



BRAINWARE UNIVERSITY

Term End Examination 2021 - 22
Programme – Diploma in Civil Engineering
Course Name – Theory of Structures
Course Code - DCE405
(Semester IV)

Time allotted : 1 Hrs.15 Min.

Full Marks : 60

[The figure in the margin indicates full marks.]

Group-A

(Multiple Choice Type Question)

1 x 60=60

Choose the correct alternative from the following :

- (1) What is the bending moment at end supports of a simply supported beam?

a) Maximum	b) Minimum
c) Zero	d) Uniform
- (2) Sagging, the bending moment occurs at the _____ of the beam.

a) At supports	b) Mid span
c) Point of contraflexure	d) Point of emergence
- (3) How do point loads and udl be represented in SFD?

a) Simple lines and curved lines	b) Curved lines and inclined lines
c) Simple lines and inclined lines	d) Cant represent any more
- (4) The relation between slope and maximum bending moment is _____

a) Directly proportion	b) Inversely proportion
c) Relative proportion	d) Mutual incidence
- (5) SI units of shear force is _____

a) kN/m	b) kN-m
c) kN	d) m/N
- (6) Hogging is _____

a) Negative bending moment	b) Positive shear force
c) Positive bending moment	d) Negative shear force
- (7) _____ positive/negative bending moments occur where shear force changes its sign.

- a) Minimum
c) Maximum
- b) Zero
d) Remains same
- (8) Which of these is the correct way of sign convention for shear force?
a) R U P
c) R U N
- b) L U P
d) L D P
- (9) What is variation in SFD, if the simply supported beam is carrying U.D.L
a) Rectangle
c) Trapezoidal
- b) Linear
d) Parabolic
- (10) The shear force in a beam subjected to pure positive bending is _____
a) Positive
c) Zero
- b) Negative
d) Cannot determine
- (11) A cantilever beam loaded with udl throughout, the maximum shear force occurs at _____
a) Free end
c) At centre
- b) Fixed end
d) At point of contraflexure
- (12) At the Point of contraflexure, what is the value of bending moment?
a) one
c) three
- b) zero
d) infinity
- (13) A cantilever beam subjected to point load at its free end, the maximum bending moment develops at the _____ of the beam.
a) Free end
c) Centre
- b) Fixed end
d) Point of inflection
- (14) Positive bending moment is known as _____.
a) Hogging
c) Ragging
- b) Sagging
d) Inflection
- (15) Bending moment can be denoted by _____
a) K
c) N
- b) M
d) F
- (16) Maximum bending moment in a cantilever beam subjected to udl (w) over the entire span (l).
a) wl
c) wl^2
- b) wl^3
d) w
- (17) There won't be any hinge in the conjugate beam.
a) True
c) can not say
- b) false
d) none
- (18) Units of deflection are _____
a) kNm
c) kN
- b) kN/m
d) m
- (19) In cantilever beams, the deflection is zero at _____
a) Free end
c) At supports
- b) Fixed end
d) Through out

- c) the action of applied forces will be affected by small deformations of the structure d) none of the above
- (32) The carryover factor in a prismatic member whose far end is fixed is
 a) 0 b) 1/2
 c) 3/4 d) 1
- (33) While using three moments equation, a fixed end of a continuous beam is replaced
 a) zero length b) infinite length
 c) zero moment of inertia d) none of the above
- (34) Bending moment at any section in a conjugate beam gives in the actual beam
 a) slope b) curvature
 c) deflection d) bending moment
- (35) Which of the following is not the displacement method ?
 a) Equilibrium method b) Column analogy method
 c) Moment distribution method d) Kani's method
- (36) Which of the following methods of structural analysis is a displacement method ?
 a) moment distribution method b) column analogy method
 c) three moment equation d) none of the above
- (37) The fixed support in a real beam becomes in the conjugate beam a
 a) roller support b) hinged support
 c) fixed support d) free end
- (38) $P=42EI/L^2$ is the equation of Euler's crippling load if
 a) Both the ends are fixed b) Both the ends are hinged
 c) One end is fixed and other end is free d) One end is fixed and other end is hinged
- (39) A close coil helical spring when subjected to a moment M having its axis along the axis of the helix
 a) It is subjected to pure bending b) Its mean diameter will decrease
 c) Its number of coils will increase d) All the above
- (40) A cantilever of length L is subjected to a bending moment at its free end. If EI is the flexural rigidity of the section, the deflection of the free end, is
 a) ML/EI b) $ML/2EI$
 c) $ML^2/2EI$ d) $ML^2/3EI$
- (41) Gradually applied static loads do not change with time their
 a) Magnitude b) Direction
 c) All the above d) Point of application
- (42) The assumption in the theory of bending of beams is:
 a) Material is homogeneous b) All the above
 c) Material is isotropic d) Young's modulus is same in tension as well as in compression
- (43) The ratio of lateral strain to axial strain of a homogeneous material, is known
 a) Yield ratio b) Hooke's ratio

- c) Poisson's ratio
- d) Plastic ratio
- (44) An isolated load W is acting at a distance 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/h
- c) $2W/ha$
- d) $2h/Wa$
- (45) A material is said to be perfectly elastic if
- a) It regains its original shape on removal of the load
- b) It regains its original shape partially on removal of the load
- c) It does not regain its original shape at all
- d) None of these
- (46) Pick up the correct statement from the following:
- a) For a uniformly distributed load, the shear force varies linearly
- b) For a uniformly distributed load, B.M. curve is a parabola
- c) For a load varying linearly, the shear force curve is a parabola
- d) All the above
- (47) Beams composed of more than one material, rigidly connected together so as to behave as one piece, are known as
- a) Composite beams
- b) Determinate beams
- c) Indeterminate beams
- d) Compound beams
- (48) 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
- (49) The equivalent length of a column of length L having one end fixed and the other end free, is
- a) $2L$
- b) L
- c) $L/2$
- d) L
- (50) A truss containing j joints and m members, will be a simple truss if
- a) $m = 2j - 3$
- b) $j = 2m - 3$
- c) $m = 3j - 2$
- d) $j = 3m - 2$
- (51) Stress may be defined as
- a) Force per unit length
- b) Force per unit volume
- c) Force per unit area
- d) None of these
- (52) The ratio of shear stress and shear strain of an elastic material, is
- a) Modulus of Rigidity
- b) Shear Modulus
- c) Modulus of Elasticity
- d) Both A. and B.
- (53) Which of the following is correct boundary condition for a beam supported by pin at both ends?
- a) Displacement at both ends is non-zero
- b) Displacement at one of the end is non-zero
- c) Displacement at both ends is zero
- d) Can't say
- (54) The double integration method to calculate slope of deflected beam is applicable only when:-
- a) Slope is very large
- b) Slope is very small

c) Slope is -ve

d) Slope is +ve

(55) Which of the following is an elastic curve equation for shear force?(EI = flexural rigidity)

a) $S = EI (dy/dx)$

b) $S = EI (d^2 y / dx^2)$

c) $S = EI (d^3 y / dx^3)$

d) $S = EI (d^4 y / dx^4)$

(56) 2) A simply supported beam carries uniformly distributed load of 20 kN/m over the length of 5 m. If flexural rigidity is 30000 kN.m², what is the maximum deflection in the beam?

a) 5.4 mm

b) 1.08 mm

c) 6.2 mm

d) 8.6 mm

(57) In cantilever beam, slope and deflection at free end is _____

a) zero

b) maximum

c) minimum

d) none of the above

(58) Deflection of a simply supported beam when subjected to central point load is given as _____

a) $(Wl / 16 EI)$

b) $(Wl^2 / 16 EI)$

c) $(Wl^3 / 48 EI)$

d) $(5Wl^4 / 384EI)$

(59) Which of the following statements is/are true for a simply supported beam?

a) Deflection at supports in a simply supported beam is maximum

b) Deflection is maximum at a point where slope is zero

c) Slope is minimum at supports in a simply supported beam

d) All of the above

(60) The design of a beam is based on strength criteria, if the beam is sufficiently strong to resist _____

a) shear force

b) deflection

c) both a. and b

d) none of the above