



DMRC Civil Engineering Paper-1 2014

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DMRC Civil Engineering Paper-1 2014

Instructions

From among the five doctors 1, 2, 3, 4 and 5, four engineers G, H, K, L and six teachers M, N, O, P, Q and R, some teams are to be selected. Of these 1, 2, G, H, O, P, Q are females and the rest are males. The formation of teams is subject to the following conditions:

Wherever there is a male doctor, there will not be a female teacher. Wherever there is a male engineer, there will not be a female doctor. There shall not be more than two male teachers in any team.

Question 1

If the team consists of two doctors, two female teachers and two engineers, then all the following teams are possible except:

- A 1, 2, K, L, P, Q
- B 1, 2, G, H, P, Q
- C 1, 2, G, H, O, Q
- D O, P, G, H, 1, 2

Answer: A

Question 2

If the team consists of two doctors, three female teachers and two engineers, then the members of the team are:

- A 3, 4, O, P, Q, G, H
- B 1, 2, O, P, Q, G, H
- C 3, 4, K, L, O, P, Q
- D 4, 5, G, H, O, P, Q

Answer: B

Question 3

If the team consists of three doctors, two male engineers and two teachers, then the members of the team could be:

- A 3, 4, 5, K, L, M, N
- B 1, 2, 3, K, L, M, R
- C 3, 4, 5, K, L, P, R
- D 1, 2, H, M, R, P, Q

Answer: A

Instructions

For the following questions answer them individually

Question 4

Oxygen was discovered by:

- A Priestly
- B Boyle
- C Scheele

D Cavendish

Answer: A

Question 5

Which Article of the constitution of India restricts courts not to inquire into proceedings of Parliament:

A Article 122

B Article 120

C Article 123

D Article 119

Answer: A

Question 6

A person shall be disqualified for being a member of either house of parliament if he is so disqualified under Tenth schedule. Under Tenth schedule the person shall be disqualified for following reason:

A If he holds any office for profit

B If is an un-discharged insolvent

C If he is of unsound mind

D On the Grounds of defection

Answer: D

Question 7

Which of the following is a clay mineral?

A Garnet

B Olivine

C Kaolinite

D Hornblende

Answer: C

Question 8

Who was given golden boot award at the conclusion of FIFA World Cup 2014?

A Paul Pogba

B Manuel Neuer

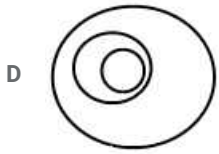
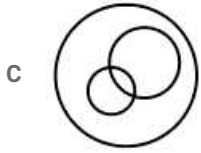
C James Rodriguez

D Lionel Messi

Answer: C

Question 9

Which figure represents the relationship between polygons, quadrilaterals and triangles?



Answer: C

Question 10

To which ocean the Panama Canal joins the Atlantic Ocean?

- A Pacific Ocean
- B Indian Ocean
- C Arctic Ocean
- D Caspian Sea

Answer: A

Question 11

A candidate gets 72% votes out of total votes and he wins by a margin of 264 votes. Total vote and vote polled for elected candidate are respectively:

- A 800, 432
- B 600, 168
- C 600, 432
- D 830, 576

Answer: C

Question 12

A lawn is in the form of a rectangle having its sides in the ratio 2:3. The area of the lawn is 600 sq. metres. Find the length of the lawn?

- A 20 m
- B 30 m
- C 25 m

D None of these

Answer: B

Question 13

"Char Baans Chobis Guz, aangal asht pravan, taa upar sultan hai, mat chooko Chauhan". Who said this?

A Prithvi Raj Chauhan

B Chandbardai

C Birbal

D Tansen

Answer: B

Question 14

Rossetta became the first ever spacecraft to reach a comet named 67P/Churyumov - Gerasimenko. This is a mission by:

A ISRO

B ESA

C NASA

D FKA & RKA

Answer: B

Question 15

IBSA is a _____ and 7th IBSA summit will be held in _____ :

A Unilateral initiative, Brasillia

B Bilateral initiative, Tshwane

C Trilateral initiative, New Delhi

D Joint initiative of 4 nations, Kabul

Answer: C

Question 16

A rectangular field is surrounded by four semi circular flower beds. If the length and breadth of the field are 6 m and 4 m respectively, find the cost of raising the flower beds at the rate of Rs. 8/- per M². ($\pi = 3.14$):

A Rs. 623.56

B Rs. 326.56

C Rs. 1306.24

D None of these

Answer: B

Question 17

When three coins are tossed together, the probability that all coins have the same face is:

A $\frac{1}{4}$

B $\frac{1}{6}$

C $\frac{1}{3}$

D None of these

Answer: A

Question 18

According to the world investment report 2014, released by UNCTAD in June, 2014, India latest ranking of most favoured destination for investment by transnational corporation is:

A Fourth

B Third

C Second

D First

Answer: A

Question 19

Dr. Sanjay Rajaram to be honoured with World Food Prize, 2014 for his outstanding work in improvement of:

A Paddy crop

B Wheat crop

C Vegetable varieties

D Soyabean crop

Answer: B

Question 20

A sum of Rs. 8000 generates Rs. 1261 as compound interest in 3 years, interest being compounded annually. The rate of compound interest is:

A 20%

B 2.5%

C 10%

D 5%

Answer: D

Question 21

Total weight of 3 boxes is $60\frac{1}{2}$ Kg. 2nd box weighs $3\frac{1}{2}$ Kg more than 1st box. The 3rd box weighs $2\frac{1}{2}$ Kg more than 2nd box. The weight of 1st box is:

A 36 kg

- B 17 kg
- C 18 kg
- D None of these

Answer: B

Question 22

12 men and 18 boys working $7\frac{1}{2}$ hours a day can do a work in 60 days. If one man works equal to 2 boys, then the number of boys required to help 21 men to do twice the work in 50 days working 9 hours a day will be:

- A 42
- B 44
- C 46
- D None of these

Answer: A

Question 23

The diameter of the wheel of a car is 77 cm. How many revolutions will it make to travel 121 km?

- A 24200
- B 30000
- C 50000
- D 42500

Answer: C

Question 24

$5625 \div 75 + \sqrt{x} = 96$. Find x.

- A 361
- B 400
- C 441
- D 484

Answer: C

Question 25

A is shorter than B but much taller than E. C is the tallest and D is little shorter than A. Who is the shortest?

- A A
- B E
- C C

D D

Answer: B

Question 26

Ebola Virus Disease (EVD) is a severe human disease and has been declared as 'Global Health Emergency' by WHO. Ebola virus takes its name from a:

- A Fruit of a democratic republic of congo
- B Catholic nun in congo
- C River in democratic republic in congo
- D Animal in democratic republic of congo

Answer: C

Question 27

If Southeast becomes 'North'. Northeast becomes 'West', then what will west become?

- A South east
- B North west
- C North east
- D South west

Answer: A

Question 28

In how many different ways the letters of the word 'DIGITAL' can be arranged so that the vowels always come together?

- A 720
- B 480
- C 144
- D 360

Answer: D

Question 29

25 men can reap a field in 20 days. When should 15 men leave the work, if the whole field is to be reaped in 37.5 days after they leave the work?

- A 6 days
- B 3 days
- C 5 days
- D 4 days

Answer: C

Question 30

Twelve solid spheres of the same size are made by melting a solid metallic cylinder of base diameter 2 cm and height 16 cm. The diameter of each sphere is:

- A 2 cm
- B 3 cm
- C 4 cm
- D 6 cm

Answer: A

Question 31

There are seven colours in a rainbow in a particular sequence. Besides the known sequence in how many other possible ways can rainbows be formed by re-sequencing the colours:

- A 5040
- B 5041
- C 5039
- D 5049

Answer: C

Question 32

The difference between the length and breadth of a rectangle is 23 m. If its perimeter is 206 m, then its area is:

- A $2520 m^3$
- B $2480 m^3$
- C $2420 m^3$
- D None of these

Answer: A

Question 33

The average of 8 numbers is 14. The average of 6 of these numbers is 16. What is the average of the remaining 2 numbers?

- A 12
- B 6
- C 8
- D 10

Answer: C

Question 34

Six families A, B, C, D, E, and F are living in houses in a row. B has F and D as neighbours, E has A and C as neighbours. A does not live next to either F or D, C does not live next to D. Who are F's next door neighbours?

- A B and E
- B B and D
- C B and C
- D Only B

Answer: C

Question 35

If Ranchi is called Delhi, Delhi is called Mumbai, Mumbai is called Dehradun, Dehradun is called Nagpur and Nagpur is called Meerut then where is the Gate way of India?

- A Meerut
- B Dehradun
- C Nagpur
- D Mumbai

Answer: B

Question 36

If 'MEDICAL' is written as 'DEMILAC' how is 'SUBJECT' written in that code?

- A BUSJETC
- B BUSTCTE
- C BUSJTCE
- D BUJSCTE

Answer: C

Question 37

Union finance minister announced to set up an expenditure Management Commission in the union budget 2014-15. Union Govt. recently decided to appoint head of the expenditure Management Commission:

- A Vimal Jalan
- B Vijay Kelkar
- C K.P. Geethakrishnan
- D Parthsarathi Shome

Answer: A

Question 38

Arjun is Arvind's brother. Swati is Arvind's mother. Prakash is Swati's father. Malti is Prakash's mother. How Arjun is related to Malti?

- A Grand Son
- B Great Grand Son

- C Son
- D Cannot be determined

Answer: B

Question 39

In a certain code 'bad and good' is written as '325', 'two and none' is written as '462' and 'that is bad' is written as '159'. How would 'good' be written in that code?

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

Answer: B

Question 40

Pick the odd one out.

- A E
- B I
- C A
- D H

Answer: B

Question 41

Select the suitable alternative to satisfy the relationship.

Arctic : Antarctic :: Cancer :

- A Disease
- B Capricorn
- C Population
- D Equator

Answer: B

Question 42

Find the wrong number in the series.

12, 237, 406, 527, 604, 657

- A 406
- B 604
- C 657
- D None of these

Answer: B

Question 43

Select the choice that represents the given number the best.

1 7 2 5 5 5 2:

- A N P N R R R S
- B A B C D E F F
- C N N P Q Q R S
- D A B C D D D C

Answer: D

Question 44

The equator does not pass through which of the following countries:

- A Kenya
- B Mexico
- C Indonesia
- D Brazil

Answer: B

Question 45

How many countries are members of the SAARC organization?

- A 10
- B 9
- C 8
- D None of these

Answer: C

TECHNICAL (APTITUDE)

Instructions

For the following questions answer them individually

Question 46

The resultant of two forces each equal to P and acting at right angles is:

- A $\frac{P}{\sqrt{2}}$
- B $\frac{P}{2}$
- C $\frac{p}{2\sqrt{2}}$
- D $\sqrt{2}p$

Answer: D

Question 47

Which of the following is a scalar quantity?

- A Force
- B Speed
- C Velocity
- D Acceleration

Answer: B

Question 48

A beam extending beyond the supports is called:

- A Simply supported beam
- B Fixed beam
- C Overhanging beam
- D Continuous beam

Answer: C

Question 49

The maximum bending moment of a simply supported beam of span l and carrying a point load w at the centre of the beam is:

- A $wl/4$
- B $wl/2$
- C wl
- D $wl^2/6$

Answer: A

Question 50

The ratio of specific weight of a liquid to the specific weight of pure water at a standard temperature is called:

- A Density of liquid
- B Specific gravity of liquid
- C Compressibility of liquid
- D Surface tension of liquid

Answer: B

Question 51

The point at which the resultant pressure on a immersed surface acts, is known as:

- A Centre of Gravity
- B Centre of depth

- C Centre of pressure
- D Centre of immersed surface

Answer: C

Question 52

The hydraulic mean depth or the hydraulic radius is the ratio of:

- A Area of flow and wetted perimeter
- B Wetted perimeter and diameter of pipe
- C Velocity of flow and area of flow
- D None of these

Answer: A

Question 53

Reynolds number is the ratio of the inertia force to the:

- A Surface tension force
- B Viscous force
- C Gravity force
- D Elastic force

Answer: B

Question 54

A pelton wheel is:

- A Tangential flow impulse turbine
- B Inward flow impulse turbine
- C Outward flow impulse turbine
- D Inward flow reaction turbine

Answer: A

Question 55

The bricks should be burnt at temperature from:

- A 300° C to 500° C
- B 500° C to 700° C
- C 700° C to 1000° C
- D 900° C to 1200° C

Answer: D

Question 56

In plane surveying:

- A The curvature of the earth is taken into consideration
- B The curvature of the earth is not taken into consideration
- C The degree of accuracy of surveys is high
- D The surveys extend over large areas

Answer: B

Question 57

Which of the following formula is used for computing the quantity of water for fire demand?

- A Freemans formula
- B Kuichling formula
- C Bustons formula
- D All of these

Answer: D

Question 58

The most common cause of acidity in water is:

- A Hydrogen
- B Oxygen
- C Carbon dioxide
- D All of these

Answer: C

Question 59

An arrangement for backwashing is provided in:

- A Slow sand filter
- B Sedimentation tank
- C Rapid sand filter
- D All of these

Answer: C

Question 60

The water content ratio of a soil is defined as the ratio of the:

- A Weight of water to the weight of solids
- B Volume of water to the volume of voids in the soil mass

C Total volume of voids to the volume of soil solids

D Total volume of voids to the total volume of soil

Answer: A

Question 61

The effective size of a soil is:

A D10

B D20

C D40

D D60

Answer: A

Question 62

Reinforced cement concrete is equally strong in taking:

A Tensile and compressive stresses

B Compressive and shear stresses

C Tensile, compressive and shear stress

D Tensile and shear stresses

Answer: C

Question 63

If σ_{cb} is the permissible stress in compression due to bending in concrete in N/mm^2 , the modular ratio (m) is of the order of:

A $\frac{280}{3} \sigma_{cb}$

B $\frac{280}{4} \sigma_{cb}$

C 19

D 23

Answer: A

Question 64

The centre to centre spacing of vertical stirrups, in a rectangular beam, is:

A Increased towards the centre of the span of the beam

B Decreased towards the centre of the span of the beam

C Increased at the ends

D None of these

Answer: A

Question 65

For one cubic meter of brick masonry, number of standard bricks required, is:

- A 400
- B 450
- C 500
- D 550

Answer: C

Question 66

The initial setting time of ordinary Portland cement, is _____ minutes:

- A 15
- B 30
- C 45
- D 60

Answer: B

Question 67

Angles of 45° with a chain line may be set out with:

- A Optical square
- B French square
- C Open cross staff
- D Prismatic square

Answer: B

Question 68

The reduced bearing of a line is N 87° W, Its whole circle bearing is:

- A 87°
- B 173°
- C 273°
- D 183°

Answer: C

Question 69

The centre of gravity of a ISA $60 \times 60 \times 6$ in the form of L, from the bottom is:

- A 7.20 mm

B 7.21 mm

C 7.22 mm

D 7.23 mm

Answer: B

Question 70

If a three hinged parabolic arch carries a uniformly distributed load on its entire span, every section of the arch resists:

A Tensile force

B Shear force

C Compressive force

D Bending moment

Answer: C

Question 71

In a loaded beam, the point of contraflexure occurs at a section, where:

A BM is zero

B BM is minimum

C BM is maximum

D SF is minimum

Answer: A

Question 72

The number of points of contra-flexure in a fixed beam carrying uniformly distributed load, is:

A 3

B 2

C 1

D 0

Answer: B

Question 73

Hydrostatic pressure on a dam depends upon its:

A Length

B Breadth

C Depth

D All of these

Answer: C

Question 74

"Cowl" is provided at:

- A Lower end of the ventilating column
- B Upper end of ventilating column
- C Upper end of the manhole
- D Lower end of manhole

Answer: B

Question 75

The rising of road towards outer radius is called:

- A Camber
- B Curve
- C Super elevation
- D Ridge

Answer: C

Question 76

Disinfection of drinking water is done to remove:

- A Odour
- B Turbidity
- C Colour
- D Bacteria

Answer: D

Question 77

The maximum pressure which a soil can carry without shear failure, is called:

- A Net safe bearing capacity
- B Safe bearing capacity
- C Net ultimate bearing capacity
- D Ultimate bearing capacity

Answer: B

Question 78

Separation of water or water sand cement from a freshly mixed concrete, is known:

- A Bleeding
- B Creeping

- C Flooding
- D Segregation

Answer: A

Question 79

Workability of concrete mix with low water cement ratio is determined by:

- A Slump test
- B Tensile test
- C Compaction factor test
- D All of these

Answer: C

Question 80

The grade of concrete not recommended by IS 456:2000, is:

- A M20
- B M60
- C M80
- D M90

Answer: D

Question 81

Le-chatelier's apparatus is used for cement testing:

- A Hardness
- B Initial setting time
- C Soundness
- D Strength

Answer: C

Question 82

In a cantilever beam, always the tension reinforcement bars are placed, at:

- A Side
- B Bottom
- C Top
- D All of these

Answer: C

Question 83

A cantilever RCC beam 230 mm × 450 mm effective depth has span 4m and carries a UDL of 500 KN/m inclusive of its selfweight, the bending moment is:

- A 1000 KNM
- B 2000 KNM
- C 3000 KNM
- D 4000 KNM

Answer: D

Question 84

An ISA 50 × 50 × 6 is welded on a gusset plate of 20 mm thick with fillet weld size 4mm, The Over all total length of weld is 100 mm, the effective length of weld is:

- A 100 mm
- B 96 mm
- C 92 mm
- D 90 mm

Answer: C

Question 85

Moment of Inertia for a circular section has 20cm diameter, is:

- A 7852 cm^4
- B 7853 cm^4
- C 7854 cm^4
- D 7855 cm^4

Answer: C

Question 86

The slenderness ratio of a steel member is:

- A Length/minimum side dimension
- B Effective length /radius of gyration
- C Effective length/corresponding radius of gyration
- D Effective length/least radius of gyration

Answer: C

Question 87

The minimum cover for bars in RCC slabs should be:

- A 15 mm
- B 15 mm or dia of bars
- C 25 mm or dia of bars
- D 15 mm or the size of the aggregate

Answer: B

Question 88

Volumetric expansion of soil due to shear in a drained shear test is called:

- A Thixotropy
- B Swelling
- C Dilatancy
- D Creep

Answer: C

Question 89

Shear stress in the Newtonian fluid is proportional to:

- A Pressure
- B Strain
- C Strain rate
- D The inverse of the viscosity

Answer: C

Question 90

A floating body is in stable equilibrium:

- A When its metacentric height is zero
- B When the centre of gravity of the body is below the centre of buoyancy
- C When its metacentre is above the centre of gravity of body
- D In none of the above situations

Answer: C

Question 91

The minimum super elevation or curves should not be less than:

- A 5%
- B 4%
- C Camber
- D None of these

Answer: C

Question 92

Which one of the following forms of chlorine has no disinfectant property:

- A Hypochlorous acid
- B Hypochlorite ion
- C Monochloramine
- D Trichloramine

Answer: D

Question 93

The most common coagulant used for sedimentation is:

- A Chlorine
- B Ferrous oxide
- C Alum
- D Ozane

Answer: C

Question 94

During leveling if back sight is more than fore sight:

- A Forward staff is at lower point
- B Back staff is at lower point
- C The difference in level can not be ascertained
- D None of these

Answer: B

Question 95

If the depth of a simply supported beam carrying an isolated load at its centre is doubled, the deflection at centre will be changed by a factor of:

- A 1
- B $\frac{1}{2}$
- C 4
- D $\frac{1}{8}$

Answer: D

Question 96

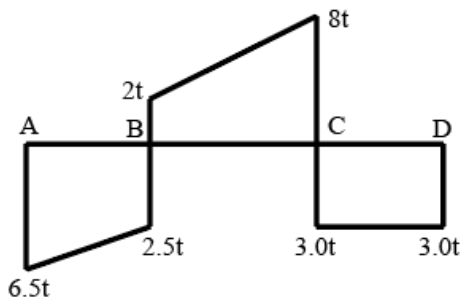
Pick up the correct statement from the following:

- A If the ratio of depth and width is less than 2 it is shallow foundation
- B If the ratio of depth and width is more than 2 it is deep foundation
- C If the ratio of the length & width is between 1 & 2, it is spread foundation
- D All of these

Answer: D

Question 97

The following figure shows the shear force diagram for a beam simply supported. The maximum BM for the loaded beam is:



- A 13.0 tm at B
- B 48 tm at C
- C 9 tm at B
- D None of these

Answer: C

Question 98

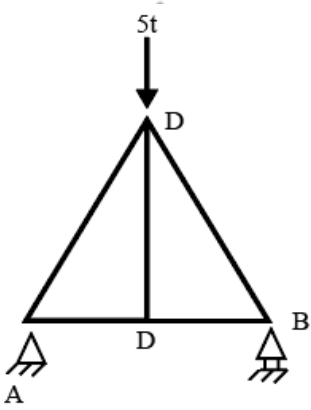
A truss which contains j joints and m members will be a simple truss if:

- A $m = 2j - 3$
- B $j = 2m - 3$
- C $m = 3j - 3$
- D $m = 3j - 2$

Answer: A

Question 99

The force in member CD of truss shown in figure is:



- A 5 t compression
- B 5 t tension
- C 2.5 t compression
- D None of these

Answer: D

Question 100

The length of a line measured with 20 m chain is found to be 400 m. If the actual length of the chain is 20.05 m, the true length of the line, is:

- A 400.5 m
- B 401.0 m
- C 399.5 m
- D 399.0 m

Answer: B

Question 101

If the area of tensile steel reinforcement is doubled, the moment of resistance of the beam increases only by about:

- A 12%
- B 22%
- C 32%
- D 42%

Answer: B

Question 102

The instrument which is used in plane tabling for obtaining horizontal and vertical distance directly without resorting to chaining, is known as:

- A Planimeter

- B Plane alidade
- C Pelescopic alidade
- D Clinometer

Answer: C

Question 103

The total pressure on the vertical face of a retaining wall acts at:

- A $h/2$ from the base
- B $h/3$ from the base
- C $2h/3$ from the base
- D $3h/4$ from the base

Answer: B

Question 104

A steel rod 50 mm in diameter, 300 cm long is subjected to a sudden pull of 10 tonnes the maximum instantaneous stress induced in the rod will be:

- A Less than 0.5 tonne / cm^2
- B Less than $0.75 \text{ tonne / cm}^2$
- C More than 1 tonne / cm^2
- D More than 2 tonne / cm^2

Answer: C

Question 105

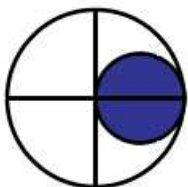
BOD represents:

- A Pollution strength of a waste
- B Pollution strength of an organic fraction of wastes
- C Pollution strength of inorganic fraction of wastes
- D Pollution strength of bio-degradable organic waste

Answer: D

Question 106

A circular hole of 50 mm diameter is cut out from a circular disc of 100 mm diameter as shown in Fig. The center of gravity of the section will lie:



- A In the bigger circle
- B In the hole
- C At center of bigger circle
- D At center of smaller circle

Answer: A

Question 107

The method of Three-moment equations is used to analyze:

- A Statically indeterminate trusses
- B Statically indeterminate frames
- C Statically determinate frames
- D Statically indeterminate multi-span beam

Answer: D

Question 108

For the purpose of foundation design, silt can be classified as:

- A Cohesionless soil
- B Limited cohesive soil
- C Highly cohesive soil
- D None of these

Answer: B

Question 109

A reinforced concrete beam is cast during a summer month when the ambient temperature is around 42°C. During the winter when the ambient temperature is around 5°C, the stress in the concrete will be:

- A Compressive
- B Compressive as well as tensile as in flexure
- C Tensile
- D The same as at the time of casting

Answer: A

Question 110

Principal Plane is a plane in a stressed body of material on which

- A Shear stress is zero
- B Shear stress is maximum
- C Shear stress is minimum

D None of the above statements is applicable

Answer: A

Question 111

Purlins are used as structural members in trussed roofs. The purlins are primarily:

- A Tension members
- B Compression members
- C Shear resisting members
- D Flexural members

Answer: D

Question 112

In a riveted connection, a minimum distance of the rivet from the edge is kept with a view to preventing failure due to

- A Shearing of rivet
- B Bearing on rivet
- C Shearing of plate
- D Tearing of plate

Answer: D

Question 113

The tie bars in a concrete pavement are provided in:

- A Contraction joints
- B Expansion Joints
- C Longitudinal joints
- D Construction joints

Answer: C

Question 114

The laboratory test to determine hardness of the road aggregates is:

- A Impact Test
- B Los Angeles Abrasion Test
- C Crushing test
- D Soundness test

Answer: B

Question 115

Allowable bearing pressure for a foundation depends on:

- A Allowable settlement only
- B Ultimate bearing capacity of soil
- C Both allowable settlement and ultimate bearing capacity
- D Neither allowable settlement nor ultimate bearing capacity

Answer: C

Question 116

The cementing property in cement is primarily due to basic material:

- A Lime
- B Silica
- C Alumina
- D Gypsum

Answer: C

Question 117

Rapid hardening cement can be obtained by:

- A Fine grinding of clinker
- B Addition of gypsum
- C Addition of calcium sulphate
- D Higher content of lime

Answer: A

Question 118

The setting time of cement can be increased by the addition of:

- A Calcium chloride
- B Hydrogen peroxide
- C Gypsum
- D Sodium

Answer: C

Question 119

The term bark in timber refers to:

- A Sap wood
- B Outermost layer
- C Cambium

D Medula

Answer: B

Question 120

Fineness modulus of sand is of order of:

A 0.3

B 3.0

C 1.3

D 30

Answer: B

