DSSSB JE

Civil Engineering

Mega Mock Test-2

(March 14th - March 15th 2022)

Questions & Answer Key

1. If the cross sectional areas of an embankment at 60m intervals are 10,30, 60, 40, and 20 m^2 respectively, then the volume (m^3) of the embankment on the basis of prismoidal rule is:

A. 5300   B. 8600

C. 9300   D. 9600

Ans. B

2. If the contour interval and contour gradient of a contour map plotted over an undulated terrain are 10m and 1 in 100, then the horizontal equivalent is :

A. 0.001 m   B. 0.01 m

C. 100 m   D. 1000m

Ans. D

3. In a closed traverse with 8 sides, the error found from the fore bearing and back bearing of last line is -6°. The correction to the fourth line will be:

A. -2°   B. -3°

C. -4°   D. -5°

Ans. B

4. The camber provided on a sloping road is 1 in 60. Which one of the following is the ruling gradient?

A. 1 in 15   B. 1 in 20

C. 1 in 30   D. 1 in 40

Ans. C

5. For a given road, the safe stopping sight distance is 100m and the passing sight distance is 300m. What is the intermediate sight distance?

A. 200 m   B. 100 m

C. 150m   D. 50 m

Ans. A

6. Design rate of superelevation of horizontal highway curve of radius 400m for a mixed traffic condition having a speed of 100kmph is:

A. 1.0   B. 0.07

C. 0.11   D. 0.3

Ans. B

7. If the radius of centre line of road is 500m and the sight distance is 200 m, the minimum setback from the building to centre line of road will be:

A. 5 m   B. 7 m

C. 10 m   D. 12 m

Ans. C

8. If the design speed of vehicle is 125 kmph, the change of radial acceleration in $m/s^2/s$ will be:

A. 0.2   B. 0.4

C. 0.5   D. 0.8

Ans. C

9. The grade compensation on a 5 degree curve on a Broad gauge railway track is:

A. 0.2%   B. 0.16%

C. 0.12%   D. 0.08%

Ans. A

10. The curve resistance for a 40 tonnes train on BG on a 4° curve is:

A. 0.052 tonne   B. 0.064 tonne

C. 0.080 tonne   D. 0.10 tonne

Ans. B

11. A waster water sample of 3 ml is made upto 300ml in a BOD bottle with distilled water. The initial DO of the sample is 6 mg/l and after 5 days it is 2 mg/l. The BOD(mg/l) is:

A. 100   B. 200

C. 300   D. 400

Ans. D

12. The chlorine dosage for the treatment of 20000 cum if water per day is 0.5 mg/l. The residual chlorine after 10 min contact is 0.2 mg/l. The chlorine demand of water in mg/l is:

A. 0.5   B. 0.4

C. 0.3   D. 0.2

Ans. C

13. The spacing of the crosshairs in a stadia diaphragm of tacheometer is 9mm. If the focal length of the object glass is 27cm, the multiplying constant of the tacheometer is

A. 30   B. 100

C. 0.033   D. 300

Ans. A

14. The appropriate percentage of water in sewage is

A. 90%   B. 99%

C. 99.90%   D. 99.99%

Ans. C

15. The most economical circular channel gives maximum discharge while:

A. depth of water = 0.95 diameter of circular section

B. hydraulic mean depth = 0.286 diameter of circular section

C. wetted perimeter = 2.6 diameter of circular section

D. All of the above.

Ans. D

16. The device used for the easy separation of dry dust of 5 to 25 μm size is _____.

A. cyclone   B. gravity settling chamber

C. bag filter   D. scrubber

Ans. A

17. Good quality sand is never obtained from

    A. river   B. lake

   C. sea   D. gravel powder

Ans. C

18. Which among the following ecosystem have inverted biomass pyramid?

    A. Marine ecosystem

    B. Grassland ecosystem

    C. Both marine and grassland ecosystems

    D. Neither marine nor grassland ecosystem

Ans. A

19. Formation width adopted by Indian railways for single line B.G. track in embankment and in cutting (excluding drains) are respectively:

    A. 6.10 m, 5.49 m   B. 10.82 m, 8.84 m

    C. 8.84 m, 4.88 m   D. 6.10 m, 4.88 m

Ans. A

20. Figure shown below represents which of the parking system of aircrafts:
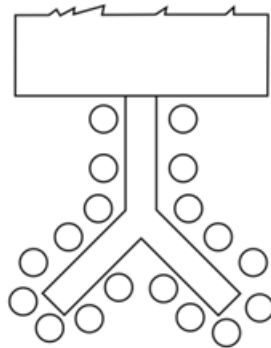
    A. Frontal   B. Open apron

    C. Finger   D. Satellite

Ans. C

21. Grade compensation on horizontal curve is provided to:

    A. To compensate for the loss of tractive effort due to the curve

    B. To counteract the effect of centrifugal force

    C. To reduce the gradient to a minimum value

    D. To provide aesthetic appearance on curves.

Ans. A

22. A vehicle moving at 40km/h speed was stopped by applying brake and the length of the skid mark was 12.2 m. if the average skid resistance of the pavement is 0.70, the brake efficiency of the test vehicle will be nearly

    A. 80%   B. 74%

    C. 68%   D. 62%

Ans. B

23. The speed density relationship for a particular road was found as v = 75.44 – 0.46 k, where 'v' is speed in kmph and 'k' is the density of vehicles per km. Consider following statements based on data given above.

   1. Density of road at which traffic volume will be max is 94 veh/km

   2. Jam density is 164 veh/km

   3. Capacity of the road is 3093 veh/h

   Correct statement(s) is/are:

   A. 1, 2 only   B. 2, 3 only

   C. 2 only   D. 1, 2 and 3

Ans. B

24. If weight of aggregate is 79 kg and specific gravity of aggregate is 2.67. Assuming angularity number 7.5 , weight of water filling the cylinder is_____gram?

   A. 49730   B. 49.73

   C. 47.45   D. 470

Ans. A

25. A collapsible soil sub-grade sample was tested using Standard California Bearing Ratio apparatus; and the observations are given below

Sl. No.	Load	Penetration
1.	60.55 kg	2.5 mm
2.	80.55 kg	5.0 mm

   Taking the standard assumption(load carried by the standard specimen = 1370 kg) regarding the load penetration curve, CBR value of the sample will be taken as

   A. 3.9%   B. 4.0%

   C. 4.4%   D. 5.5%

Ans. C

26. Consider the following statements:

   Statement 1: In rigid pavements, the flexural strength of the slab is utilized to resist the loads.

   Statement 2: In rigid pavement, major criteria for failure is due to the stresses generated by wheel load action and temperature variations.

   A. Both Statement (I) and Statement (II) are individually true, and Statement (II) is the correct explanation of Statement (I).

   B. Both Statement (I) and Statement (II) are individually true, but Statement (II) is not the correct explanation of Statement (I).

   C. Statement (I) is true, but Statement (II) is false.

   D. Statement (I) is false, but Statement (II) is true.

Ans. B

27. Which 20-year plan was able to achieve its targets before the end of the stipulated 20-year period?

   A. First 20-year plan   B. Second 20-year plan

   C. Third 20-year plan   D. None

Ans. A

28. Flattening and smoothing the road surface by scrapping is called

   A. Compaction   B. Consolidation

   C. Grading   D. Ditch digging

Ans. C

29. What will be the non-passing sight distance on a highway for a design speed of 100 kmph when its ascending gradient is 2%? Assume coefficient of friction as 0.7 and brake efficiency as 50%.

   A. 176m   B. 200m

   C. 150m   D. 185m

Ans. A

30. A linear reservoir is one in which

   A. The storage varies linearly with the outflow rate.

   B. The volume varies linearly with elevation.

   C. The storage varies linearly with time.

   D. The storage varies linearly with the inflow rate.

Ans. A

31. For a catchment with an area of 400 km^2 and the equilibrium discharge of S-curve obtained by 4 h unit hydrograph in (m^3/s)

   A. 178   B. 228

   C. 278   D. 378

Ans. C

32. If the net irrigation requirement is 8 cm and water application efficiency is 80 %, then water depth required to be applied in the field will be

   A. 8 cm   B. 10 cm

   C. 12 cm   D. 16 cm

Ans. B

33. In a river carrying a discharge of 150 m^3/s, the stage at a station A was 3.6 m and the water surface slope was 1 in 6000. If during a flood, the stage at A was 3.6 m and the water surface slope was 1 in 1500, what was the flood discharge (approximately)?

   A. 200 m^3/s   B. 150 m^3/s

   C. 250 m^3/s   D. 300 m^3/s

Ans. D

34. A canal irrigates a portion of a culturable command area to grow sugarcane and wheat. The average discharge required to grow sugarcane and wheat are 1 cumec and 0.6 cumec respectively. The time factor is 0.8. The required design capacity of the canal is

   A. 0.5 cumec   B. 1 cumec

   C. 1.5 cumec   D. 2 cumec

Ans. D

35. The following rainfall data refers to station P and R which are equidistant from station:

	Station P	Station Q	Station R
Long term normal annual rainfall in mm	150	240	200
Annual rainfall for the year 1980 in mm	105	X	180

The value of X will be

A. 180 mm   B. 192 mm

C. 216 mm   D. 204 mm

Ans. B

36. Hyetograph shows the variation of

A. Cumulative rainfall with time

B. Rainfall intensity with time

C. Rainfall depth over an area

D. Rainfall intensity with the cumulative rainfall

Ans. B

37. The precipitation caused due to upward movement of the air that is warmer than its surroundings

A. cyclonic precipitation

B. convective precipitation

C. Orographic precipitation

D. frontal precipitation

Ans. B

38. What would be the optimum number of rain gauges if allowable degree of error in estimation of mean rainfall is E (in %) and coefficient of variation of rainfall is C_v?

A. $\left(\dfrac{C_v}{E}\right)^2$ B. $\left(\dfrac{C_v}{E}\right)^{1/2}$

C. $\left(\dfrac{E}{C_v}\right)^{1/2}$ D. $\left(\dfrac{E}{C_v}\right)^{3/2}$

Ans. A

39. If the specific retention is 10 % and the specific yield of the 100 km² alluvial basin is 0.15. What is the porosity of the soil?

A. 0.25   B. 0.35

C. 0.15   D. 0.10

Ans. A

40. Given the base period is 100 days and the duty of canal is 1000 hectares per cumec, the depth of water will be

A. 0.864 cm   B. 8.64 cm

C. 86.4 cm   D. 864 cm

Ans. C

41. Acidic soils are reclaimed by

    A. Leaching of the soil

    B. Using limestone as a soil amendment

    C. Using gypsum as a soil amendment

    D. Provision of drainage

Ans. B

42. Critical velocity ratio for use in Kennedy's theory is:

    A. Less than 1   B. More than 1

    C. Equal to 1   D. All of the above

Ans. D

43. In order that a droplet of water at 20^0C (σ = 0.0728 N/m) has an internal pressure 1 KPa greater than that of outside pressure, its diameter should be nearly:

    A. 0.15 mm   B. 0.3 mm

    C. 0.6 mm   D. 1.2 mm

Ans. B

44. Glycerine (specific weight 1260 kg/m^3, dynamic viscosity 8 x 10^{-2} kg-s/m^2) is spread freely to a thickness of 1 mm between a bottom stationary plate and a top moveable plate of 10 cm^2 area. The top plate is to be moved at a uniform speed of 1m/s. The force to be exerted on the top plate is:

    A. 1.6 kg   B. 0.8 kg

    C. 0.16 kg   D. 0.08 kg

Ans. D

45. Centre of pressure on an inclined plane is _____.

    A. At the centroid   B. Above the centroid

    C. Below the centroid   D. At metacentre

Ans. C

46. As the depth of immersion of a vertical plane surface increases, the location of centre of pressure:

    Which one of the following statement is correct?

    A. comes closer to the centre of gravity of the area

    B. Moves apart from the centre of gravity of the area

    C. Depends on the density of the fluid the plate is submerged in

    D. remains unaffected

Ans. A

47. A one dimensional flow is one which _____.

    A. Is uniform

    B. Is steady uniform

    C. Takes place in straight lines

    D. Involves zero transverse components of flow

Ans. D

48. A rectangular floating body is 20 m long and 5 m wide. The water line is 1.5 m above the bottom. If the centre of gravity is 1.8 m from the bottom, then its metacentric height will be approximately:

A. 3.3 m   B. 1.65 m

C. 0.35 m   D. 0.30 m

Ans. C

49. Which of the following statements is not correct?

A. A gauge always measures pressure above the surrounding atmospheric pressure

B. At a point inside a fluid, pressure is exerted equally in all directions.

C. Typical actual variation of pressure with elevation in the atmosphere is more adiabatic than isothermal

D. Vacuum pressure at a point is always measured above absolute zero pressure.

Ans. D

50. The **Characteristics Length** is given by _____.

A. wetted perimeter divided by area

B. area divide by square of wetted perimeter

C. area divided by wetted perimeter

D. It is the ratio of wetted area and top width of the water surface

Ans. D

51. When the mach number is more than 6, the flow is called

A. Subsonicflow   B. supersonic flow

C. sonic flow   D. hypersonic flow

Ans. D

52. The valve which protects the water meter from the damages of water hammer?

A. reflux valve   B. pressure relief valve

C. water hammer valve   D. stop cock

Ans. B

53. Which one of the following phenomena in a pipe flow is termed as water hammer?

A. The sudden rise of pressure in a long pipe due to sudden closure of the valve.

B. The rise of a pressure in a pipe flow due to gradual closure of valve

C. The rise of negative pressure

D. None of these

Ans. A

54. A hydroelectric reservoir can supply water continuously at a rate of 100 m^3/s. The head is 75 m/. The theoretical power that can be developed is:

A. 100 mhp   B. 1, 00,000 mhp

C. 7500 mhp   D. 75000 mhp

Ans. B

55. Which of the following statement is CORRECT?

A. Pumps connected in parallel are used to boost the head, whereas pump operating in series boosts the discharge.

B. Pump operating in series, boosts the head, whereas pump operating in parallel, boosts the discharge.

C. Pump either in parallel or series always boost only discharge.

D. Pump either in parallel or series always boost only head.

Ans. B

56. The rate at which saturate clay or other soil undergo consolidation when subjected to an increase in pressure called

A. coefficient of volume change

B. Coefficient of consolidation

C. Compression index

D. Coefficient of compression

Ans. B

57. For drained condition in NC clay soil sample the failure envelop passes through

A. Origin

B. C distance on abscissa axis

C. C distance on ordinate axis

D. Depends on water content of sample

Ans. A

58. The initial and final void ratios of a clay sample in a consolidation test are 1.0 and 0.5 respectively. If the initial thickness of the sample is 2.4 cm, then its final thickness will be

A. 1.3 cm   B. 1.8 cm

C. 1.9 cm   D. 2.2 cm

Ans. B

59. The type of foundation most suitable for bridges

A. Raft foundation   B. Pile foundation

C. Well foundation   D. Combined foundation

Ans. C

60. A fill have volume of 1500m^3 is to be constructed at a void ratio of 0.6. The borrow pit soil has void ratio of 1.2. The volume of soil required to be excavated from the borrow pit will be(m^3)

A. 1062   B. 2062

C. 3062   D. 4062

Ans. B

61. Which of the following methods is not used for determination of water content?

A. Pycnometer Method   B. Sand Bath Method

C. Sand Replacement Method   D. Torsion Balance method

Ans. C

62. If an infinite slope of clay at a depth 7m has cohesion of $2t/m^2$ and unit weight of $1t/m^3$, then the stability number is

A. 0.29
B. 0.51
C. 3.5
D. 4

Ans. A

63. A fully saturated soil has a water content of 200%

If G=2.6, the void ratio is

A. 1.3
B. 2.6
C. 5.2
D. none of these

Ans. C

64. A 300 mm square bearing plate settles by 15 mm in a plate load test on a cohesionless soil when the intensity of loading is $0.2 \ N/mm^2$. The settlement of a prototype shallow footing 1 m square under the same intensity of loading is

A. 15 mm
B. 35 mm
C. 50 mm
D. 167 mm

Ans. B

65. If u1 / u2 = 2.5 and 1 - u1 / 1 - u2 = 0.657, then the value of k1 / k2 will be

A. 1.7
B. 3.8
C. 3
D. 2.8

Ans. B

66. Total float can be expressed as:

1) Latest start time-earliest start time

2) Latest finish time-earliest finish time

A. Both 1 and 2 are false
B. 1 is true but 2 is false
C. Both 1 and 2 are true
D. 1 is false but 2 is true

Ans. C

67. As per IS specifications, the heat of hydration of low-heat Portland cement for 28 days is:

A. Not more than 100 calories/gm

B. Not more than 50 calories/gm

C. Not more than 75 calories/gm

D. Not more than 150 calories/gm

Ans. C

68. In time estimates PERT follows

A. Probabilistic approach
B. Deterministic approach
C. Possibility approach
D. Non-Probabilistic approach

Ans. A

69. Which among the following is not a part of shield equipment?

A. Gravel tank
B. Trailing dam
C. Nipper car
D. Chute

Ans. C

70. As per Indian standard code 1077, the burnt clay building bricks having compressive strength less than _____ N/mm² are known as common brunt clay bricks

   A. 3.5
   B. 12.5
   C. 30
   D. 40

Ans. D

71. Which is the major constituent of ordinary Portland cement?

   A. CaO
   B. MgO
   C. SO_3
   D. Fe_2O_3

Ans. A

72. Which of the following is a field test for measuring the consistency of plastic concrete?

   A. Le Chatelier's Test
   B. Compaction Factor Test
   C. Elongation Index Test
   D. Kelly Ball Test

Ans. D

73. Timber can be made reasonably fire-resistant by

   A. Soaking it in Ammonium Sulphate
   B. Coating it with Tar paint
   C. Pumping creosote oil into timber under high pressure
   D. Seasoning process

Ans. A

74. The cost inflow a firm receives if a machine still has value at the time of its disposal is known as

   A. Salvage value
   B. Purchase expenses
   C. Operating cost
   D. Ownership cost

Ans. A

75. The value of dismantled materials:

   A. Scrap value
   B. Rateable value
   C. Salvage value
   D. Market value

Ans. A

76. Honey comb brick wall is measured in

   A. Metres
   B. Square metres
   C. Cube metres
   D. Number

Ans. B

77. Which of the following is not a non-destructive test?

   A. Rebound Hammer Test
   B. Surface Hardness Test
   C. Ultrasonic Pulse Velocity Test
   D. Soundness Test

Ans. D

78. When the ratio of effective length of the column to its least lateral dimension does not exceed 12, it is termed as a

   A. Long column
   B. Short column
   C. Plain column
   D. None of the given answers

Ans. B

79. As per Indian Standards, the maximum bearing pressure at the column base should not exceed the bearing strength equal to :

A. $0.40\ f_{ck}$

B. $0.45\ f_{ck}$

C. $0.50\ f_{ck}$

D. $0.60\ f_{ck}$

Ans. D

80. Effective flange width of a continuous T-beam is

A. $b_f = \dfrac{I_0}{6} + b_w + 6D_f$

B. $b_f = \dfrac{I_0}{12} + b_w + 3D_f$

C. $b_f = \dfrac{I_0}{\dfrac{I_0}{b} + 4} + b_w$

D. $b_f = \dfrac{0.5I_0}{\dfrac{I_0}{b} + 4} + b_w$

Ans. A

81. The minimum and maximum % of reinforcement in RCC short column are

A. 0.8 and 6

B. 6 and 0.8

C. 0.8 and 4

D. 4 and 6

Ans. A

82. Minimum period before striking soffit formwork to slabs:

A. 21 days

B. 7 days

C. 3 days

D. 1 day

Ans. C

83. To avoid sudden collapse just after a shear crack, minimum shear reinforcement is provided in prestressed concrete member in the form of stirrups. IS 1343 suggested the relation as

A. $\dfrac{A_{sv}}{b.s_v} = \dfrac{0.4d}{0.87 f_y}$

B. $\dfrac{A_{sv}}{bd.s_v} = \dfrac{0.4}{0.87} X\!f_y$

C. $\dfrac{A_{sv}}{b.s_v} = \dfrac{0.4}{0.87 f_y}$

D. $\dfrac{A_{sv}}{b.s_v} = \dfrac{0.4 f_{ck}}{0.87 f_y}$

Ans. C

84. The effective slenderness ratio of a battened column, λ_e, is taken as 1.10 times the actual slenderness ratio of the column to account for

A. Axial deformation

B. Bending deformation

C. Shear deformation

D. All of the above

Ans. C

85. The top chord of a roof truss is inclined at an angle of 20°, no access is provided for maintenance. The live load to be considered for the design will be

A. Zero

B. $0.4\ kN/m^2$

C. $0.75\ kN/m^2$

D. $0.55\ kN/m^2$

Ans. D

86. If a structure is under fatigue stresses, then the welded joints as compared to riveted joints will fail

A. Earlier

B. Later

C. At the same time

D. Not at all

Ans. B

87. In the normal cross- section A of a member is subjected to tensile force P, the resulting normal stress in an oblique plane inclined at angle to the transverse plane will be

A. $\frac{P}{A}\sin^2\theta$

B. $\frac{P}{A}\cos^2\theta$

C. $\frac{P}{2A}\sin^2\theta$

D. $\frac{P}{2A}\cos^2\theta$

Ans. B

88. If a circular shaft is subjected to both torque T and bending moment M. Then the equivalent bending moment M_e is given by

A. $M_e = \dfrac{M + \sqrt{M^2 + T^2}}{2}$

B. $M_e = M + \sqrt{\dfrac{M^2 + T^2}{2}}$

C. $M_e = M - \sqrt{\dfrac{M^2 + T^2}{2}}$

D. $M_e = \dfrac{M - \sqrt{M^2 + T^2}}{2}$

Ans. A

89. Strain Energy theory was postulated by

A. Rankine

B. Mohr

C. Tresca

D. Haigh

Ans. D

90. The number of independent kinematic indeterminacy for the prismatic beam as shown in figure is
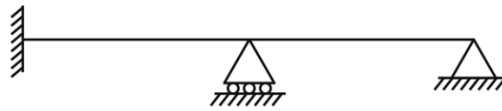
A. 5

B. 2

C. 4

D. 3

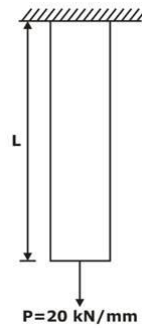Ans. D

91. If the flexibility matrix is $[\mathbf{F}] = \dfrac{1}{2EI}\begin{bmatrix} 2 & 4 \\ 1 & 5 \end{bmatrix}$ then the stiffness matrix will be

A. $[\delta] = \dfrac{EI}{3}\begin{bmatrix} 5 & -4 \\ -1 & 2 \end{bmatrix}$

B. $[\delta] = \dfrac{EI}{3}\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$

C. $[\delta] = \dfrac{EI}{6}\begin{bmatrix} -5 & 4 \\ 1 & -2 \end{bmatrix}$

D. $[\delta] = 3EI\begin{bmatrix} 5 & -4 \\ -1 & 2 \end{bmatrix}$

Ans. A

92. For prismatic bar shown below find the deflection due to external load P (Axial stiffness = 120 GPA) (L = 130 mm)

P=20 kN/mm

A. 21.67 mm   B. 0.167

C. 3.33 × 10⁻⁶ mm   D. 0

Ans. B

93. The work done in producing strain on a material per unit volume is called:

A. Resilience   B. Plasticity

C. Elasticity   D. Ductility

Ans. A

94. If l is the length of the column, then the equivalent length of the column for one end fixed, and other end free is

A. l   B. 2l

C. $\dfrac{l}{\sqrt{2}}$ D. $\dfrac{l}{2}$

Ans. B

95. The maximum shear stress in a rectangular beam is

A. 1.5 times the average shear stress

B. 1.25 times the average shear stress

C. 2.0 times the average shear stress

D. 1.75 times the average shear stress

Ans. A

96. In rolled steel I beams, shear force is mostly resisted by

A. Web only   B. Top flange only

C. Both web and flanges   D. Bottom Flange only

Ans. A

97. The angle of inclination of the plane at which the body begins to move down the plane, is called

A. Angle of friction   B. Angle of projection
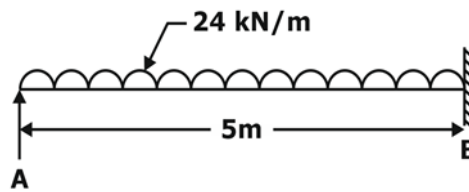
C. Angle of repose   D. None of these

Ans. C

98. The maximum frictional force, which comes into play, when a body just begins to slide over the surface of the other body, is known as

A. Static friction   B. Limiting friction

C. Dynamic friction   D. Coefficient of friction

Ans. B

99. If fixed and moment at A i.e. $M_{FAB} = -50$ kN.m, then what is the value of slope at A for the beam shown in figure below?

A. $\dfrac{125}{2EI}$ B. $\dfrac{250}{EI}$

C. $\dfrac{125}{EI}$ D. $\dfrac{250}{3EI}$

Ans. A

100. A thin spherical shell of wall thickness 4 mm and internal diameter 400 mm is subjected to an internal pressure of 5 N/mm^2. The hoop stress exerted by the thin shell is

A. 62.5 MPa   B. 100 MPa

C. 125 MPa   D. 250 MPa

Ans. D

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