Q :) The main undesirable properties of concrete are:

(i) Undergoes shrinkage

(ii) Requires careful attention during manufacturing, placing and curing

(iii) Has lower tensile strength

(iv) For equal load, cement members are heavier than steel members

(a) i and iv only

(b) i, ii, ii and iv only

(c) i, ii and iv only

(d) ii, iii and iv only

Q :) On inspection of the damaged reinforced Concrete (RCC) elements of a pier on the sea coast (with surface of members in tidal zone), it is seen that M 20 concrete was used for the RCC works. As per IS 456 2000,minimum grade of concrete to be used for the works would be:

(a) M 255

(b) M 300

(c) M 35

(d) M 40

Q :) The corrosion of steel in reinforced concrete structures can be assessed by non-destructive testing using the principle:
(a) Linear polarization resistance technique
(b) Ultrasonic Pulse Velocity Method
(c) Acoustic emission technique
(d) Computer Tomography

Q :) While testing the compressive strength of cement concrete, the correct conditions (viz temperature, age, humidity and size of the specimen) to be maintained as per IS are

(a) 27 ± 3°C, 28 days, 90% and 15 cm cube

(b) 26 ± 2°C, 28 days, 80% and 15 cm cube

(c) 25 ± 1°C, 14 days, 75% and 10 cm cube

(d) 27 ± 3°C, 7 days, 70% and 10 cm cube

Q :) RMC is acronym of

(a) Rapidly mixed concrete

(b) Ready mixed concrete

(c) Readily mix concrete

(d) Recently mixed concrete

Q :) The most undesirable properties of water used for making concrete of mortar are:
(a) high concentration of carbonates
(b) high concentration of bicarbonates
(c) high concentration of sulphate and chloride
(d) high concentration of silicates

Q :) The impurity if mixing water which affects the setting time and strength of concrete is
(a) Calcium chloride
(b) Sodium carbonates and bicarbonates
(c) Sodium chloride
(d) Sodium sulphate

Q :) Spirit varnish generally consists of:

(a) oil, wax and resin

(b) alcohol, wax and turpentine

(c) pigment and synthetic resin

(d) spirit and shellac

Q :) Shielding glass consists high content of

(a) Lead oxide

(b) Manganese dioxide

(c) Tin oxide

(d) Cobalt oxide

Q :) Consider the following statements:

1. All soils can be identified in the field by visual examination
2. Fine-grained soils can be identified in the field by visual examination and touch
3. Fine-grained soils can be identified in the field by dilatancy test
4. By visual examination, only coarse-grained soils can be identified

Which of the above statements are correct?

(a) 1 and 2only

(b) 3 and4 only

(c) 2 and 3 only

(d) 1 and 4 only

Q :) Which one of these methods is used to find thein-situ density of soil?

(a) Pycnometer Method

(b) Torsion balance method

(c) Alcohol Method

(d) Rubber Balloon Method

Q :) Hydrometers are generally calibrated at..... degrees Celsius.

(a) 29

(b) 27

(c) 28

(d) 26

Q :) The following soils are compacted at the same compactive effort in the field. Which one of the following is the correct sequence in the increasing order of their maximum dry density?

(a) Clay < Silty clay < Sand < Gravel sand clay mixture

(b) Silty clay < Sand < Gravel Sand clay mixture<Clay

(c) Sand< Gravel sand < clay mixture < Clay < Silty Clay

(d) Sand < Clay < Silty Clay < Gravel sand clay mixture

Q :) A normally consolidated clay settled 10 mm when effective stress was increased from 50 kN/m² to 100 kN/m². If the effective stress is further increased from 100 kN/m² to 200 kN/m², then further settlement of the clay shall be:

(a) 10 mm
(b) 30 mm
(c) 20 mm
(d) 40 mm

Q :) The strain energy of a pin-jointed structure can be expressed as:

(a) $\sum F^2L / 2AE$

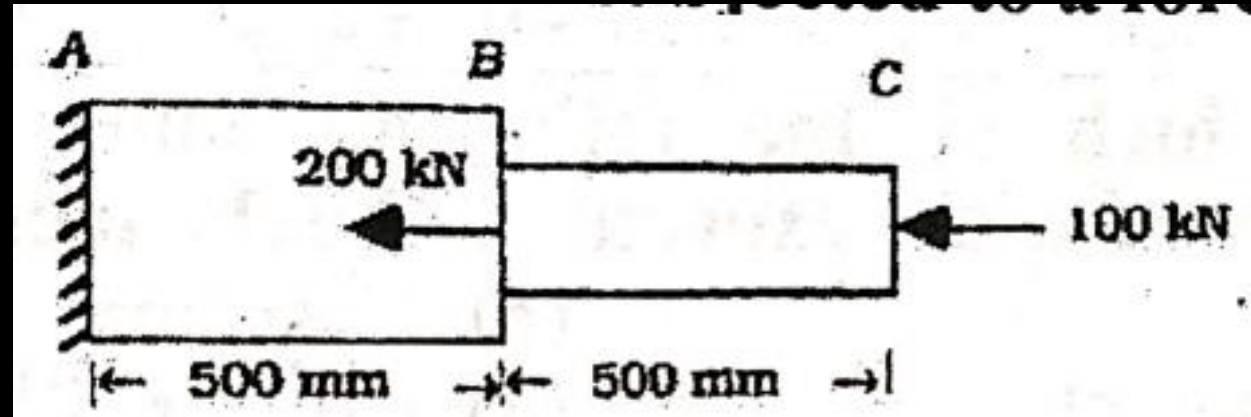(b) $\sum F^2L / AE$

(c) $\sum L^2F / 2AE$

(d) $\sum FL^2 / AE$

Q :) The Poisson's ratio of a material is 0.3 and Young's modulus is 200 GPa. Its Rigidity Modulus is:

(a) 77 GPa

(b) 51 GPa

(c) 125 GPa

(d) 333 GPa

Q :) The portion AB is subjected to a force equal to

(a) 200 kN

(b) 300 kN

(c) 100 kN

(d) 400 kN

Q :) If all the dimensions of a prismatic bar are increases in the proportion n:1, the proportion with which the maximum stress produced in the bar by its own weight will change by

(a) $1:n^2$

(b) $1:n$

(c) $\sqrt{n}:1$

(d) n:1

Q :) Radius of gyration of a circular section with diameter D is

(a) D/2

(b) D/4

(c) D/3

(d) $D/\sqrt{3}$

Q :) In which form is the permissible stress in columns, f by Merchant - Rankine's formula?

(a) $f \propto \dfrac{\pi^2 E}{\lambda^2}$

(b) $f \propto \dfrac{f_y}{1 + 0.2 \sec\left(c.\lambda.\sqrt{f}\right)}$

(c) $\dfrac{1}{(f)^n} \propto \dfrac{1}{\left(f_y\right)^n} + \dfrac{1}{\left(f_{cr}\right)^n}$

(d) $f \propto \dfrac{f_y}{\phi + \sqrt{\phi^2 + \lambda^2}}$

Q :) Match List I with List II and select the correct answer using the codes given below the lists:

List-I	List-II
A. Both ends hinged B. One end fixed and other end free C. One end fixed and the other pin-joined D. Both ends fixed	(i) L (ii) $L/\sqrt{2}$ (iii)L/2 (iv)2L

Code :

A   B   C   D

(a) i, iv, ii, iii

(b) i, iii, ii, iv

(c) iii, i, ii, iv

(d) iii, i, iv, ii
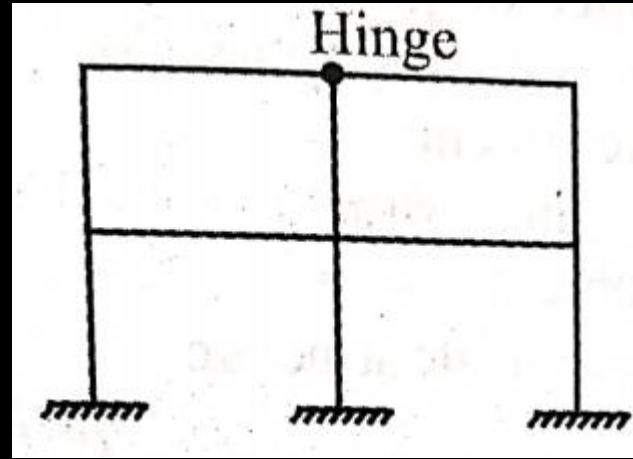
Q :) Torsional rigidity of a shaft is given by

(a) T/ℓ

(b) T/J

(c) T/θ

(d) T/r

Q :) For the rigid frame shown in figure the statical indeterminacy is

(a) 8

(b) 10

(c) 12

(d) 14

Hinge