or less depending on speed

Answer: A

Question 176

The most economical section of a rectangular channel for maximum discharge is obtained when its depth is equal to

A half the breadth

B twice the breadth

C same as the breadth

D three-fourth of the breadth

Answer: A

Question 177

In case of a two dimensional flow the components of velocity are given by $u = ax; v = by$, the point where no motion occurs, is known as

A critical point

B neutral point

C stagnation point

D None of these

Answer: D

Question 178

The head loss in case of hot water flow through a pipe compared to cold water flow will be

- A same
- B more
- C less
- D more or less depending on range of temperatures

Answer: C

Question 179

Maximum efficiency of transmission of power through a pipe is

- A 0.25
- B 0.3333
- C 0.5
- D 0.6667

Answer: D

Question 180

In the case of turbulent flow

- A it occurs in open channel
- B losses are proportional to square of velocity
- C velocity at boundary is zero
- D shear stresses are more compared to laminar flow

Answer: D

Question 181

Hydraulic grade line for any flow system as compared to energy line is

- A above
- B below
- C at same level
- D may be below or above depending upon velocity of flow

Answer: B

Question 182

For maximum discharge through a circular open channel, the ratio of depth of flow to diameter of channel should be

- A 0.7
- B 0.5
- C 0.65
- D None of these

Answer: D

Question 183

A triangular section in open channel flow will be most economical when the vertex angle at the triangle base point is

- A 30 degree
- B 50 degree
- C 20 degree
- D None of these

Answer: D

Question 184

The value of coefficient of velocity depends upon

- A slope of orifice
- B size of orifice
- C head of liquid above orifice
- D friction at the orifice surface

Answer: D

Question 185

The discharge through an orifice fitted in a tank can be increased by

- A fitting a short length of pipe to the outside
- B sharpening the edges of orifice
- C fitting a long length of pipe to the outside
- D fitting a long length of pipe to the inside

Answer: A

Question 186

Total pressure on the top of a closed cylindrical vessel completely filled with liquid, is directly proportional to

- A radius
- B square of radius
- C cube of radius

D None of these

Answer: D

Question 187

If flow in an open channel is gradually varied, then the flow will be

A steady uniform flow

B unsteady uniform flow

C steady non-uniform flow

D unsteady non-uniform flow

Answer: C

Question 188

The energy loss in flow through nozzle as compared to venturimeter is

A same

B more

C less

D unpredictable

Answer: B

Question 189

Orifice is an opening

A with closed perimeter and of regular form through which water flows

B with prolonged sides having length of 2 to 3 diameters of opening in thick wall

C with partially full flow

D in hydraulic structure with regulation provision

Answer: A

Question 190

The value of coefficient of discharge in comparison to coefficient of velocity is

A more

B less

C same

D unpredictable

Answer: B

Question 191

Heating of dry steam above saturation temperature is known as

- A enthalpy
- B superheating
- C super saturation
- D latent heat

Answer: B

Question 192

The specific heat of superheated steam in kcal/kg is generally of the order of

- A 0.1
- B 0.3
- C 0.5
- D 0.8

Answer: C

Question 193

Adiabatic process is

- A essentially as isentropic process
- B non-heat transfer process
- C reversible process
- D constant temperature process

Answer: B

Question 194

The diameter (in cm) of Cornish boiler is of the order of

- A 1 to 2
- B 1.5 to 2.5
- C 2 to 3
- D 2.5 to 3.5

Answer: A

Question 195

Which of the following boilers is best suited to meet fluctuating demands?

- A babcock and wilcox
- B locomotive
- C Lancashire

D Cochran

Answer: B

Question 196

An engine indicator is used to determine the following

A speed

B temperature

C volume of cylinder

D None of these

Answer: D

Question 197

Diesel fuel, compared to petrol is

A less difficult to ignite

B just about the same difficult to ignite

C more difficult to ignite

D highly ignitable

Answer: C

Question 198

The fuel air ratio in a petrol engine fitted with suction carburetor, operating with dirty air filter as compared to clean filter will be

A higher

B lower

C remain unaffected

D unpredictable

Answer: D

Question 199

Which of the following is the lightest and most volatile liquid fuel?

A. 6 : 1

B. 9 : 1

C. 12 : 1

D. 15 : 1

A Only A

B Only B

C Only C

D Only D

Answer: D

Question 200

Ignition quality of petrol is expressed by

- A** octane number
- B** cetane number
- C** calorific value
- D** self-ignition temperature

Answer: A