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# UPPSC-2021

UTTAR PRADESH

PUBLIC SERVICE COMMISSION 2021

**Assistant Engineer**

**Civil Engineering**

**PAPER-I**

Exam held on 29-05-2022

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Questions and Answer Keys

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# UPPSC - 2021

## Civil Engineering | Assistant Engineer

Exam held on 29-05-2022

Q.1 निम्नलिखित में से तद्भव शब्द हैं

- (a) मयंक (b) संतान  
(c) वानर (d) धूलि

Ans. (a)

Q.2 'समाज' शब्द में कौन-सा प्रत्यय जोड़कर 'सामाजिक' शब्द बना है?

- (a) ईय (b) इत  
(c) ई (d) इक

Ans. (d)

Q.3 इनमें से 'मोर' का पर्यायवाची शब्द है

- (a) अरुणशिखा (b) वारक  
(c) ताम्रचूड़ (d) कलापी

Ans. (d)

Q.4 निम्नलिखित वर्गों में 'चन्द्रमा' के सभी पर्यायवाची शब्द किस वर्ग में शुद्ध हैं?

- (a) हिमांशु, सुधांशु, सुधाकर  
(b) चाँद, हिमांशु, अर्कजा  
(c) चाँद, हिमांशु, पारावार  
(d) चाँद, हिमांशु, पद्माकर

Ans. (a)

Q.5 'वह कौन-सा मनुष्य है, जिसने महाप्रतापी भोज का नाम न सुना हो' – यह वाक्य है

- (a) समानाधिकरण वाक्य  
(b) साधारण वाक्य  
(c) मिश्र वाक्य  
(d) संयुक्त वाक्य

Ans. (c)

Q.6 एक शब्द में महाप्राण व्यंजनों का प्रयोग नहीं हुआ है

- (a) जोगन (b) घाघ  
(c) झूठ (d) खीझ

Ans. (a)

Q.7 'पर्वत के ऊपर की समतल भूमि' के लिए एक शब्द है

- (a) उपत्यका (b) पहाड़  
(c) अधित्यका (d) पठार

Ans. (c)

Q.8 'पाण्डव' शब्द में इनमें से प्रयुक्त प्रत्यय है

- (a) अव (b) व  
(c) अ (d) इनमें से कोई नहीं

Ans. (c)

Q.9 इनमें से तत्सम और तद्भव का एक युग्म गलत है

- (a) प्रिय – प्रिया (b) चुल्लि: – चूल्हा  
(c) शक्तु – सत्तू (d) खर्पर – खपरा

Ans. (a)

Q.10 निम्नलिखित में से शुद्ध वर्तनी वाला शब्द है

- (a) अनुग्रहित (b) अनग्रहीत  
(c) अग्रहित (d) अनुगृहीत

Ans. (d)

Q.11 अधोलिखित शब्द – युग्मों में से कौन-सा शुद्ध है?

- (a) पति – पत्नी (b) पति – पत्नि  
(c) पती – पतनी (d) पती – पत्नी

Ans. (a)

Q.12 अनेकार्थी शब्द 'अक्षर' का इनमें से एक अर्थ नहीं है

- (a) अंक (b) वर्ण  
(c) मोक्ष (d) अविनाशी

Ans. (a)

**Q.13** किस वर्ग की सभी ध्वनियाँ मूर्धन्य हैं?

- (a) ट, ठ, ड, ढ, ष  
 (b) क, च, ट, त, प  
 (c) ट, ठ, ड, श, स्  
 (d) ख, छ, व, थ, फ़

**Ans. (a)**

**Q.14** अर्थ और प्रयोग की दृष्टि से एक मुहावरा गलत है

- (a) खाक छानना— दर—दर भटकना।  
 प्रयोग— राम ने पहले तो पढ़ाई नहीं की, अब नौकरी के लिए खाक छान रहा है।  
 (b) आस्तीन का साँप — धोखबाज  
 प्रयोग— मैं जिसे अपना मित्र समझता था, वह आस्तीन का साँप निकला।  
 (c) ओखली में सिर देना — जान—बूझकर विपत्ति में फँसना।  
 प्रयोग— उसे कितना समझाया था कि रामसेवक के साथ मिलकर खेती मत करो लेकिन वह माना ही नहीं। उसने जान—बूझकर ओखली में सिर दे ही दिया।  
 (d) हाथ मलना — हाथ साफ करना।  
 प्रयोग— कड़ाके की सर्दी में वह अपने हाथ मल रहा था।

**Ans. (d)**

**Q.15** किस वाक्य में सकर्मक क्रिया है?

- (a) श्याम खाता है।  
 (b) साँप सरकता है।  
 (c) सूरज निकलता है।  
 (d) गाय बैठती है।

**Ans. (c)**

**Q.16** 'साझे की हाँड़ी चौराहे फूटी' कहावत का अर्थ है

- (a) भ्रमण पर जाने से कार्य बिगड़ जाता है।  
 (b) जिम्मेदारी एक व्यक्ति की हो, अन्यथा कार्य बिगड़ जाता है।

(c) सावधानी से कार्य करना।

(d) सभी बिना जवाबदेही के कार्य करें तो सफलता हाथ लगती है।

**Ans. (b)**

**Q.17** 'अश्व' का पर्यायवाची शब्द नहीं है

- (a) वाजि (b) सैधव  
 (c) वैशाखनन्दन (d) हय

**Ans. (c)**

**Q.18** 'वह (व्यक्ति) जिसने संन्यास ग्रहण किया हो' — इस वाक्यांश के लिए एक शब्द है

- (a) प्रव्राज (b) प्रव्रजित  
 (c) प्रव्रजित (d) प्रशमित

**Ans. (c)**

**Q.19** निम्नांकित शब्द — युग्मों में से विलोम शब्दों की दृष्टि से एक युग्म गलत है, वह है

- (a) हयादार — बेहया  
 (b) अभिमानी — निरभिमान  
 (c) अज्ञ — अनभिज्ञ  
 (d) सुशासन — कुशासन

**Ans. (c)**

**Q.20** निम्नलिखित में से वर्तनी की दृष्टि से कौन—सा शब्द सही नहीं है?

- (a) प्रातिनिधिक (b) आधीन  
 (c) आध्यात्मिक (d) आभ्यन्तरिक

**Ans. (b)**

**Q.21** इनमें से 'अग्नि' का पर्यायवाची शब्द नहीं है

- (a) जातवेद (b) वैश्वानर  
 (c) कान्तार (d) शाण्डिल्य

**Ans. (c)**

**Q.22** निम्नलिखित में से एक का अर्थ 'पाँवों की आहट' भी है

- (a) शरासन (b) कमान  
 (c) धनुष (d) चाप

**Ans. (a)**

**Q.23** निम्नलिखित शब्दों में से एक में उपसर्ग का प्रयोग नहीं है

- (a) कुढंग (b) कुतरना  
(c) कुडौर (d) कुर्तक

**Ans. (b)**

**Q.24** निम्नलिखित में से कौन-सा विशेषण शब्द है?

- (a) भालू (b) आलू  
(c) ढालू (d) बालू

**Ans. (c)**

**Q.25** अधोलिखित में से 'नदी' के पर्यायवाची किस वर्ग में नहीं है?

- (a) तरंगिणी, सरिता  
(b) निम्नगा, तरंगिणी  
(c) आपगा, तटिनी  
(d) जाहनवी, यियामा

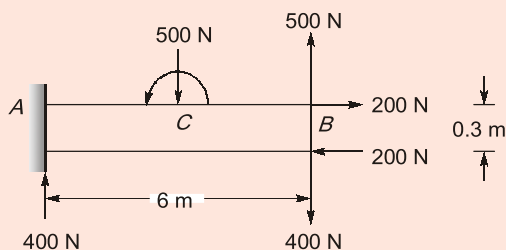
**Ans. (d)**

**Q.26** Deep beams are designed for

- (a) Bending moment only  
(b) Shear force only  
(c) Both shear force and bending moment  
(d) None of the above

**Ans. (c)**

**Q.27** Determine the net couple moment acting on the following beam shown in figure.



- (a) 960 N-m (b) 3960 N-m  
(c) 840 N-m (d) None of these

**Ans. (d)**

**Q.28** A high strength concrete generally requires a

- (a) Sand increasing agent  
(b) Water increasing agent

- (c) Sand reducing agent  
(d) Water reducing agent

**Ans. (d)**

**Q.29** Unit weight of common burnt clay bricks in  $\text{kN/m}^3$  ranges between

- (a) 9.9 – 12.35  
(b) 15.70 – 18.85  
(c) 6.85 – 14.30  
(d) 18.85 – 23.50

**Ans. (b)**

**Q.30** If an element of a specimen of brittle material is subjected to shear stress, the crack propagation if occurs, will be inclined to the sides of the element at

- (a)  $60^\circ$  (b)  $45^\circ$   
(c)  $30^\circ$  (d)  $90^\circ$

**Ans. (b)**

**Q.31** The commercially successful fibres in fibre reinforced concrete are of

- (a) Carbon (b) Asbestos  
(c) Steel (d) Glass

**Ans. (b)**

**Q.32** The slenderness ratio of component column in a latticed column is limited to

- (a) 50 (b) 250  
(c) 145 (d) 180

**Ans. (a)**

**Q.33** Pick up the incorrect statement from the following:

- (a) In the heel slab of retaining wall, reinforcement is provided at the bottom of the slab  
(b) In the stem of retaining wall, reinforcement is provided near the earth side  
(c) In the toe slab of retaining wall, reinforcement is provided at the bottom of the slab  
(d) None of the above

**Ans. (a)**

**Q.34** The area under stress-strain curve represent

- (a) Energy required to cause failure  
(b) Breaking strength of material

- (c) Hardness of material  
(d) Toughness of material

Ans. (d)

- Q.35** The plasticity characteristic of clay are due to  
(a) Free water  
(b) Adsorbed water  
(c) Capillary rise  
(d) None of the above

Ans. (b)

- Q.36** A simply supported steel beam of span 5 m carries a concentrated load of 50 kN at 3 m from left support. The beam is of circular cross-section with 100 mm diameter. Deflection under point load is  
(a)  $210/EI$  (b)  $120/EI$   
(c)  $90/EI$  (d)  $350/EI$

Ans. (b)

- Q.37** Distribution of time for project as a whole will be  
(a) Normal distribution  
(b)  $\beta$ -distribution  
(c) Both (a) and (b)  
(d) None of the above

Ans. (a)

- Q.38** Deflection in truss depends upon  
(a) Flexural rigidity  
(b) Axial rigidity  
(c) Axial and flexural rigidity  
(d) None of the above

Ans. (b)

- Q.39** In two methods A and B of a network analysis, the following methods are true about them.  
**Method A:** Project cost increases in time duration is either increased or decreased.  
**Method B:** Project cost varies directly with time. Method A and Method B are called respectively  
(a) Both are PERT  
(b) PERT, CPM  
(c) Both are CPM  
(d) CMP, PERT

Ans. (d)

- Q.40** What is the area ( $m^2$ ) of influence line diagram for the reaction at the hinged end of a uniform propped cantilever beam of span 'L' m?

- (a)  $\frac{3L}{8}$  (b)  $\frac{L}{8}$   
(c)  $\frac{L}{4}$  (d)  $\frac{L}{2}$

Ans. (a)

- Q.41** Concrete can be pumped upto a distance \_\_\_\_\_ without any loss of its property.

- (a) 350 m (b) 100 m  
(c) 250 m (d) 150 m

Ans. (d)

- Q.42** Internal radius of the bend for hooks of deformed bar should be for mild steel

- (a) 6 times the diameter of bar  
(b) 2 times the diameter of bar  
(c) 4 times the diameter of bar  
(d) 3 times the diameter of bar

Ans. (c)

- Q.43** In a particular material, if the modulus of rigidity is equal to the bulk modulus, then Poisson's ratio will be

- (a)  $\frac{2}{3}$  (b)  $\frac{1}{8}$   
(c)  $\frac{1}{2}$  (d)  $\frac{1}{4}$

Ans. (b)

- Q.44** How many times the compactive energy is used in IS heavy compaction test in comparison to IS light compaction test?

- (a) 1.56 (b) 4.56  
(c) 2.56 (d) 3.56

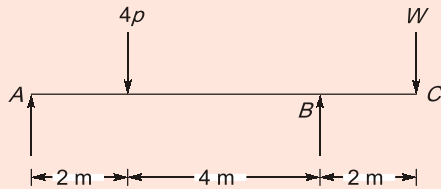
Ans. (b)

- Q.45** In CPM Network, an estimate that is required to complete a job in absolute minimum time is called

- (a) Threshold estimate  
(b) Normal estimate  
(c) Minimum time estimate  
(d) Crash estimate

Ans. (d)

- Q.46** A beam ABC is simply supported at A and B with an overhang BC as shown in figure below. It carries loads as shown in figure. If both the reactions are equal, then W will be equal to



- (a)  $\frac{4p}{5}$                       (b)  $\frac{8p}{5}$   
 (c)  $\frac{5p}{4}$                       (d)  $\frac{5p}{8}$

**Ans. (a)**

- Q.47** In a fillet welded joint, the weakest area of the weld is  
 (a) Face                      (b) Toe  
 (c) Throat                      (d) Root

**Ans. (c)**

- Q.48** The angle of internal friction is least for  
 (a) Clay  
 (b) Angular grained loose sand  
 (c) Round grained loose sand  
 (d) Angular grained dense sand

**Ans. (a)**

- Q.49** Aerated concrete is provided by addition of  
 (a) Zinc sulphate  
 (b) Copper sulphate  
 (c) Sodium silicate  
 (d) Aluminium powder

**Ans. (d)**

- Q.50** Which theorem/principle may be stated as the net external forces acting on the system and the resultant reversed effective forces (internal force) are in equilibrium?  
 (a) Lami's theorem  
 (b) Varignon's theorem  
 (c) D'Alembert's principle  
 (d) None of the above

**Ans. (c)**

- Q.51** The maximum crushing values of aggregate to be used in concrete for road or runway should be  
 (a) 45%                      (b) 20%  
 (c) 30%                      (d) 25%

**Ans. (c)**

- Q.52** The ratio of intensity of stress in case of a suddenly applied load to that in case of a gradually applied load is  
 (a) 4                      (b)  $\frac{1}{2}$   
 (c) 2                      (d) 1

**Ans. (c)**

- Q.53** Minimum tension steel in RCC beam needs to be provided to  
 (a) Control excessive deflection  
 (b) Control excessive cracks  
 (c) Prevent sudden failure  
 (d) Control surface cracks

**Ans. (d)**

- Q.54** In plastic design of structures if degree of statical indeterminacy of 'j', the members of hinges 'p' required to convert the structure into mechanism is given by  
 (a)  $p = j$                       (b)  $p = j + 3$   
 (c)  $p = j + 1$                       (d)  $p = j + 2$

**Ans. (c)**

- Q.55** In case of stratified soil layers the best equation that can be adopted for computing the pressure distribution is  
 (a) Boussinesq's  
 (b) Prandtl's  
 (c) Westergaard's  
 (d) Skempton's

**Ans. (c)**

- Q.56** A load 'p' is applied to a wire of diameter 'd'. If the radius of a wire is doubled and reduced the load to half, then its Young's modulus will be  
 (a) Become one fourth  
 (b) Double  
 (c) Remain unaffected  
 (d) Halved

**Ans. (c)**

**Q.57** Crown glass is an example of

- (a) Sheet glass
- (b) Soda-lime glass
- (c) Boro-silicate glass
- (d) Lead glass

**Ans. (b)**

**Q.58** The Kernel of a short column of rectangular cross-section is a

- (a) Parallelogram
- (b) Rectangle
- (c) Rhombus
- (d) Square

**Ans. (c)**

**Q.59** The effective length of compression flange of a simply supported beam not restrained against torsion at ends is K times the span, where K is

- (a) 1.20
- (b) 0.70
- (c) 1.00
- (d) 0.85

**Ans. (a)**

**Q.60** The basic action involved in sheep foot rolling is

- (a) Vibration
- (b) Kneading
- (c) Tamping
- (d) Pressing

**Ans. (b)**

**Q.61** The probability distribution for time estimate of an activity which fits well for PERT analysis is

- (a) Normal distribution
- (b) Beta distribution
- (c) Alpha distribution
- (d) None of the above

**Ans. (b)**

**Q.62** A rectangular section with b/d ratio of 0.5 and a circular section have same area of cross-section  $10,000 \text{ mm}^2$ . The ratio of moment of resistance of rectangle to that of circle is

- (a) 0.5
- (b) 1.67
- (c) 1.0
- (d) 0.6

**Ans. (b)**

**Q.63** A solid round bar 3 m long and 5 cm in diameter is used as a strut with both ends hinged. If  $E = 2 \times 10^5 \text{ N/mm}^2$  crippling load is

- (a) 16.82 kN
- (b) 67.28 kN
- (c) 33.64 kN
- (d) 134.56 kN

**Ans. (b)**

**Q.64** For a saturated clay soil Skempton's pore pressure parameter 'B' is

- (a) 2.0
- (b) 0.1
- (c) 1.0
- (d) 0.5

**Ans. (c)**

**Q.65** The utilization of concrete in tension zone of prestressed concrete member saves concrete ranging between

- (a) 10 to 20%
- (b) 15 to 30%
- (c) 35 to 60%
- (d) 20 to 50%

**Ans. (b)**

**Q.66** Which of the following is NOT network technique of project management?

- (a) BAR CHART
- (b) PERT
- (c) UNETICS
- (d) CPM

**Ans. (a)**

**Q.67** If a particle is moving with simple harmonic motion, the velocity is \_\_\_\_ at the mean position

- (a) Maximum
- (b) Zero
- (c) Minimum
- (d) None of these

**Ans. (a)**

**Q.68** Self compacting concrete is characterized by

- (a) Rough surface finish
- (b) High powder component
- (c) Cementitious materials upto 30%
- (d) High water-powder ratio

**Ans. (b)**

**Q.69** Which of the following materials is more suitable to increase the mortar's compressive strength?

- (a) Lime
- (b) Mortar joints' profile
- (c) Sand
- (d) Portland cement

**Ans. (d)**

**Q.70** The shape factor of a triangular section is

- (a) 1.7
- (b) 1.5
- (c) 2.0
- (d) 2.3

**Ans. (d)**

**Q.71** Two circular footings of diameter  $D_1$  and  $D_2$  are resting on the surface of same purely cohesive soil. The ratio of their gross ultimate bearing capacities is



- (a)  $\frac{D_2}{D_1}$                       (b)  $\frac{D_1}{D_2}$   
 (c)  $\left(\frac{D_1}{D_2}\right)^2$                 (d) 1.0

Ans. (d)

**Q.72** Which is NOT the graphical method for locating principal axes?

- (a) Dyadic circle      (b) Mohr-circle  
 (c) Ellipse of inertia (d) Circle of inertia

Ans. (a)

**Q.73** The moment resisting capacity of the cross-section of a beam is termed as \_\_\_\_\_ of the beam.

- (a) Strength                      (b) Stiffness  
 (c) Inertia                        (d) Modulus

Ans. (a)

**Q.74** CPM Network is updated

- (a) Whenever there is difference in the planned and actual performance  
 (b) At regular intervals  
 (c) At any times  
 (d) At fixed times

Ans. (b)

**Q.75** The bond strength of concrete increases with

- (a) The quantity of concrete  
 (b) The quantity of steel  
 (c) The grade of concrete  
 (d) The tensile strength of steel

Ans. (c)

**Q.76** Effective length for batten column shall be increased by

- (a) 20%                              (b) 5%  
 (c) 15%                              (d) 10%

Ans. (d)

**Q.77** The actual neutral axis of under reinforced section is

- (a) on the critical neutral axis  
 (b) below the critical neutral axis of a balanced section  
 (c) above the critical neutral axis  
 (d) None of the above

Ans. (c)

**Q.78** The area ratio of thin wall sampler should NOT normally exceed more than

- (a) 80%                              (b) 15%  
 (c) 60%                              (d) 40%

Ans. (b)

**Q.79** The ratio of distance moved by effort to distance moved by load is called

- (a) Resistance of machine  
 (b) Mechanical advantage  
 (c) Effect ratio  
 (d) Velocity ratio

Ans. (d)

**Q.80** According to IS : 399—1963, weight of timber is specified at

- (a) 14% moisture content  
 (b) 8% moisture content  
 (c) 12% moisture content  
 (d) 10% moisture content

Ans. (c)

**Q.81** Lug angles are

- (a) Angles subjected to reversal of stress  
 (b) Provided to take heavy moment  
 (c) Angles with bulb on one leg  
 (d) Angles to reduce the length of connection

Ans. (d)

**Q.82** The maximum permissible eccentricity of a retaining wall of width 'B' to avoid failure in tension is

- (a) B/12                              (b) B/2  
 (c) B/6                                (d) B/3

Ans. (c)

**Q.83** A symmetrical parabolic arch of span 20 metres and rise 5 meters is hinged at the springings. It supports a uniformly distributed load of 2 tonnes per meter run of the span. The horizontal thrust in tonnes at each of the spring is

- (a) 0                                      (b) 8  
 (c) 20                                    (d) 16

Ans. (c)

**Q.84** To provide safety against piping failure with a factor of safety of 5, what should be the maximum permissible exit gradient for soil with specified gravity of 2.5 and porosity of 0.35?

- (a) 0.213                      (b) 0.155  
(c) 0.195                      (d) 0.167

**Ans. (c)**

**Q.85** The fixed beam AB of span 'L' has a hinge C at mid span, a concentrated load W is applied at C, what is the fixed end moment  $M_A$ ?

- (a)  $\frac{WL}{8}$                               (b) WL  
(c)  $\frac{WL}{4}$                               (d)  $\frac{WL}{2}$

**Ans. (c)**

**Q.86** The element is subjected to two equal and like stress ' $\sigma$ ' on two mutually perpendicular planes. The shape of the Mohr's circle will be

- (a) it will be a point only  
(b) a circle of radius  $2\sigma$   
(c) a circle of radius  $\sigma/2$   
(d) a circle of radius  $\sigma$

**Ans. (a)**

**Q.87** Which of the following statements are correct?

- A. Direct cost increases with duration.  
B. Direct cost decreases with duration.  
C. Indirect cost increases with duration.  
D. Indirect cost decreases with duration.  
(a) C                                      (b) A and B  
(c) B                                      (d) B and C

**Ans. (d)**

**Q.88** The diameter of the column head support of a flat slab is generally kept

- (a) 5 cm larger than column diameter  
(b) 0.25 times the span length  
(c) 4 cm larger than column diameter  
(d) 0.25 times the column diameter

**Ans. (b)**

**Q.89** As per IS : 2911 (Part III) the bulbs in piles can not be installed in \_\_\_\_\_ under water level.

- (a) Black cotton soils  
(b) Silty soils  
(c) Clay soils  
(d) Sandy soils

**Ans. (d)**

**Q.90** The forces which meet at one point, but their line of action do not lie in a plane are called

- (a) Intersecting forces  
(b) Coplanar non-concurrent forces  
(c) Non-coplanar non-concurrent forces  
(d) Non-coplanar concurrent forces

**Ans. (d)**

**Q.91** Economic saving of time results by crashing

- (a) Costliest noncritical activity  
(b) Cheapest critical activity  
(c) Costliest critical activity  
(d) Cheapest noncritical activity

**Ans. (b)**

**Q.92** A column bearing truss in an open industrial shed is of 6 m height between its own base and bottom of the truss, what is the effective height of the column taken for calculation of compressive strength?

- (a) 9.0 m                              (b) 4.8 m  
(c) 7.2 m                              (d) 6.0 m

**Ans. (b)**

**Q.93** A load of 16 kN/m<sup>2</sup> is uniformly distributed over a circular area of 6 m diameter at the ground surface. The vertical stress at a point P, which is a depth of 5 m directly below the centre of the loaded area will be

- (a) 3.45 kN/m<sup>2</sup>                      (b) 5.35 kN/m<sup>2</sup>  
(c) 6.45 kN/m<sup>2</sup>                      (d) 7.35 kN/m<sup>2</sup>

**Ans. (b)**

**Q.94** The shape of the influence line diagram for horizontal thrust in a symmetrical three hinged parabolic arch is

- (a) Rectangular                      (b) Parabolic  
(c) Triangular                      (d) Trapezoidal

**Ans. (c)**

**Q.95** Stability of brick wall is NOT checked for

- (a) Against overturning  
(b) Against sliding  
(c) Against stress  
(d) None of these

**Ans. (c)**

- Q.96** Sinking effort in well foundation is the ratio of weight of well steining to that of skin friction developed on the sides and should preferably be
- (a) More than two (b) Less than one  
(c) More than one (d) Equal to one

Ans. (c)

- Q.97** Ball A of mass 2 kg moving with a velocity of 2 m/s, strikes directly on a ball B of mass 4 kg at rest. The ball A, after striking comes to rest. Find the coefficient of restitution after the collision.
- (a) 1.00 (b) 0.5  
(c) 0.67 (d) 0.33

Ans. (b)

- Q.98** Factor of safety against stability of the footing which dead load, live load and earth pressure are considered for shallow foundation
- (a) >1.75 against sliding  
(b) <1.75 against sliding  
(c) < 2.0 against overturning  
(d) None of the above

Ans. (a)

- Q.99** For a singly reinforced balanced section,  $M_{u,lim} = R_{u,lim} bd^2$  for  $M_{20}$  concrete and Fe415 steel  $R_{u,lim}$  is
- (a) 2.978 (b) 1.995  
(c) 2.761 (d) 2.660

Ans. (c)

- Q.100** A simply supported beam of span 'L' carrying a UDL of W per unit length. If the beam is propped at its centre then in bending moment diagram, the bending moment is zero at a distance of
- (a)  $\frac{3l}{2}$  from both ends  
(b)  $\frac{2l}{8}$  from both ends  
(c)  $\frac{3l}{4}$  from both ends  
(d)  $\frac{3l}{8}$  from both ends

Ans. (d)

- Q.101** A soil sample having a void ratio of 1.3, water content of 50% and specific gravity of 2.60 is in a state of
- (a) Moist (b) Dry  
(c) wet (d) Saturated

Ans. (d)

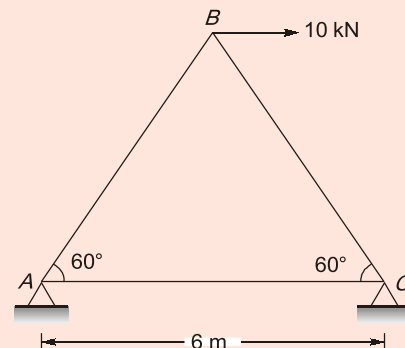
- Q.102** Baluster in staircase is the \_\_\_\_\_ member supporting \_\_\_\_\_.
- (a) Vertical, hand rail  
(b) Horizontal, hand rail  
(c) Horizontal, landing  
(d) Vertical, landing

Ans. (a)

- Q.103** Differential settlement for isolated foundation of plastic clay in case of RCC structure
- (a) 0.0025 L (b) 0.0015 L  
(c) 0.0035 L (d) None of the above

Ans. (b)

- Q.104** What is the force in the member BC of the plane frame shown below?



- (a) Zero  
(b) 10 kN tensile force  
(c) 5.76 kN compressive force  
(d) 10 kN compressive force

Ans. (d)

- Q.105** Blast furnace slag has approximately
- (a) 25% calcium sulphate and 15% alumina  
(b) 45% calcium oxide and 35% silica  
(c) 25% magnesia and 15% silica  
(d) 50% alumina and 20% calcium oxide

Ans. (b)

- Q.106** A compacting factor of 0.88 for a fresh concrete sample indicates a mix of

- (a) very low workability
- (b) high workability
- (c) low workability
- (d) medium workability

Ans. (d)

**Q.107** Multi under reamed piles are generally provided in

- (a) Gravelly sandy soil
- (b) Silty soil
- (c) Expansive clayey soil
- (d) Sandy soil

Ans. (c)

**Q.108** The strain energy stored by an elastic member subjected to bending is given by

- (a)  $\int \frac{M^2 dx}{4EI}$
- (b)  $\int \frac{M^2 dx}{EI}$
- (c)  $\int \frac{M^2 dx}{3EI}$
- (d)  $\int \frac{M^2 dx}{2EI}$

Ans. (d)

**Q.109** In PERT analysis, the probability of completion of the project in 40 days will be (given: earliest expected time,  $T_E$  of last event is 40 days)

- (a) 0%
- (b) 100%
- (c) Less than 100%
- (d) 50%

Ans. (d)

**Q.110** As per IS : 10262-2019; the water to powder ratio is expected to be between \_\_\_\_\_ for designing of self compacting concrete mix.

- (a) 0.85 - 1.10
- (b) 0.55 - 0.95
- (c) 0.80 - 1.00
- (d) 0.60 - 1.00

Ans. (a)

**Q.111** In the presence of sea water and soils and water of corrosive characters, the cover over structural members should be increased by

- (a) 15 mm
- (b) 8 mm
- (c) 12 mm
- (d) 20 mm

Ans. (d)

**Q.112** When water content in a soil is reduced beyond the shrinkage limit, the soil will be in a

- (a) Liquid state
- (b) Solid state
- (c) Plastic state
- (d) Semi solid state

Ans. (b)

**Q.113** Two people weighing 'W' each are sitting on a plank of length 'L' floating on water at  $\frac{L}{4}$  from either end, neglecting the weight of plank the bending moment at centre of plank is

- (a) Zero
- (b)  $\frac{WL}{16}$
- (c)  $\frac{WL}{8}$
- (d)  $\frac{WL}{12}$

Ans. (a)

**Q.114** Piping in soil occurs, then

- (a) Soil is highly stratified
- (b) Soil is high porous
- (c) Effective pressure becomes zero
- (d) Sudden change in permeability

Ans. (c)

**Q.115** The main reinforcement of a RCC slab consists of 10 mm bar at 100 mm spacing. If it is desired to replace 10 mm bars by 12 mm bars, then spacing of 12 members should be

- (a) 160 mm
- (b) 120 mm
- (c) 140 mm
- (d) 150 mm

Ans. (c)

**Q.116** A three hinged arch supported at different levels is

- (a) Geometrically unstable
- (b) Statically indeterminate by 1 degree
- (c) Statically determinate
- (d) Statically indeterminate by 2 degree

Ans. (c)

**Q.117** In fire proof paints, the main constituent is

- (a) Asbestos fibre
- (b) Aluminium powder
- (c) Copper powder
- (d) Red lead

Ans. (b)

**Q.118** A tie bar 50 mm × 8 mm is to carry a load of 80 kN. A specimen of the same quality steel of cross sectional area is 250 mm<sup>2</sup>. For a maximum load of 125 kN carried by the specimen, the factor of safety in the design will be

- (a) 1.5
- (b) 3.0
- (c) 2.0
- (d) 2.5

Ans. (d)

Q.119 Critical activities have

- (a) Zero float
- (b) Maximum float
- (c) Negative float
- (d) Minimum float

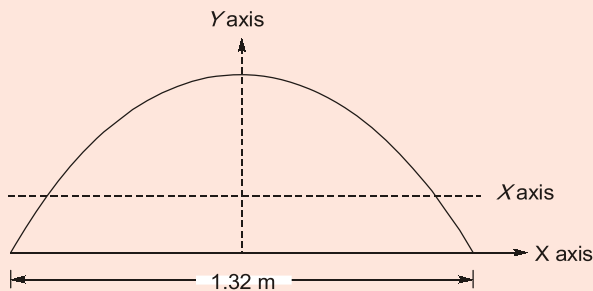
Ans. (d)

Q.120 Age factor for gain in strength of concrete with age after 6 months is

- (a) 1.20
- (b) 1.00
- (c) 1.15
- (d) 1.1

Ans. (c)

Q.121 The Y axis of centre of gravity of semicircular plate 1.32 m diameter from its base as shown in figure.



- (a) 0.14 m
- (b) 0.21 m
- (c) 0.28 m
- (d) None of these

Ans. (c)

Q.122 The most efficient section to resist bending stress is

- (a) Circular section
- (b) Rectangular section
- (c) T-section
- (d) I-section

Ans. (d)

Q.123 For placing of concrete under water, which principal technique(s) is NOT used?

- (a) Packer's method
- (b) Tremie method
- (c) Prepacked concrete method
- (d) Bucket method

Ans. (a)

Q.124 If  $M_t$  is torsional moment,  $T_U$  is the bending moment and  $M_U$  is factored bending moment at the cross section. Flexural compression reinforcement is provided in structural member, when

- (a)  $M_t = M_U$
- (b)  $M_t > M_U$
- (c)  $M_t < M_U$
- (d) None of these

Ans. (b)

Q.125 If ' $I_b$ ' is moment of inertia of the rolled beam section, ' $A_p$ ' is the area of cover plates in one flange and ' $h$ ' is the distance between the centroid of the top and bottom flange plates, moment of inertia of built up plate girder is given by

- (a)  $I = I_b + A_p \left(\frac{h}{2}\right)^2$
- (b)  $I = I_b + 2A_p \left(\frac{h}{2}\right)^2$
- (c)  $I = I_b + 2A_p \left(\frac{h}{2}\right)$
- (d)  $I = I_b + 2A_p \left(\frac{h}{2}\right)^3$

Ans. (b)

