Chettinad College of Engineering & Technology
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

Department of Civil Engineering

CE8602 Structural Analysis II

Unit V - MCQ Bank

1. What is the condition for equilibrium in plastic analysis?

a) bending moment distribution defined by assumed plastic hinges must not be in static equilibrium with applied loads and reactions

b) shear force distribution defined by assumed plastic hinges must be in static equilibrium with applied loads and reactions

c) bending moment distribution defined by assumed plastic hinges must be in static equilibrium with applied loads and reactions

d) shear force distribution defined by assumed plastic hinges must not be in static equilibrium with applied loads and reactions.

Answer: c

2. Which of the following is true?

a**) ultimate load is reached when a mechanism is formed**

b) ultimate load is not reached when a mechanism is formed

c) plastic hinges are not required for beam to form a mechanism

d) frictionless hinges are not required for beam to form a mechanism

Answer: a

3. Which of the following relation is correct?

a) $-M_p \geq M$

b) $M > M_p$

c) $M \geq M_p$

d) $M \leq M_p$

Answer: d

4. Lowest plastic limit load is obtained when _____

a) only equilibrium condition of plastic analysis is satisfied

b) only equilibrium and mechanism condition of plastic analysis are satisfied

c) only mechanism condition of plastic analysis is satisfied

d) equilibrium, mechanism and plasticity condition of plastic analysis are satisfied

Answer: d

5. Which load is obtained when equilibrium and mechanism conditions of plastic analysis are satisfied?

a) plastic limit load

b) upper bound solution of true ultimate load

c) lower bound solution of true ultimate load

d) no solution

Answer: b

6. Which load is obtained when equilibrium and plasticity conditions of plastic analysis are satisfied?

a) plastic limit load

b) upper bound solution of true ultimate load

c) lower bound solution of true ultimate load

d) no solution

Answer: c

7. What is principle of virtual work?

a) work done by external forces is greater than work done by internal forces

b) work done by external forces is less than work done by internal forces

c) work done by external forces is equal to work done by internal forces

d) work done by internal forces is greater than work done by external forces

Answer: c

8. Principle of virtual work is used to satisfy _____

a) mechanism condition

b) equilibrium condition

c) plasticity condition

d) no condition is satisfied

Answer: b

9. Virtual work is used to determine _____

a) yield load

b) elastic load

c) plastic load

d) collapse load

Answer: d

10. What is static theorem ?

a) load must be greater than collapse load

b) load must be less than collapse load

c) load must be not equal to collapse load

d) load cannot be related to collapse load

Answer: b

11. Which of the following is true about static theorem?

a) it represents upper limit to true ultimate load

b) it represents plastic load

c) it has minimum factor of safety

d) it satisfies equilibrium and yield conditions

Answer: d

12. Which of the following condition is true for kinematic theorem?

a**) load must be greater than collapse load**

b) load must be less than collapse load

c) load must be not equal to collapse load

d) load cannot be related to collapse load

Answer: a

13. Which of the following is true about kinematic theorem?

a) it represents lower limit to true ultimate load

b) it represents plastic load

c) it has small factor of safety

d) it satisfies equilibrium and yield conditions

Answer: c

14. Which of the following condition is true for uniqueness theorem?

a) load must be greater than collapse load

b) load must be less than collapse load

c) load must be equal to collapse load

d) load cannot be related to collapse load

Answer: c

15. Load is called as correct collapse load when

a) static theorem is not satisfied

b) kinematic theorem is not satisfied

c) only static theorem is satisfied

d) both static and kinematic theorem are satisfied

Answer: d

16. Which of the following is true about kinematic analysis?

a) virtual work equations are not used to determine collapse load

b) virtual work equations are used to determine collapse load

c) equilibrium condition is assumed

d) plasticity condition is assumed

Answer: b

17. The number of independent mechanism is related to number of possible plastic hinge locations by _____

a) n = h * r

b) n = h / r

c) n = h + r

d) n = h – r

Answer: d

18. In static method of analysis, moment at any section is _____ plastic moment capacity.

a) greater than

b) two times

c) less than

d) three times

Answer: c

19. Which of the following relation between load factor, collapse load(Wc) and working load (W)

a) $F = W_c / W$

b) $F = W / W_c$

c) $F = W_c W$

d) $F = W_c + W$

Answer: a

20. Which of the following is load factor for simply supported beam with central point load?

a) $(f_y f_{bc})v$

b) $(f_{bc}/ f_y)v$

c) $(f_y/f_{bc})v$

d) $(f_y + f_{bc})v$

Answer: c

21. Single bay portal frames with fixed bases have _____

a) two redundancies

b) three redundancies

c) four redundancies

d) zero redundancies

Answer: b

22. If order of indeterminacy is r, then minimum number of plastic hinges required for total collapse is _____

a) r-1

b) r

c) r+1

d) r+2

Answer: c

23. . Which of the following statement is true?

a) combined mechanism is combination of elementary mechanism

b) elementary mechanism is combination of combined mechanism

c) combined mechanism is not combination of elementary mechanism

Answer: a

24. The presence of axial equation implies that _____

a) sum of tension forces is always zero

b) sum of compression forces is always zero

c) sum of tension and compression forces is not zero

d) sum of tension and compression forces is zero

Answer: c

25. Which method is used when mechanism is applied to structures with sloping members?

a) method of instantaneous centre

b) method of centre

c) method of seismic centre

d) method of metacenter

Answer: a