APPLIED MECHANICS DEPARTMENT

SAMPLE MCQs

For Program- Civil Engineering

CE5978 Limit State Design of Steel Structures

Note:1. Each question carries *one* mark.

2. Select correct option.

3. Mathematical calculations may be required.

Q1. The steel section represented by "ISA" designation is

A) "I" section   B) Angle section C) Plate D) Tension member

Q2. Criteria considered in Limit state method is

A) Limit state of strength B) Limit state of material C) Limit state of structure D None of these

Q3. For a 4.6 grade bolt, calculate design strength in single shear. Given d= 16mm

A) 45.26KN   B) 90.52 KN   C) 56.58 KN   D) 113.15 KN

Q4. The disadvantage of welded connection is

A) Appearance of welded connection is better B) Joints of any shape can be made easily

C)Welding requires skilled labour   D) Welded connections are light in weight

Q5.Strength of tension member is mainly influenced by

A) Type of connection   B) Net area C) Shear stress D) All of these

Q6. Calculate design strength of tension member due to gross section yielding, if A_g = 1164 mm2, f_y = 250 N/mm^2.

A) 234.8 KN   B) 291 KN   C) 310 KN   D) None of these

Q7. Steel member carrying axial compression is known as

A) Tie   B) Compression member C) Tension member   D) Bracing

Q8. A strut carries factored compressive load of 90 KN. For the strut design compressive stress is determined as 93.4 MPa. If it's sectional area is 1138 mm^2, check adequacy/safety of strut section.

A) Safe   B) Unsafe   C) Revise the section D) None of these

Q9. Purlin is a ---------------------------- member.

A) Tension   B) Compression   C)Flexural   D) None of theses

Q10. Calculate panel point load at support of a steel roof truss, if panel length = 1.5m , spacing of truss = 4m , total dead load on plan area = 330 N/m^2.

A) 1980 N B) 1320 NC) 660 N D) 990 N

For Program- Civil Engineering

SAMPLE MCQs

CE5961 DESIGN OF R.C.C. STRUCTURES

(Note : Mathematical Calculations may be required)

Q : Select the correct answer (option) for the following multiple choice questions

1. Which IS code is used for general construction of steel?
   a) IS 456
   b) IS 256
   c) IS 800
   d) IS 100

2. What is the modular ratio to be used in the analysis of R.C. beams using working stress method, if the grade of concrete is M20?
   a) 18.66
   b) 13.33
   c) 9.9
   d) 6.6

3. If the actual neutral axis lies below the critical neutral axis then the section is said to be–
   a) Balanced section
   b) Over-reinforced section
   c) Under- reinforced section
   d) None of the above

4. In which situation the doubly reinforced section is not provided
   a) When Md > Mu,lim
   b) When there is reversal of B.M.
   c) When sufficient headroom height is available
   d) When the breadth and depth of the section dimensions are restricted

5. The minimum number of main steel bars provided in R.C.C.
   A. rectangular columns is 4
   B. circular columns is 6
   C. octagonal columns is 8
   D. All of the above

6. The diameter of longitudinal bars of a column should never be less than
    a) 6 mm
    b) 8 mm
    c) 10 mm
    d) 12 mm

7. The effective span of a simply supported slab, is

    a) distance between the centres of the bearings

    b) clear distance between the inner faces of the walls plus the thickness of the wall

    c) clear span plus effective depth of the slab

    d) Minimum of (B) and (C) above

8. The width of the flange of a T-beam, which may be considered to act effectively with the rib depends upon

    a) breadth of the rib

    b) centre to centre distance between T-beams

    c) span of the T-beam

    d) all the above.

9. Design of R.C.C. simply supported beams carrying U.D.L. is based on the resultant B.M. at

    a) supports

    b) mid span

    c) every section

    d) quarter span.

10. The transverse reinforcements provided at right angles to the main reinforcement

    a) distribute the load

    b) resist the temperature stresses

    c) resist the shrinkage stress

    d) all the above.

11. The percentage of minimum reinforcement (For HYSD bars) of the gross sectional area in slabs, is

    a)   0.10%

    b). 0.12%

    c.) 0.15%

    d). 0.20%

12. Calculate actual depth of neutral axis for a S. R. section having f_y = 415 N/mm2, A_{st} = 1200mm^2, f_{ck} = 20N/mm^2, b=230mm.

a) 261.6 mm
b) 410 mm
c) 110.4 mm
d) None of these

13. Classify a R.C section as under or over or balanced section, if steel grade is Fe500, d=450mm and X_u actual = 198mm.

a) Under reinforced
b) Balanced section
c) Over reinforced
d) Data is inadequate

For Program- Civil Engineering

SAMPLE MCQ

CE 3901 Mechanics of Structures

1)What is the SI unit of Stress?

a)N/mm^2 b)mm^2/N   c)N.m^2 d)None of the above.

2)If a material has identical properties in all directions, it is said to be

a)homogeneous   b)Isotropic   c)Elastic   d)Orthotropic.

3)Shear Stress on principal Planes is

a)Zero   b)Maximum   c)Minimum   d)None of the above.

4)Rate of change of bending moment is equal to

a)Shear force

b)deflection

c)slope

d)Rate of loading .

5)Maximum bending moment in a beam occurs where

a)deflection is zero

b)shear force is maximum

c)shear force is minimum

d)shear force changes sign.

6)The units of moment of inertia of an area are

a)$kg.m^2$

b)m^4

c)kg/m^2

d)m^3

7)In a loaded beam , the point of contraflexure occurs at a section where

a)Bending moment is minimum

b)Bending moment is zero or changes sign

c)Bending moment is maximum

d)Shearing Force is maximum.

8)The shear stress at any section of a shaft is maximum

a)At the centre of the section

b)At a distance r/2 from the centre

c)At the top of the surface

d)At a distance ¾.r from the center.

9)Strain energy of any member may be defined as work done on it

a)To deform it

b)To resist elongation

c)To resist shorteing

d)All of the above .

10)If 'p' is the internal pressure in a thin cylinder of diameter 'd' and thickness 't',the developed hoop stress is

a)pd/2t

b)pd/4t

c)pd/t

d)2pd/ t.

For Program- Civil Engineering

SAMPLE MCQ

CE3902 Theory of structure

1) $P=4p^2EI / L^2$ Is the equation of Eulers crippling load if
   a) Both ends are fixed   b) both ends are hinge

   c)one end is fixed and other is free   d) one end is fixed and other end is hinge

2) The forces in the members of simple truss ,may be analysed by

a) graphical method   b) method of joint   c) method of section

d) all the above

3) The maximum bending moment for a simply supported beam with a u.d.l. w/unit length is

a)wl/2   b) $wl^2/4$ c) $wl^2/8$ d) $wl^2/12$

4)The ratio of the area of cross section of a circular section to the area of its core,is

a) 4   b) 8   c) 12   d) 16

5)The maximum deflection due to load W at the free end of a cantilever of length L and having flexural rigidity EI is

a) $Wl^2/2EI$ b) $Wl^2/3EI$ c) $Wl^3/2EI$ d) $Wl^3/3EI$

6)In moment distribution method, the sum of the distribution factors of all the members meeting at any joint is always

a) zero   b) less than 1   c) 1   d) greater than one

7) While using three moments equation , a fixed end of a continuous beam is replaced by an additional span of

a) zero length   b) infinite length   c) zero moment of inertia   d) none of the these

8) A truss containing joints j and members m , will be a simple perfect truss if

a) m=2j-3   b) j=2m-3   c) m=3j-2   d) j= 3m-2

9)The point of contraflexure is the point where

a) B.M. changes sign   b) B.M. is maximum   c) B.M. is minimum   d) S.F. is zero

10)Slenderness ratio of a long column ,is

a)area of c/s divided by radius of gyration   b) area of c/s divided by least radius of gyration

c) radius of gyration divided by area of c/s   d) length of column divided by least radius of gyration

For Program- Civil Engineering

SAMPLE MCQ

CE3904   GEOTECHNICAL ENGINEEERING

MARKS-1 MARK EACH

1.Bulk unit weight of soil can be given by,

- A. M/V
- B. W/V
- C. $(M_d)_{sub}$/V
- D. W_d/V_s

2.Rate of discharge of water per unit of total cross-sectional area of soil is termed as,

- A. Hydraulic gradient
- B. Coefficient of permeability
- C. Velocity of flow
- D. Density of water

3.Moisture content of saturated soil is 35% and relative density of its particles is 2.7, then porosity of soil will be,

- A. 50%
- B. 48.58%
- C. 52%
- D. 52.10%

4.Which of the following is not a component of shearing resistance?

- A. Cohesion
- B. Structural resistance
- C. Permeability
- D. Frictional resistance

5.Supportive power of soil or rock can be referred as,

- A. Gross pressure intensity
- B. Ultimate bearing capacity
- C. Bearing capacity
- D. Safe bearing capacity

6.Compaction means,

- A. Gradual process of reduction of volume of soil under static loading.
- B. Improvement of soil properties by adding cementing material.
- C. Reduction in volume by squeezing out of water from the soil.
- D. Rapid reduction of volume of soil by mechanical means.

7. Which of the following is not the field identification test of soil?

    A. Dilatancy test
    B. Toughness test
    C. Unconfined compression test
    D. Dry strength test

8.The minimum water content at which soil will just begin to crumble when rolled into threads is,

    A. Plastic limit
    B. Shrinkage limit
    C. Liquid limit
    D. Plasticity index

9.The general shape of particle size distribution curve is described by,

    A. Uniformity coefficient
    B. Permeability coefficient
    C. Compressibility coefficient
    D. Coefficient of curvature

10.Calculate coefficient of permeability of a soil sample, having 60 sq.cm c/s area,10cm in height. The quantity of water equal to 500 ml passed down in 15 minutes under an effective constant head of 50 cm.

    A. 2.15×10^{-3} cm/sec
    B. 2.22×10^{-5} cm/sec
    C. 1.34×10^{-5} cm/sec
    D. 1.85×10^{-3} cm/sec

For Program- Civil Engineering

Sample MCQs

CE3903-Concrete Technology

1. The strength of the concrete depends upon
    a) Size of aggregates
    b) Grading of aggregates
    c) Moisture contents of aggregates
    d) All of these
2. The presence of lime in cement
    a) makes the cement sound
    b) provides strength to the cement
    c) lowers the clinkering temperature
    d) all of these

3. The maximum particle size of fine aggregate is
   a) 2.5mm
   b) 4.75mm
   c) 5.85mm
   d) 6.5mm
4. The development of first 28 days strength is on account of the hydration of
a) Dicalcium silicates
b) Tricalcium silicates
c) Tricalcium aluminate
d) Tetra calcium alumino ferrite
5. Maximum quantity of water needed per 50 kg of cement for M15 grade of concrete is
   a) 28 litres
   b) 30 litres
   c) 32 litres
   d) 34 litres
6. The final setting time of ordinary Portland cement should not be more than
   a) 5 hours
   b) 7.5 hours
   c) 10 hours
   d) 13 hours
7. Curing of the concrete can be done by
   a) Spraying
   b) Ponding
   c) Covering with moist cloth
   d) Any of the above
8. The process of applying cement mortar under pressure through a nozzle is called
   a) Prestressing
   b) Spraying
   c) Guniting
   d) None of these
9. M10 grade of concrete approximates
   a) 1:3:6 mix
   b) 1:1:2 mix
   c) 1:2:4 mix
   d) 1:1.5:3 mix
10. Workability can be improved by adding
   a) Air entraining agent
   b) Foaming agent
   c) Oily agent
   d) All of these

For Program- Civil Engineering

SAMPLE MCQs

CE 2906 Applied Mechanics

1. It is _____ branch of Engineering Mechanics, which deals with the forces and their effects, while acting upon the bodies in motion.

 a. Static b. Dynamic c. Kinematics d. Both (a) & (b)

2. If a number of forces are simultaneously acting on a body, then the resultant of these forces will have the _____ effect as produced by all the forces.

 a. Opposite b. Different c. Same d. None of the above

3. The forces, whose lines of action lie on the same plane, are known as _____ forces.

a. non-coplanar b. collinear c. concurrent d. coplanar

 4. Two like parallel forces of 50 N and 100 N act at the ends of a rod 360 mm long. Find the magnitude of the resultant force_____ and the point _____where it acts.

 a. 150 kN, 240m b. 240 N, 150mm c. 150 N, 240mm d. none of the above

 5. Three forces of 2P, 3P and 4P act along the three sides of an equilateral triangle of side 100 mm taken in order. Find the magnitude _____ and position _____ of the resultant force.
a. 1.732 P, 150 mm b. 0.732 P, 150 mm c. 1.732 P, 150 m d. 150 P, 1.732 mm

 6. Limiting friction is directly proportional to _____.

a. Normal reaction b. Frictional force c. Dynamic friction d. all of the above

7. The point at which whole area of lamina is assumed to act is known as _____.

a. Centroid b. Polaroid c. Point of centre d. all of these

8. A _____ may be defined as a device, which enables us to do some useful work at some point or to overcome some resistance, when an effort or force is applied to it, at some other convenient point.

a. Simple machine b. Lifting machine c. Compound machine d. all of these

 9. Whenever a force acts on a body, and the body undergoes some displacement, then _____ is said to be done.

a. Power b. Work c. Energy d. Momentum

10. Three forces X, Y and Z are acting on a particle are in equilibrium. The angles between the first X and second Y is 90° and that between the second Y and third Z is 120°. Find the ratio of the forces X, Y and Z is _____.

 a. 2:2.154:2 b. 1.154:4:2 c. 2.154:1:2 d. 1.154:2:1

For Program- Mechanical Engineering

Sample MCQ paper

ME3905 Strength of Materials

Q. No.	Question	Option 1	Option 2	Option 3	Option 4
1	A composite body consisting of two different materials…………….. will be same in both materials.	stress	strain	both stress and strain	shear
2	When a bar is subjected to rise of temperature and its longitudinal deformation is prevented, the stress induced in the bar is ………..in nature	tensile	shear	compressive	torsion
3	Find the size of square steel bar that has to carry an axial pull of 60 kN if permissible stress is 150 MPa.	20 x20 mm	25 x25 mm	18 x18 mm	None of these
4	The ratio of shear stress to shear strain is known as…………….	Modulus of rigidity	Modulus of Elasticity	bulk modulus	toughness
5	The angle between normal stress to tangential stress is known as angle of ……………….	friction	declination	rotation	obliquity
6	A plane across which only normal stress act and no shear stress is called as …………………..	shear planes	principal planes	principal stress	shear stress
7	The point, at which bending moment is zero in	zero shear	positive moment	contra-flexure	negative moment

	bending moment diagram, is called as point of ………...				
8	Which lamina has same moment of inertia (Ixx and Iyy) about axes passing through its centroid along XX and YY axis?	circular	rectangle	square	option 1 and 3 is correct
9	Calculate Ixx for a square lamina of 20 mm side about an axis xx passing through its centroid.	15.22×10^3 mm^4	18.12×10^3 mm^4	13.33×10^3 mm^4	None of these
10	What is the maximum bending moment of a cantilever beam of span 2.0 m carries a point load 2 kN act at its free end.	2 kNm	4 kNm	8 kNm	None of these
11	Which of the following is the assumption made in pure bending?	material is homogeneous and isotropic	material must obey Hook`s law	The beam is stressed up to an elastic limit	all of these
12	The load whose line of action does not coincide with the longitudinal axis of the member is called ………. load.	point	eccentric	axial	None of these
13	Find the torque for a solid circular shaft 50 mm diameter can safely transmit the shear stress 80 MPa.	1.96 kNm	2.5 kNm	1.5 kNm	None of these
14	Strain energy stored in a uniform bar is given as ……………	$\dfrac{\sigma^2}{2AE}$	$\dfrac{\sigma^2}{4AE}$	$\dfrac{\sigma^2 AL}{4E}$	$\dfrac{\sigma^2 AL}{2E}$
15	The stress which is set up to resist the force, due to the applied pressure, tending to separate the top and bottom halves of the cylinder is called as …………	hoop stress	linear stress	redial stress	None of these

For Program Plastic & Polymer Engineering

Sample MCQs

PP 3904 Mechanics of Materials

1) Which of these are types of normal stresses

   a) Tensile and compressive stresses
   b) Tensile and thermal stresses
   c) Shear and bending
   d) Compressive and plane stresses

2) Which of the following stress can also be known as hoop stress

   a) Axial stress
   b) Longitudinal stress
   c) Fluid stress
   d) Circumferential stress

3) Shear force is diagram is _____ representation of shear force plotted as ordinate.

   a) Scalar
   b) Aerial
   c) Graphical
   d) Statically

4) In thin cylinders, the thickness should be _____ times of diameter.

   a) 1/20
   b) 1/15
   c) 1/30
   d) 1/40

5) What is the formula of radius of gyration

   a) $K^2=I/A$
   b) $K^2=I^2/A$
   c) $K^2=I^2/A^2$
   d) $K^2=(I/A)^2$

6) Torsional sectional modulus is also known as

   a) Polar modulus
   b) Sectional modulus
   c) Torsion modulus
   d) Torsional rigidity

7) A steel rod 10 mm in diameter and 1 m long is heated from 20 to 100 degree celcius,E=200GPa and coefficient of thermal expansion is 12 x 10 ^(-6) /°C. Calculate the thermal stress developed?

   a) 192MPa(Tensile)
   b) 212 MPa(Tensile)
   c) 192 MPa(Compressive)
   d) 212 MPa(Compressive)

8) Which law states the when a number of loads are acting on a body,the resulting strain,according to principle of superposition,will be algebraic sum of strains caused by individual loads

   a) Hooke's law
   b) Principle of superposition
   c) Lam'is theorem
   d) Strain law

9) A tensile load of 100 KN is suddenly applied to a rectangular bar of dimension 2cmx4cm. What will be the instantaneous stress in bar?

   a) 100 N/mm^2
   b) 120 N/mm^2
   c) 150 N/mm^2
   d) 250 N/mm^2

10) Hogging is _____

   a) negative bending moment

   b) positive bending moment

   c) negative shear force

   d) positive shear force

For Program- Mechanical Engineering & Plastic and Polymer Engineering

SAMPLE MCQs

FC 2906 Engineering Mechanics

Note – Each question carries 01 mark.

1) The branch of Engineering Mechanics which deals with the study of forces and their effects on bodies at rest is
   a) Dynamic   b) Static   c) Kinetics   d) Kinematics

2) Force is a
   a) Vector quantity   b) scalar quantity   c) both a) & b)   d) none of the above

3) Resolve a force of 10 KN inclined at 45^0 with x axis acting towards the point.

   a) Fx = 0, fy = -10N   b) Fx = 0, fy = 10N   c) Fx = 10N, fy = 0   d) none of the these

4) A single force which can produce the same effects as produced by the number of forces   acting on a body is called as
   a) Equilibrant force   b) Couple force   c) Resultant force   d) none of these

5) Two like parallel forces of 50N and 200N are 1 m apart. Resultant of the forces is

   a) 120 N   b) 250 N   c) 200N   d) 150 N

6) A single force which keeps the body in equilibrium is called as

   a) Equilibrant force   b) Couple force   c) Resultant force   d) none of these

7) Frictional resistance is independent of

   a) Area of contact   b) Nature of contact surfaces   c) Weight of the body   d) none of these

8) The point at which the entire weight of the body is supposed to be concentrated is called   as
   a) Centre of gravity   b) Centroid   c) both a) & b)   d) none of the these

9) The machine with zero friction is called as

   a) Simple machine   b) Compound machine   c) Ideal machine   d) None of these

10) Momentum is a

   a) Vector quantity   b) scalar quantity   c) both a) & b)   d) none of the above

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