137 PU Ph.D Civil Engineering

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147 PU_2016_137_E
A beam of square cross-section is placed such that its neutral axis coincides with its diagonal, and it is subjected to a shear force F. What is the ratio of the maximum shear stress to the shear stress at the neutral axis?

- 7/8
- 8/9
- 8/7
- 9/8

2 of 100
203 PU_2016_137_E
Rankine's theory of earth pressure assumes that the back of the wall is:-

- Vertical and smooth
- Plane and smooth
- Plane and rough
- Vertical and rough

3 of 100
193 PU_2016_137_E
The slope of isochrone at any point at a given time indicates the rate of change of:-

- Pore water pressure with depth
- Pore water pressure with time
- Effective stress with time
- Effective stress with depth

4 of 100
131 PU_2016_137_E
In a cantilever beam, the bending moment at any section of the beam is equal to the:-

- The area of shear force diagram between the fixed end of the beam and that section
- Area of the bending force moment diagram between the free end of the beam and that section
- Area of the shear force diagram between the free end of the beam and that section
- The vertical ordinate at that section in the shear force diagram

5 of 100
213 PU_2016_137_E
A circular slab subjected to external loading, deflects to form a:-

- ellipsoid
- parabolloid

- Semi-hemisphere
- none of these

6 of 100

108 PU_2016_137_E

A circular shaft of diameter 120mm is welded to a rigid by a fillet weld of size 6mm. If a torque of 8 kNm is applied to the shaft, what is the maximum stress in the weld (to the nearest unit)?

- 95 N/mm^2
- 90 N/mm^2
- 87 N/mm^2
- 84 N/mm^2

7 of 100

123 PU_2016_137_E

For the preparation of lowheat cement, the contents of:-

- C_3S and C_3A are reduced and content of C_2S is increased
- C_3A, C_2S and C_3S are reduced.
- C_2S and C_3S are reduced and content of C_3A is increased
- C_3A and C_2S are reduced and content of C_3S is increased

8 of 100

128 PU_2016_137_E

Which of the following pair is not correctly matched?

- Lame's constant : thick cylinder
- Eddy's theorem : Torsion of shafts
- Macaulay's method : Deflection of beams
- Euler's method : Theory of columns

9 of 100

211 PU_2016_137_E

In a combined footing if shear stress exceeds 5 $kg/cm^2$the nominal stirrups provided are:-

- 6 legged
- 12 legged
- 10 legged
- 8 legged

10 of 100

183 PU_2016_137_E

The drain which is provided parallel to roadway to intercept and divert the water from hill slopes is known as:-

- side drain

- cross drain
- sloping drain
- catchwater drain

11 of 100

199 PU_2016_137_E

Contact pressure beneath a rigid footing resting on cohesive soil is:-

- Uniform throughout
- More at the edges compared to middle
- Less at edges compared to middle
- None of the above

12 of 100

182 PU_2016_137_E

The suitable surfacing material for a bridge deck slab is:-

- rolled asphalt
- sheet asphalt
- bituminous carpet
- mastic asphalt

13 of 100

219 PU_2016_137_E

Which of the following methods is more suitable for the determination of permeability of clayey soil?

- Falling head method
- Constant head method
- Horizontal permeability test
- None of the above

14 of 100

122 PU_2016_137_E

For batching 1:3:6 concrete mix by volume, the ingredients required per bag of 50 kg cement are:-

- 70 litres of sand and 120 litres of aggregates
- 105 litres of sand and 210 litres of aggregates
- 105 litres of sand and 140 litres of aggregates
- 70 kg of sand and 120 litres of aggregates

15 of 100

181 PU_2016_137_E

The minimum design speed for hairpin bends in hill roads is taken as:-

- 20 kmph

- 30kmph
- 15 kmph
- 10 kmph

16 of 100

192 PU_2016_137_E
The clay mineral with the largest swelling and shrinkage characteristics is:-

- Illite
- Kaolinite
- Montmorillonite
- None of the above

17 of 100

149 PU_2016_137_E
Consider the following statements: In plate girder

1. Bearing stiffeners are designed for bearing forces and they must also be checked for safety against compressive forces.
2. The length of any staggered intermittent fillet weld should not be less than 10 times the thickness of the stiffener.
3. Bearing stiffeners must be provided at the point of maximum bending moment.

Which of the above statements are correct?

- 1,2 and 3
- 1 and 2 only
- 1 and 3 only
- 2 and 3 only

18 of 100

118 PU_2016_137_E
Consider the following related to sand in mortars:

1. It increases the volume of the mortar mix
2. It increases the strength of masonry
3. The cost of the mortar is reduced
4. Shrinkage of the mortar is almost prevented
5. Surkhi can replace sand in cement mortar used in plastering and this modified mortar is more durable.

Which of the above are relevant to ‘sand’ in mortar?

- 1, 2, 4 and 5
- 1, 3 and 4 only
- 2, 3 and 4 only
- 3, 4 and 5 only

19 of 100

188 PU_2016_137_E
Uniformity coefficient of a soil is:-

- Equal to or less than 1
- Equal to or greater than 1
- Always equal to 1
- Always less than 1

20 of 100

179 PU_2016_137_E
The number of repetitions ,which the pavement thickness designed for a given wheel load should be able to support during the life of pavement is:-

- 100000
- 1000
- 10000
- 1000000

21 of 100

159 PU_2016_137_E
The Reaction time of a driver:-

- Is same for all speed
- Decrease with increase in speed
- Increase with increase in speed
- None of the above

22 of 100

111 PU_2016_137_E
Which of the following statements are correct in case of vertical intermediate stiffeners?

1. These are required only when the ratio of web depth to thickness is greater than 150
2. They should be provided throughout the length of beam at spacing less than 1.5 times web depth.
3. These can be fitted between flanges with clear gaps at top and bottom.

- 2 and 3 only
- 1 and 2 only
- 1, 2 and 3
- 1 and 3 only

23 of 100

146 PU_2016_137_E
A closely coiled helical spring of round steel wire 5mm in diameter having 12 complete coils of 50 mm mean diameter is subjected to an axial load of 100 N. Modulus of Rigidity of the spring is 80 kN/mm^2. What is the deflection of the spring?

- 48 mm

- 36 mm
- 24 mm
- 12 mm

24 of 100

161 PU_2016_137_E

The maximum number of vehicles beyond which the rotary may not function efficiently is:-

- 500 vehicles per hour
- 500 vehicles per day
- 5000 vehicles per hour
- 5000 vehicles per day

25 of 100

103 PU_2016_137_E

A beam of overall length l, with equal overhangs on both sides, carries a uniformly distributed load over the entire length. To have numerically equal bending moments at the centre of the beam and at its supports, the distance between the supports should be:-

- 0.586 l
- 0.707 l
- 0.403 l
- 0.277 l

26 of 100

162 PU_2016_137_E

Equivalent factor of passenger car unit(PCU) for a passenger car per IRC is:-

- 2.0
- 10
- 1.0
- 0.5

27 of 100

152 PU_2016_137_E

What is the p^H value of potable water, as specified by IS 456-2000?

- Between 6 and 9
- Not less than 6
- Equal to 7
- Less than 6

28 of 100

173 PU_2016_137_E

One degree of curve is equivalent to:-

- 1750/R
- 1600/R
- 1700/R
- 1850/R

29 of 100

189 PU_2016_137_E

Toughness index is defined as the ratio of:-

- Liquidity index to flow index
- Consistency index to liquidity index
- Plasticity index to flow index
- Plasticity index to consistency index

30 of 100

119 PU_2016_137_E

If aggregates completely pass through a sieve of size 75 mm and are retained on sieve of size 60 mm, the particular aggregate will be flaky if its minimum dimension is less than:-

- 20.5 mm
- 50.5 mm
- 40.5 mm
- 30.5 mm

31 of 100

198 PU_2016_137_E

Which of the following tests would take the longest to conduct?

- UU triaxial
- CD triaxial
- Unconfined compression
- CU triaxial

32 of 100

158 PU_2016_137_E

In CBR test the value of CBR is calculated at:-

- 7.5 mm penetration only
- 2.5 mm penetration only
- 5.0 mm penetration only
- both 2.5 mm and 5.0 mm penetration only

33 of 100

121 PU_2016_137_E

The preliminary test is repeated if the difference of compressive strength of three test specimens, exceeds:-

- 10 kg/m^2
- 8 kg/m^2
- 15 kg/m^2
- 5 kg/m^2

34 of 100

205 PU_2016_137_E

The most suitable method for drainage of fine grained cohesive soils is:-

- Deep well system
- Vacuum method
- Electro osmosis method
- Well pipette system

35 of 100

163 PU_2016_137_E

"Dead Slow" is a:-

- informatory sign
- regulatory sign
- warning sign
- none of the above

36 of 100

190 PU_2016_137_E

Stoke's law is valid only if the size of particle is:-

- Between 0.2mm and 0.0002mm
- Less than 0.0002mm
- Greater than 0.2mm
- All of the above

37 of 100

201 PU_2016_137_E

From a site, 10m overburden had been removed in the past. The soil this site is a example of:-

- Normally consolidated
- Under consolidated
- Over consolidated
- None of the above.

38 of 100

191 PU_2016_137_E
Coefficient of permeability of soil:-

- Increase with increase in temperature
- Increases with the decrease in temperature
- Does not depend upon temperature
- None of the above

39 of 100

145 PU_2016_137_E
A simply supported beam of length 4 m is subjected to a uniformly distributed load of 2 kN/m. What is maximum shear stress if the cross-section is rectangular, 100 mm wide and 200 mm deep?

- 0.4 N/mm^2
- 0.2 N/mm^2
- 0.1 N/mm^2
- 0.3 N/mm^2

40 of 100

129 PU_2016_137_E
A two hinged semicircular arch of radius 'R' carries a concentrated load 'W' at the crown. The horizontal thrust is:-

- $\frac{4W}{3\pi}$
- $\frac{2W}{3\pi}$
- $\frac{W}{2\pi}$
- $\frac{W}{\pi}$

41 of 100

212 PU_2016_137_E
To ensure uniform distribution of pressure, the thickness of the foundation is:-

- decreased gradually towards the edge
- increased gradually towards the edge
- kept zero at the edge
- Kept uniform throughout

42 of 100

169 PU_2016_137_E
Which of the following factors govern the choice of the gauge?

i)volume and nature of traffic
ii)speed of train
iii)physical features of the country.

- Both (i) and (ii)
- (i), (ii) and (iii)
- Only (i)
- Both (ii) and (iii)

43 of 100

218 PU_2016_137_E

Pick up the incorrect statement from the following: Tensile reinforcement bars of a rectangular beam:-

- Are bent up at suitable places to serve as shear reinforcement
- Are curtailed if not required to resist the bending moment
- Are bent down at suitable places to serve as shear reinforcement
- Are maintained at bottom to provide at least local bond stress

44 of 100

112 PU_2016_137_E

As per IS 3102-1965, for F1 class bricks, the percentage water absorption after 24 hrs of immersion in cold water shall not exceed:-

- 20%
- 12%
- 5%
- 25%

45 of 100

202 PU_2016_137_E

The coefficient of active earth pressure for a loose sand having an angle of internal friction of 30° is:-

- 1
- 1/3
- 3
- ½

46 of 100

178 PU_2016_137_E

The recommended grade of tar for grouting purpose is:-

- RT-5
- RT-2
- RT-3
- RT-1

47 of 100

171 PU_2016_137_E

The maximum degree of curvature for meter gauge is limited to:-

- 13°
- 10°
- 20°
- 16°

48 of 100

102 PU_2016_137_E

If the deflection at the free end of a uniformly loaded cantilever beam is 15mm and the slope of the deflection curve at the free end is 0.02 radian, then the length of the beam is:-

- 1.2m
- 1.0m
- 1.5m
- 0.8m

49 of 100

148 PU_2016_137_E

What is the nearest magnitude of strength of a 6mm fillet weld of 100mm length made between two flats each 10mm thick? The allowable shear stress on the weld is 110 MPa:-

- 23 kN
- 46 kN
- 66 kN
- 33 kN

50 of 100

151 PU_2016_137_E

Carry-over factor at a support-end is defined as:-

- 2 EK
- Modulus of Elasticity EI
- The ratio of moment produced at the far end to the applied moment at that support end
- The value of the moment to be applied to that end to cause a local slope of one radian

51 of 100

101 PU_2016_137_E

A simply supported beam is subjected to a couple at a section within its span. It will produce

(A) SF diagram of zero magnitude
(B) Uniformly varying triangular BM diagram
(C) Sudden change in sign of BM at the point of application of the couple.
(D) Equal and opposite reactions at supports.

Which of the above statements are correct?

- 2 and 3
- 1 and 2
- 3 and 4
- 1 and 4

52 of 100

109 PU_2016_137_E
A solid shaft transmits 150kW at a shear stress of 70 MPa running at a frequency of 3 Hz What will be the shear stress when the frequency is 1.5 Hz?

- 50 MPa
- 35 MPa
- 57 MPa
- 140 MPa

53 of 100

132 PU_2016_137_E
Consider the following statement:

Excess of sulphur in steel results in

(1) red shortness
(2) segregation
(3) cold shortness.

Of these statements:-

- 1 alone is correct
- 2 alone is correct
- 2 and 3 are correct
- 1 and 2 are correct

54 of 100

100 PU_2016_137_E
Two simply supported beams are made up of the same material and are of the same cross- section. Both beams carry uniformly distributed loads of equal intensities. One beam is 2m long and the other is 4m long. The 2m long beam shows a central deflection of 1mm. What is the central deflection of the 4m long beam?

- 2mm
- 8mm
- 1mm
- 16mm

55 of 100

133 PU_2016_137_E

A bar of 4 cm diameter is subjected to an axial load of 4t. the extension of the bar over a gauge length of 20 cm is 0.03 cm. the decrease in diameter is 0.0018 cm. the Poisson's ratio is:-

- 0.30
- 0.33
- 0.25
- 0.35

56 of 100

113 PU_2016_137_E

The effective height of a masonry wall of height H restrained fully at its top and partially at its bottom, is:-

- 0.75H
- 0.85H
- 1.50H
- 1.00H

57 of 100

206 PU_2016_137_E

The maximum depth of neutral axis of singly reinforced beam is kept:-

- to ensure that tensile steel reaches its working stress
- at the centre of tensile steel
- Half the depth of the cross section
- to ensure that tensile steel reaches its yield stress

58 of 100

153 PU_2016_137_E

A certain RC structure has to be constructed along the sea coast of Puducherry. The minimum grade of concrete to be used as per IS 456-2000 is:-

- More than M 20 and less than M 30
- More than M 20
- Not less than M 30
- Less than M 45 and more than M 30

59 of 100

170 PU_2016_137_E

The side slope of embankments for a railway track is generally taken as:-

- 1:1
- 2:1
- 1:2

- 1.5:1

60 of 100

172 PU_2016_137_E

The shape of transition curve used by Indian Railways is:-

- sine curve
- cubic parabola
- spiral
- lemniscate of Bernoulli

61 of 100

222 PU_2016_137_M

Relative density of the compacted dense sand is approximately equal to:-

- 0.4
- 1.20
- 0.95
- 0.6

62 of 100

239 PU_2016_137_M

Which of the following are likely to be present in photochemical smog?

- Photochemical oxidants
- Sulphur dioxide
- Smog
- Chloroflurocarbon

63 of 100

258 PU_2016_137_M

The velocity profile for turbulent flow through a closed conduit is:-

- Parabolic
- Linear
- Logarithmic
- Hyperbolic

64 of 100

247 PU_2016_137_M

The self cleaning velocity of all sewers in India is usually:-

- 3.0 m/sec to 3.5 m/sec
- 1.0 m/sec to 1.2 m/sec
- less than 1.0 m/sec

- 1.5 m/sec to 2.0 m/sec

65 of 100
253 PU_2016_137_M
The detention period for oxidation ponds is usually kept as:-

- 24 hours
- 4-8 hours
- 10 to 15 days
- 3 months

66 of 100
233 PU_2016_137_M
According to IS : 1172-1963, a minimum of 135 litres of water capita per day, is required for:-

- Boarding schools
- hostels
- Nurses home and medical quarters
- all the above

67 of 100
243 PU_2016_137_M
The non-clog pump which permit solid matter to pass out with the liquid sewage is:-

- Pneumatic ejector
- Reciprocating Pump
- Centrifugal pump
- None of these

68 of 100
231 PU_2016_137_M
Sewage treatment units are designed for:-

- Maximum and minimum flow
- Minimum flow only
- average flow
- Maximum flow only

69 of 100
246 PU_2016_137_M
Sewerage system is usually designed for:-

- 75 years
- 10 years
- 25 years

- 20 years

70 of 100

237 PU_2016_137_M

Noise pollution limits at residential area:-

- 80 DB
- 45 DB
- 90 DB
- 55 DB

71 of 100

227 PU_2016_137_M

If the water content of a fully saturated soil mass is 100 % , then the voids ratio of the sample is:-

- Equal to specific gravity of the soil
- Less the specific gravity of the soil
- Independent of specific gravity of the soil
- Greater than specific gravity of the soil

72 of 100

257 PU_2016_137_M

Laminar flow of a Newtonian fluid ceases to exist, when the Reynolds number exceeds:-

- 3000
- 4000
- 1500
- 2100

73 of 100

252 PU_2016_137_M

Most of the bacteria in sewage are:-

- Parasitic
- Pathogenic
- Anaerobic
- Saprophytic

74 of 100

221 PU_2016_137_M

If the volume of voids is equal to the volume of solids in a soil mass , then the values of porosity and voids ration respectively are:-

- 1.0 and 0.5
- 1.0 and 0.0

- 0.0 and 1.0
- 0.5 and 1.0

75 of 100
223 PU_2016_137_M
Residual soils are formed by:-

- Water
- Wind
- Glaciers
- None of the above

76 of 100
245 PU_2016_137_M
Which one of the following characteristics describes a watershed system in system's parlance?

- Linear
- Non-linear and time-variant
- Linear and time-invariant
- Non-linear

77 of 100
228 PU_2016_137_M
The standard height of a standard rain guage:-

- 30cm
- 40 cm
- 10 cm
- 20cm

78 of 100
242 PU_2016_137_M
Generally the detention period for grit chambers is kept as:-

- 1 minute
- 2-4 hours
- 12 hours
- 5 minute

79 of 100
251 PU_2016_137_M
For normal sludge, the value of sludge index for Indian conditions is:-

- 350 to 500
- 50 to 150

- 0 to 50
- 150 to 350

80 of 100
232 PU_2016_137_M
Most commonly used pump for lifting water in water supply mains, is:-

- Axial flow pump
- Centrifugal pump
- Reciprocating pump
- Rotary type pump

81 of 100
273 PU_2016_137_D
Piezometer is used to measure:-

- Very low pressure
- Pressure in pipe, channels etc
- Difference of pressure between two points
- Atmospheric pressure

82 of 100
293 PU_2016_137_D
On wetting cohesive soils:-

- loose elasticity
- gain shear strength
- Loose permeability
- decrease their shear strength

83 of 100
274 PU_2016_137_D
Ratio of interia force to elastic force is known as:-

- Webr's number
- Reynold's number
- Mach number
- Froude number

84 of 100
264 PU_2016_137_D
Which of the fluid forces are not considered in the Reynolds equation of flow?

- Turbulent forces
- Viscous forces

- Compressibility forces
- Pressure forces

85 of 100

281 PU_2016_137_D

A unit hydrograph has one unit of:-

- Discharge
- Rainfall Excess
- Rainfall duration
- Time base of direct runoff

86 of 100

292 PU_2016_137_D

A partially saturated soil is classified as:-

- One phase soil
- four phase soil
- two phase soil
- three phase soil

87 of 100

287 PU_2016_137_D

The arrangement made to support an unsafe structure temporarily, is known as:-

- shoring
- jacking
- Scaffolding
- underpinning

88 of 100

283 PU_2016_137_D

In India, which of the following is adopted as standard recording raingauge?

- Symon's raingauge
- Natural syphon type
- Tipping bucket type
- Weighing bucket type

89 of 100

276 PU_2016_137_D

Flow of water in a pipe about 3 meters in diameter can be measured by:-

- Rotameter
- orifice plate

- Pitot tube
- venturi

90 of 100

291 PU_2016_137_D

The maximum load carried by a pile, when it continues to sink without further increase of load, is known as:-

- ultimate bearing resistant
- safe pile load
- ultimate bearing capacity
- Ultimate load carrying capacity

91 of 100

271 PU_2016_137_D

The point in the immersed body through which the resultant pressure of the liquid may be taken to act is known as:-

- Center of pressure
- Meta center
- Center of buoyancy
- Center of gravity

92 of 100

288 PU_2016_137_D

Queen closer may be placed:-

- in stretcher course next to first brick
- in header course next to first brick
- in stretcher course
- In header course

93 of 100

263 PU_2016_137_D

Check values are used:-

- for unidirectional flow
- at high pressure
- for controlling water flow
- in bends

94 of 100

272 PU_2016_137_D

Which of the manometer has highest sensitivity?

- Inclined U-tube

- U-tube with mercury
- Micro-manometer with water
- U-tube with water

95 of 100

261 PU_2016_137_D

Foot values provided in pumps are _____ values.

- Pressure reducing
- Three/four way
- Directional control
- Relief

96 of 100

294 PU_2016_137_D

The full width of land acquired before finalizing a highway alignment is known as:-

- carriage way
- roadway
- Width of formation
- right of way

97 of 100

286 PU_2016_137_D

which of the following types of rain gauges is used for measuring rain in remote hilly inaccessible areas?

- Tipping bucket type
- Simon's raingauage
- Floating type
- Weighing type

98 of 100

262 PU_2016_137_D

Centrifugal pump is normally classified on the basis of the:-

- rpm
- Number of blades in impeller
- Impeller blade angle
- type of casing

99 of 100

299 PU_2016_137_D

Dampness causes:-

- growth of termites

- crumbling of plaster
- Efflorencesce
- bleaching of paints

100 of 100

282 PU_2016_137_D

A hyetograph is a graphical representation of:-

- Rainfall intensity and time
- Discharge and time
- Cumulative rainfall and time.
- Rainfall depth and time