Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: CE352

Course Name: COMPREHENSIVE EXAM (CE)

Max. Marks: 50 Duration: 1 Hour

Instructions

(1) Each question carries one mark. No negative marks for wrong answers

(2) Total number of questions: 50

(3) All questions are to be answered. Each question will be followed by 4 possible answers of which only ONE is correct.

(4) If more than one option is chosen, it will not be considered for valuation.

(5) Calculators are not permitted

1 Find the distance travelled if $r(t) = (1 - 3sint)i + 3costj, 0 \leq t \leq \pi$.

(A) 0 (B) 3π (C) 2π (D) 4π

2 If y=x is a solution of $x^2y^{II}+xy^{I}-y=0$,then the second linearly independent solution is :

(A) x^2 (B) x^{-2} (C) x^{-1} (D) x^n

3 Moment of inertia of a triangular section of base (*b*) and height (*h*) about an axis passing through its C.G. and parallel to the base, is :

(A) $bh^3/4$ (B) $bh^3/8$ (C) $bh^3/12$ (D) $bh^3/36$

4 The angle between two forces when the resultant is maximum and minimum respectively are :

(A) 0^o and 180^o (B) 180^o and 0^o (C) 90^o and 180^o (D) 90^o and 0^o

5 If front and top view of a point lie above the reference line, in which quadrant the point lies ?

(A) First quadrant (B) Second First quadrant

(C) Third First quadrant (D) Fourth First quadrant

6 In an isometric projection all horizontal lines of the object are represented by lines inclined at an angle of ……. to horizontal

(A) 20^o (B) 30^o (C)40^o (D) 45^o

7 Which of the following is not a green house gas ?.

(A) CO_2 (B) H_2S (C) O_3 (D) CH_4

8 As per LEED certification, the platinum scale for building design and construction phase is

(A) 40-49points (B) 50-59 pointS

(C) 60-79 points (D) greater than or equal to 80 points

9 Which manufacturing technique is based on the principle of "Seeing what is out there"?.

(A) Concurrent Engineering (B) Value Engineering

(C) Reverse Engineering (D) Prototype Engineering

10 The concept of the high speed trains, Shinkansen Bullet Trains, was inspired by :

(A) The kingfisher (B) Shark skin

(C)The burr seed (D) The Gecko feet

11 Yield point of brittle material can be ascertained by drawing a line parallel to the stress-strain curve at

(A) 0.2 % of max strain (B) 2 % of max strain

(C) 5 % of max strain (D) 10 % of max strain

12 If the modulus of elasticity for a material is 250 GN/m^2 and Poisson's ratio is 0.25, the modulus of rigidity of the material is

(A)250 GN/m^2 (B) 125 GN/m^2 (C)100 GN/m^2 (D) 65 GN/m^2

13 For a given shear force, across a symmetrical I section, the intensity of shear stress is maximum at the

(A)extreme fibres

(B) centroid of the section

(C)at the junction of the flange and the web, but on the web

(D)at the junction of the flange and the web, but on the flange

14 If w is the load intensity, F the shear force and M the bending moment, which of the following relationship is correct?

(A) dF/dx=M (B) dw/dx=F (C) dM/dx=w (D)dF/dx=w

15 . In a thin cylinder of diameter d and thickness t, subjected to internal pressure p, the hoop stress developed is given by

(A) pd/4t (B) pd/2t (C) pd/8t (D) pd/6t

16 In a shaft subjected to pure twist, the maximum shear stress occurs at

(A)Centre of section (B)mid radius

(C) ¾ radius from centre (D)surface

17 The ratio of Euler buckling load for two columns with same material and geometric parameters having (i) both ends fixed and (ii) both ends pinned is

(A)2 (B) 4 (C) 1/8 (D) 8

18 Pressure of 10m head of water is ……

(A). 9.81kN/m^2 (B) 98.1kN/m^2 (C) 981 kN/m^2 (D) 9810 kN/m^2

19 The flow of a liquid at constant rate in a conically tapered pipe is classified as :

(A) Steady, non-uniform flow (B) steady, uniform flow

(C) unsteady, uniform flow (D) unsteady, non-uniform flow

20 A Pitot tube is used to measure :

(A)) discharge (B) pressure head

(A) velocity (D) energy

21 Coconut oil has ……viscosity when compared with water

(a) Lower (b) equal (c) higher (d) None of these

22 For stable equilibrium of a floating body, its metacentre

(A) coincides with centre of gravity(B) is below the centre of gravity

(C) is above the centre of gravity(D)None of above

23 When a mouth piece is fitted, the discharge through an orifice :

(A) Increases (B) Decreases (C) No change (D)No discharge

24 A Cipolletti weir has a side slope of

(A) 1 Vertical : 4 Horizontal (B) 1 Vertical : 2 Horizontal

(C) 1 Horizontal : 4 Vertical(D) 1 Horizontal : 2 Vertical

25 Degree of indeterminacy of a pin supported portal frame :

(A) 1(B) 2(C) 3(D) 4

26 A pin jointed plane truss with m number of members and j number of joints, is unstable if :

(A) $(m+3) < 2j$ (B) $(m+3) = 2j$ (C) $(m+3) > 2j$ (D) None of the above

27 Identify which among the following is not a method for finding deflections

(A) Macaulay's method (B) Mohr's area moment theorems

(C) Virtual work principles(D) Three moment theorem

28 In a two span continuous beam ABC (AB = BC, EI – constant) simply supported at the ends with a uniformly distributed load over the entire length, the maximum bending moment occurs at

(A)Mid span of AB (B) Mid span of BC

(C) a point between centre of AB and centre of BC (D)support B

29 A concentrated load W is acting at a distance of 'a' from the left hand support of a three hinged arch of span 2l and rise h hinged at the crown, the horizontal reaction at the support is

(A) Wa/h (B)Wa/(2h) (C)2W/(ah) (D)2h/(Wa)

30 A single concentrated load of 8kN rolls along a girder of 15 m span. The absolute maximum bending moment will be

(A)8 kN.m(B)15 kN.m(C) 30 kNm(D) 60 kN.m

31 Types of steel reinforcement used in concrete structures:

(A)Hot Rolled Deformed Bars (B)Mild Steel Plain bars

(C) Prestressing Steel (D)All the above

32 Curing of pavements, floors, roofs and slabs, is done by

(A)Membrane method (B)Ponding method

(C)Covering surface with bags (D)Sprinkling water method

33 Out the following which one is not a types of stone masonry

(A) Veneer masonry (C) Fixer Masonry

(B) Rubble Masonry (D) Ashlar Masonry

34 A volatile substance added to paint to make its application easy and smooth is known as:

(A) Base (B) Solvent (C) Vehicle (D) None of these

35 Steps that are narrower on one side than the other and are used to change the direction of the stairs without landings

(A) Trim (B)Volute (C)Winders (D)Stringer

36 Causes of Foundation failure is

(A) Poor soil preparation (B) Water problems

(C) Dry heat (D) All of the above

37 As per IS 456 nominal cover depends upon:

(A) Grade of concrete (B) Grade of steel

(C) Exposure conditions (D) Diameter of bar

38 Which type of failure is expected in over reinforced flexural members

(A) Compression failure (B) Balanced failure

(C) Tension failure (D) None of these.

39 Permissible tensile stress in M25 concrete is :

(A) 25N/mm^2 (B) 2.5 N/mm^2(C) 3.5 N/mm^2(D) 5 N/mm^2

40 Total area of side face reinforcement in a beam shall be:

(A) O,2% of web area(B) 0.1% of web area

(C) 0.12% 0f web area(D) 0.15% of web area

41 For a column effectively held in position and restrained against rotation at both ends , the effective length as per IS 456 is :

(A) 1.0L (B) 0.70L (C) 0.65L (D) 0.5L

42 The span to depth ratio of a slab simply supported and spanning in two directions shall not exceed:

(A) 25 (B) 30 (C) 35 (D) 40

43 For a two way slab the ratio of larger span to smaller span shall be :

(A) equal to 3 (B) less than 3

(C) greater than 3 (D) less than 2

44 Porosity of a soil is 1/3. Void ratio of the soil is …..

(A) 0.25 (B) 0.5 (C) 0.75 (D) 1

45 Effective stress concept was enunciated by:

(A) Cassagrande (B) Atterberg (C) Terzaghi (D) Proctor

46 Liquid limit and plastic limit of a fine grained soil are 120% and 30% respectively. As per IS the soil is classified as :

(A) CL (B) CH (C) MI (D) MH

47 Read the following statements related to IS light compaction test.

I. Soil is always compacted in 3 layers in the compaction mould.

II. Each lalyer is always given 25 blows.

Select the correct answer from among the following:

(A) Statement I is TRUE and Statement II is FALSE

(B) Statement II is TRUE and Statement I is FALSE

(C) B oth Statements are TRUE

(D) Both Statements are FALSE

48 The water level in a lake rises by 2m. The increase in effective stress at a depth of 1m below the bed level of the lake, due to above increase in water level would be (saturated unit weight of soil bed= 18kN/m^3, unit weight of water=10kN/m^3)

(A)18kPa (B) 8kPa (C) 20kPa (D) zero

49 Choose the soil property useful for estimation of rate of consolidation settlement of a clay soil:

(A) Compression index (B) Uniformity coefficient

(C) Coefficient of consolidation (D) Time factor

50 Angle of internal friction of a purely cohesive soil is :

(A) 45^o (B) 30^o (C) 0 (D) 60^o

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE COMPREHENSIVE EXAMINATION, MAY 2019

Course Code: CE352

Course name: COMPREHENSIVE EXAM (CE)

Max. Marks: 50 Duration: 1Hour

Instructions: ***(1) Each question carries one mark. No negative marks for wrong answers***
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PART A- COMMON COURSES

1. The radius of convergence of the series $\sum_{k=1}^{\infty} \frac{(x-5)^k}{k^2}$ is

   a) 1 b) 2 c) 3 d) 0

2. Solution of $y''' - y' = 0$ is

   a) $c_1 + (c_2 + c_3 x)e^x$ b) $c_1 e^x + c_2 e^{-x}$ c) $c_1 + c_2 e^x + c_3 e^{-x}$ d) $c_1 + (c_2 + c_3 x)e^{-x}$

3. A mass m is attached to two identical springs having spring constant k. Natural frequency of the single degree of freedom system is

   a) $\sqrt{2k/m}$ b) $\sqrt{3k/m}$ c) $\sqrt{4k/m}$ d) $\sqrt{k/m}$

4. A ball of weight 100N is tied to a smooth wall by a cord making an angle of 30 degree to the wall. Tension in the cord is

   a) 86.6 b) 50 c) 75.5 d) 0

5. The desired features or characteristics of the design that determine its ultimate effectiveness or suitability for a given task

   a) Design Function b) Design Constraints c) Design analysis d) Design Functions

6. In 'House of Quality' the roof represents:

   a) Relationship between customer and manufacturer b) Inter–relationship between technical requirements c) Relation between customer and technical requirements d) Customer requirements

7. Lowest atmospheric temperature is observed in ----------

   a) Troposphere b) Stratosphere c) Thermosphere d) Mesosphere

8. Industrial Symbiosis aims at

a) zero waste generation b) energy efficiency c) high employment generation d) industrial mechanisation

9. A 5 cm long line is parallel to VP and inclined at 30° to HP. What is its length in the front view?

a) 4.33 cm b) 2.5 cm c) 5 cm d) 2.88 cm

10. A cylinder is placed on H.P on its base and section plane is inclined to V.P and perpendicular to H.P cutting the solid the section gives

a) parabola b) circle c) rectangle d) ellipse

PART B- CORE COURSES

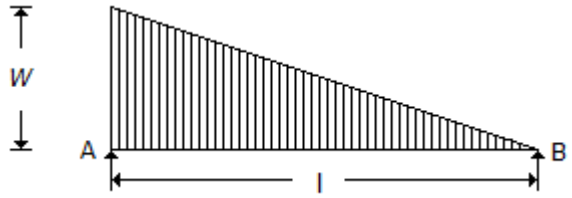
11. The relationship between the linear elastic properties Young's modulus (E), rigidity modulus (N) and bulk modulus (K) is

a) $E = \frac{KN}{3K+N}$ b) $E = \frac{9KN}{K+N}$ c) $E = \frac{9KN}{K+3N}$ d) $E = \frac{9KN}{3K+N}$

12. If two equal tensile stresses σ that are mutually perpendicular act on a rectangular parallelopiped bar with material properties E and μ , the resulting strain of the bar is given by

a) $\frac{\sigma}{E}(1+\mu)$ b) $\frac{\sigma}{E}(1-\mu)$ c) $\frac{\sigma}{E}(1+2\mu)$ d) $\frac{\sigma}{E}(1-2\mu)$

13. For the beam shown in the below figure, the shear force at *A* is equal to



a) wl/6 b) wl/3 c) wl d) 2wl/3

14. The maximum shear stress in a rectangular cross section is _____ average shear stress

a) ¾ times b) 4/3 times c) 3/2 times d) 2/3 times

15. The simply supported beam '*A*' of length *l* carries a central point load *W*. Another beam '*B*' is loaded with a uniformly distributed load such that the total load on the beam is *W*. The ratio of maximum deflections between beams *A* and *B* is

a) 5/8 b) 8/5 c) 5/4 d) 4/5

16. According to Euler's column theory, the crippling load for a column of length (l) fixed at both ends is _____ the crippling load for a similar column hinged at both ends.

a) equal to b) two times c) four times d) eight times

17. For a circular shaft subjected to torsion, the variation of shear stress across the section is

a) Parabolic with maximum stress at centre b) uniform over the section c) Linear with zero at centre d) linear with maximum at centre

18. In the 'method of joints' for the analysis of truss, the number of equilibrium equations at each

joint is

a) 1 b) 2 c) 3 d) 4

19. The prop reaction of a propped cantilever of span L, subjected to udl of intensity *w* over full span is

a) 3 wL/8 b) 5wL/8 c) wL/8 d) 9wL/8

20. A simply supported beam AB has a span of 5m. The ordinate of influence line diagram for bending moment at C, 1m from A is maximum at -------- and its value is ----------

a) Midspan, 1.0 b) C, 0.8 c) supports, 0.5 d) Midspan, 0.2

21. Horizontal component of the force along the length of a cable carrying a UDL over the entire span is

a) zero b) constant c) increasing uniformly with minimum at support d) decreasing uniformly with maximum at support

22. A 3-hinged arch with span L and rise h carries a concentrated load P at quarter span. The third hinge is at the crown. Horizontal reaction at the hinged supports which are at the same level

a) PL/4h b) PL/8h c) PL/4 d) PL/h

23. The analysis of a statically indeterminate beam can be done by

a) Equations of equilibrium b) Equations of displacements or deformations c) Both (a) and (b) d) None of the above.

24. A beam AB (span L, flexural rigidity EI) is fixed at A and B. The support B settles by Δ. The effect is

a) A moment of $\frac{6\,EI\,\Delta}{L^2}$ is induced at A only b) A moment of $\frac{6\,EI\,\Delta}{L^2}$ is induced at B only c) Moment of $\frac{6\,EI\,\Delta}{L^2}$ is induced at A and B d) Moment of $\frac{6\,EI\,\Delta}{L^2}$ at A and $\frac{3\,EI\,\Delta}{L^2}$ at B

25. The discharge of a broad crested weir with an available head H is maximum when the depth of water h is

a) H/3 b) 2H/5 c) 2H/3 d) H/2

26. The free vortex flow forms

a) straight lines b) concentric circles c) parabola d) hyperbola

27. The imaginary line drawn in the fluid in such a way that the tangent to any point gives the direction of motion at that point, is known as

a) Path line b) Stream line c) Steak line d) Potential line

28. Darcy- Weisbach equation gives relation between

a) Pressure and temperature b) Mass, volume and pressure c) Head loss and pressure loss d) Pressure loss only

29. With the boundary layer separation, displacement thickness

a) Increases b) Decreases c) Remains Same d) Independent

30. Boundary layer thickness is the distance from the boundary to the point where velocity of the fluid is

a) equal to 10% of free stream velocity b) equal to 50% of free stream velocity c) equal to 90% of free stream velocity d) equal to 99% of free stream velocity

31. Ingredients of gauged mortar are

a) Cement, sand, water b) Lime , sand, water c) Lime,cement,sand, water d) Clay, water

32. For good concrete fineness modulus of coarse aggregate is between

a) 3 to 4.5 b) 2 to 3.5 c) 6 to 8.5 d) None of the above

33. Most commonly used admixture in concrete to reduce the setting time of cement is

a) Calcium sulphate b) Calcium chloride c) Natural wood resins d) Pozzolana

34. ----------foundations are most suited for the expansive soils

a) Under reamed pile b) Timber pile c) Well foundation d) Stepped footing

35. The member which is placed horizontally to support common rafter of a sloping roof is?

a) Purlin b) Batten c) Strut d) Cleat

36. The process of injecting mortar with low water cement ratio at a high pressure through a nozzle to repair cracks in concrete is called

a) Grouting b) Shortcreting c) Guniting d) None of the above

37. The ratio of saturated unit weight to dry unit weight of a soil is 1.25. The water content of the soil is

a) 10% b) 25% c) 50% d) 100%

38. The liquid limit (LL), plastic limit (PL) and shrinkage limit (SL) of a cohesive soil satisfy the relation

a) LL > PL < SL b) LL > PL > SL c) LL > PL < SL d) LL > PL < SL

39. A flow is taking place in a soil for which porosity is ‘n’. If the discharge velocity is ‘v’, then the seepage velocity will be

a) n. v b) n/v c) v/n d) v/n^2

40. Quick sand is occurring when its

a) Effective pressure is equal to atmospheric pressure b) Effective pressure equal to seepage pressure c) Effective pressure is reduced to zero d) None of the above

41. Primary Consolidation is due to expulsion of

a) Air b) Water c) Both Air and Water d) None of the above

42. In the stability analysis of finite slopes, the Swedish Circle method assumes that the surface of sliding is

a) An Arc of a parabola b) Straight line c) An arc of a Circle d) An elliptical arc

43. With the increase in the amount of compaction energy

a) OMC increases but MDD decreases b) OMC decreases but MDD increases c) Both OMC and MDD increase d) Both OMC and MDD decrease

44. As per IS 456 2000, permissible tensile stress in concrete made of M25 concrete is

a) 3.5 N/mm^2 b) 60 N/mm^2 c) 2.5 N/mm^2 d) None of these

45. As per IS 456-2000, in the limit state design of flexural member, the strain in reinforcing bars under tension at ultimate state should not be less than

a) $\frac{fy}{Es}$ b) $\frac{fy}{Es}$+ 0.002 c) $\frac{fy}{1.15\,Es}$ d) $\frac{fy}{1.15Es}$+0.002

46. The minimum area of tension reinforcement in a beam shall be greater than

a) $\frac{0.85\,bd}{fy}$ b) $\frac{0.87fy}{bd}$ c) 0.04bd d) $\frac{0.4bd}{fy}$

47. For limit state of collapse in flexure of singly reinforced beams, if the strain in concrete reaches the limiting value earlier than that in steel, the beam section is called

a) Under reinforced section b) Critical section c) Over reinforced section d) Balanced section

48. Side face reinforcement shall be provided in the beam when depth of the web in a beam exceeds

a) 50cm b) 100cm c) 75cm d) 120cm

49. If d is the diameter of a bar, f_t is allowable tensile stress and fb is allowable bond stress, the bond length is given by

a) $\frac{ft\,d}{4\,fb}$ b) $\frac{\pi ft\,d}{4\,fb}$ c) $\frac{\pi ft\,d^2}{fb}$ d) $\frac{\pi ft\,d^2}{4\,fb}$

50. The load carrying capacity of a helically reinforced column as compared to that of a tied column is about

a) 5% less b) 10% less c) 5% more d) 10% more

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE COMREHENSIVE EXAMINATION(S), DECEMBER 2019

Course Code: CE352

Course name: COMPREHENSIVE EXAM

Max. Marks: 50 Duration: 1 Hour

Instructions: ***(1) Each question carries one mark. No negative marks for wrong answers***
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PART A- COMMON COURSES

1. The sum of the series $\sum$ – is

   a) _ b) _ c) _ d)

2. The solution of the differential equation is

   a) $y = (A + Bx)e^{2x}$ b) $y = (A + Bx)e^{-2x}$ c) $y = (A + Bx)e^{x}$ d) y

3. The resultant of two equal forces has the same magnitude as either of the forces, then the angle between the two forces is

   a) 120^0 b) 30^0 c) 90^0 d) 60^0

4. Two bodies of masses m_1 and m_2 are dropped from the top of a tower of same height. When these bodies reach the ground, their kinetic energies will be in the ratio

   a) 1 : 2 b) 1: √2 c) 1: 4 d) 1 : 1

5. The top view of a pentagonal prism with axis perpendicular to the vertical plane and parallel to horizontal plane will be a

   a) Pentagon b) Rectangle c) Trapezoid d) Straight line

6. In perspective projection the object is assumed to be kept on which of these planes.

   a) Picture plane b) Horizon plane c) Ground plane d) Central plane

7. Which is the most abundant element available in the atmosphere?

   a) Oxygen b) Nitrogen c) Argon d) Carbon di oxide

8. The total amount of greenhouse gases produced to directly and indirectly support human activities, usually expressed in equivalent tons of carbon dioxide

   a) Carbon Dating b) Carbon Trading c) Carbon Footprint d) Carbon Factor

9. One of the pins in a 3 pin plug top is bigger than the rest. This is most closely related to design for ‘X’, where ‘X’ is

   a) Assembly b) Manufacturing c) Life cycle Cost d) Environment

10. Which of the following can be most appropriately associated with the design space of a ball?

a) Speed b) Velocity c) Diameter d) Height

PART B- CORE COURSES

11. Elongation of a bar of uniform cross section having unit area of length 'L', due to its own weight 'W' is given by

a) 2WL/E b) WL/E c) WL/2E d) WL/3E

12. If a material neither expands nor contracts in volume when subjected to stresses, then the poisons ratio must be

a) 0.25 b) 0.33 c) 0.5 d) zero

13. A uniformly distributed load *w* in kN/m is acting over the entire length of a 3m long cantilever beam. If the shear force at the midpoint of cantilever is 6 kN, what is the value of *w*?

a) 2 b) 3 c) 4 d) 5

14. If two equal tensile stresses σ that are mutually perpendicular act on a rectangular parallelopiped bar with material properties E and μ , the resulting strain of the bar is given by

a) $\frac{\sigma}{E}(1+\mu)$ b) $\frac{\sigma}{E}(1-\mu)$ c) $\frac{\sigma}{E}(1+2\mu)$ d) $\frac{\sigma}{E}(1-2\mu)$

15. According to Euler's column theory, the crippling load of a column is given by $P = \pi^2 EI/Cl^2$. In the Euler's formula, the value of *C* for a column with one end fixed and the other end free, is

a) 5/8 b) 8/5 c) 5/4 d) 4/5

16. The polar modulus (torsional section modulus) for a solid shaft of diameter (*D*) is

a) $\frac{\pi D^2}{4}$ b) $\frac{\pi D^3}{16}$ c) $\frac{\pi D^3}{32}$ d) $\frac{\pi D^4}{64}$

17. For a circular shaft subjected to torsion, the variation of shear stress across the section is

a) Parabolic with maximum stress at centre b) uniform over the section c) Linear with zero at centre d) linear with maximum at centre

18. Strain energy due to axial load P in a member with cross sectional area A, moment of inertia I is

a) $\int P^2 dx/AE$ b) $\int P^2 dx/EI$ c) $\int P^2 dx/2EI$ d) $\int P^2 dx/2AE$

19. The prop reaction of a propped cantilever of span L, subjected to udl of intensity *w* over full span is

a) 3 wL/8 b) 5wL/8 c) wL/8 d) 9wL/8

20. A UDL shorter than the half the span crosses a simply supported beam from left to right. The shear at left support is maximum when the UDL is placed

a) With its head at mid span b) With its tail at support A c) With its head at support A d) With its head at support B

21. The ends of a cable, which carries 3 equally spaced concentrated loads, are supported at different levels. Horizontal reaction at the supports:

a) More at the support which is at higher level
b) More at the support which is at lower level
c) equal
d) Cannot be generalised

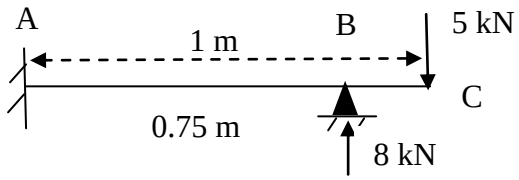
22. A beam AB (span L, flexural rigidity EI) is fixed at A and B. The support B settles by Δ. The effect is

a) A moment of $\frac{6\,EI\,\Delta}{L^2}$ is induced at A only
b) A moment of $\frac{6\,EI\,\Delta}{L^2}$ is induced at B only
c) Moment of $\frac{6\,EI\,\Delta}{L^2}$ is induced at A and B
d) Moment of $\frac{6\,EI\,\Delta}{L^2}$ at A and $\frac{3\,EI\,\Delta}{L^2}$ at B

23. The analysis of a statically indeterminate beam can be done by

a) Equations of equilibrium
b) Equations of displacements or deformations
c) Both (a) and (b)
d) None of the above.

24. The beam ABC shown in figure is horizontal. The distance to the point of contraflexure from the fixed end 'A' is



a) 0.333 m
b) 0.666 m
c) 0.25 m
d) 0.75 m

25. A uniform body 3m long, 2m wide and 1m deep floats in water. If the depth of immersion is 0.6m, the weight of the body is

a) 3.53kN
b) 33.5kN
c) 35.3kN
d) 25.2kN

26. In pipe flow the critical Reynolds number is about

a) 640
b) 500
c) 2000
d) 64000

27. The velocity vector in a fluid is given $V=5x^4+3y^2+2z$(in metre/sec). What is the acceleration of it at point (1,3,4) ?

a) 40 m/s^2
b) 20 m/s^2
c) 60 m/s^2
d) 80 m/s^2

28. The flow in a pipe is said to be non-uniform when

a) The liquid particles at all sections have the same velocities
b) The liquid particles at different sections have different velocities
c) The quantity of liquid flowing per second is constant
d) Each liquid particle has a definite path

29. Streamline and an equipotential line in a flow field

a) Are parallel to each other
b) Are perpendicular to each other
c) Intersect at an acute angle
d) Are identical

30. Boundary layer thickness is the distance from the boundary to the point where velocity of the fluid is

a) equal to 10% of free stream velocity
b) equal to 50% of free stream velocity
c) equal to 90% of free stream velocity
d) equal to 99% of free stream velocity

31. Mild steel contains carbon content up to

a) 0.25% b) 0.25 to 0.7% c) 0.7 to 1.5% d) >2%

32. Impact value of aggregate for concrete used in wearing surface

a) Not greater than 45% b) Not greater than 30% c) Not less than 15% d) Not greater than 15%

33. Most commonly used admixture in concrete to reduce the setting time of cement is

a) Calcium sulphate b) Calcium chloride c) Natural wood resins d) Pozzolana

34. A roof which slopes in 4 direction is called?

a) Shed roof b) Hipped c) Gambrel roof d) Gable end roof

35. The voussoir placed at crown of an arch is known as?

a) Key b) Soffit c) Springer d) Haunch

36. The process of injecting mortar with low water cement ratio at a high pressure through a nozzle to repair cracks in concrete is called

a) Grouting b) Shortcreting c) Guniting d) None of the above

37. Cohesionless soils are formed due to

a) Oxidation of rocks b) Leaching action of water on rocks c) Physical disintegration of rock d) Blowing of hot and cold wind

38. The ratio of saturated unit weight to dry unit weight of a soil is 1.25. The water content of the soil is

a) 10% b) 25% c) 50% d) 100%

39. The toughness index of clayey soils is given by

a) Plasticity Index/ Flow Index b) Liquid limit/ Plastic limit c) Liquidity Index/ Plastic Limit d) Plastic limit/ Liquidity index

40. Unconfined compressive strength of a pure clayey soil is given by 120 KN/m^2, what will be the value of cohesion?

a) 0 b) 60 kN/m^2 c) 120 kN/m^2 d) 240 kN/m^2

41. Square Root time method is to determine

a) T_v, Time factor b) a_v, Coefficient of compressibility c) C_v, Coefficient of consolidation d) m_v, Coefficient of volume compressibility

42. In the stability analysis of finite slopes, the Swedish Circle method assumes that the surface of sliding is

a) An Arc of a parabola b) Straight line c) An elliptical arc d) An arc of a Circle

43. Compaction by vibratory roller is the best method of compaction in the case of

a) Moist Silty Sand b) Well graded dry sand c) Clay of medium compressibility d) Silt of high compressibility

44. The modulus of rupture of concrete is

a) The direct tensile strength of concrete
b) The direct compressive strength of concrete
c) The tensile strength of concrete under bending
d) The characteristic strength of concrete

45. As per IS 456-2000, in the limit state design of flexural member, the strain in reinforcing bars under tension at ultimate state should not be less than

a) $\frac{fy}{Es}$
b) $\frac{fy}{Es}$ + 0.002
c) $\frac{fy}{1.15\ Es}$
d) $\frac{fy}{1.15Es}$+0.002

46. The limiting strain in an extreme fibre in concrete in a balanced section at limit state of flexure as per IS 456: 2000 is

a) 0.002
b) 0.0035
c) 0.0038
d) 0.0041

47. For limit state of collapse in flexure of singly reinforced beams, if the strain in steel reaches the limiting value earlier than that in concrete, the beam section is called

a) Under reinforced section
b) Critical section
c) Over reinforced section
d) Balanced section

48. The span to depth ratio limit is specified in IS 456-1978 for the reinforced concrete beams, in order to ensure that the

a) Tensile crack width is below a limit
b) Shear failure is avoided
c) Stress in the tension reinforcement is less than the allowable value
d) Deflection of the beam is below a limiting value

49. If d is the diameter of a bar, f_t is allowable tensile stress and fb is allowable bond stress, the bond length is given by

a) $\frac{ft\ d}{4\ fb}$
b) $\frac{\pi ft\ d}{4\ fb}$
c) $\frac{\pi ft\ d^2}{fb}$
d) $\frac{\pi ft\ d^2}{4\ fb}$

50. The load carrying capacity of a helically reinforced column as compared to that of a tied column is about

a) 5% less
b) 10% less
c) 5% more
d) 10% more

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