



MPPSC (AE) 2017 Test Series

Test 05

Test ID: 835

Date: 19/06/2017

Time: 60 Minutes

Total Marks: 120

Topics:

RCC & STEEL STRUCTURES

Instructions for Candidates

1. Do not open the Question Booklet until you are asked to do so by the invigilator.
2. This Question Booklet contains **04** pages. After you are permitted to open the booklet, please check all pages and report discrepancies, if any, to the invigilator.
3. There are a total of 40 **questions** carrying **120 marks**. All these questions are of objective type. Each Question has only **one** correct answer. Questions must be answered on the Back side of the **OMR** by darkening the appropriate bubble (marked A, B, C, D) using **ONLY** a **black/blue ink ball point pen** against the question number. **For each question darken the bubble of the correct answer**. More than one answer bubbled against a question will be treated as an incorrect response.
4. Since bubbles darkened by the black/blue ink ball point pen **cannot** be erased, candidates should darken the bubbles in the OMR very carefully.
5. Questions 01 – 40 belong to **RCC AND STEEL STRUCTURES** carrying 03marks each.
6. Unattempted questions will result in zero mark and also **there is no negative marking** for wrong answers.
7. Calculator, charts, graph sheets or tables are **NOT** allowed in the examination hall.
8. Rough work can be done on the question paper itself. Rough Work on Answer sheet is strictly prohibited otherwise answer sheet will be rejected.
9. **Use of mobile is strictly prohibited during exam.**
10. Before the start of the examination, write your name and registration number in the space provided below using a black ink ball point pen.

Name of Student	
Batch (B1/B3)	
Registration Number	

Q.1. The limiting compressive strain in concrete is

- (a) 0.0035 (b) 0.0015 (c) 0.0025 (d) 0.015

Q.2. The characteristic strength of cold worked deformed bars is determined at

- (a) 0.1% of strain (b) 2% of strain
(c) Ultimate strain (d) none of the above

Q.3. The form work for RCC structures can be removed after

- (a) 1 day (b) 3 days
(c) 7 days (d) 14 days

Q.4. The probability of failure implied in limit state design is of the order of

- (a) 10^{-2} (b) 10^{-3} (c) 10^{-4} (d) 10^{-5}

Q.5. If a simply supported concrete beam, prestressed with a force of 2500 kN, is designed by load balancing concept for an effective span of 10 m and to carry a total load of 40 kN/m, the central dip of the cable profile should be

- (a) 100 mm (b) 200 mm (c) 300 mm (d) 400 mm

Q.6. For the design of a simply supported RCC T-beam, the ratio of the effective span to the overall depth of the beam should not exceed

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

Q.7. The main reinforcement of a RC slab consists of 10 mm bars at 10 cm spacing. If it is desired to replace 10 mm bars by 12 mm bars, then the spacing of 12 mm bars should be

- (a) 12 cm (b) 14 cm (c) 14.40 cm (d) 16 cm

Q.8. A simply supported isotropic ally reinforced square slab of side 4 m is subject to a service load of 6 kPa. The thickness of the slab is 120 mm. The moment of resistance required as per yield line theory is

- (a) 9 kNm (b) 9 kNm/m
(c) 13.2 kNm (d) 13.2 kNm/m.

Q.9. A square slab 4 m × 4 m is isotropically reinforced at the bottom. If it is subjected to a working load 12 kPa (including self weight), the moment capacity required as per yield line theory is

- (a) 6 kNm/m (b) 8 kNm/m
(c) 10 kNm/m (d) 12 kNm/m.

Q.10. The conventional flexure theory is not applicable to fasteners when the length to diameter ratio of the fasteners is less than

- (a) 2.5 (b) 4 (c) 10 (d) 15

Q.11. A single –angle tie of a welded steel truss in an industrial shed is required to be design for an axial tension of 50 kN. If the steel is of grade Fe 410, then the most suitable section satisfying IS: 800 codal requirements will be

- (a) ISA 75 50 6 (b) ISA 60 60 5
(c) ISA 60 60 5 (d) ISA 45 30 5.

Q.12. The steel plate is 30cm wide and 10 mm thick. A bolt of 18 mm nominal diameter is driven. The net sectional area of the plate is

- (a) 18.00 cm² (b) 28.20 cm²
(c) 28.05 cm² (d) 32.42 cm²

Q.13. The slenderness ratio of lacing flats is limited to

- (a) 350 (b) 250 (c) 180 (d) 145

Q.14. The deflection of simple steel beams is limited to span divided by

- (a) 180 (b) 150 (c) 325 (d) 360

Q.15. Angel section purlin can be designed by IS: code if the roof slope is less than

- (a) 10° (b) 20° (c) 30° (d) code is silent.

Q.16. The effective length of compression flange of a simply supported beam not restrained against torsion at ends is k times the span, where k is

- (a) 0.70 (b) 0.85 (c) 1.00 (d) 1.20

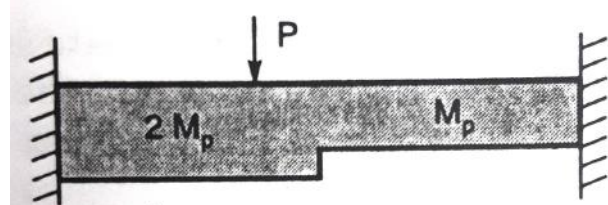
Q.17 The maximum shear force at a section is 56 kN. An ISWB of height 350 mm, breadth 200 mm, thickness of web 8 mm, with a section modulus of 887 cm^3 is used as a beam at the section. The shearing stress is

- (a) 10 N/mm (b) 20 N/mm^2
 (c) 28.4 N/mm^2 (d) 41.6 N/mm^2

Q.18. Gross flange area for a riveted plate girder is to be designed considering net area as 80% of its gross area. Consider width of the flange as 500 mm while web plate as $1000 \text{ mm} \times 12 \text{ mm}$. The girder is to resist a maximum BM of 4500 kNm. Maximum allowable bending stress in tension is 150 MPa. Gross flange area is

- (a) 22000 mm^2 (b) 35500 mm^2
 (c) 46000 mm^2 (d) 73000 mm^2

Q.19. A fixed beam is shown in figure. The plastic failure load for this beam is



- (a) 10.0 Mp/L (b) 12.5 Mp/L
 (c) 15.0 Mp/L (d) 16.5 Mp/L

Q.20. Limit state method of R.C.C. design takes care of structure

A. Its safety

B. Its fitness throughout its designed life.

Select your answer code from the list given below:

- (a) Both A and B are true
 (b) A is true but is not true
 (c) A is not true but B is true
 (d) Both A and B are not true.

Q. 21. Limit state method is based on probable

A. Load

B. Strength.

Select your answer code from the list given below:

- (a) Both A and B are true
 (b) A is true and B is false
 (c) A is false and B is true
 (d) Both A and B are false

Q.22. Characteristic load means

- (a) Maximum load (b) Mean load
 (c) Mean load + 5 % of standard deviation
 (d) Mean load + 10 % of standard deviation

Q.23. Characteristic strength is

- (a) Minimum assured strength
 (b) Minimum assured strength +1.64 times standard deviation
 (c) Mean strength
 (d) Mean strength + 1.64 times standard deviation

Q.24. If standard deviation is 4 N/mm^2 , the mean strength of M : 20 concrete should be

- (a) 16 N/mm^2 (b) 20 N/mm^2
 (c) 24 N/mm^2 (d) 26.4 N/mm^2

Q.25. Partial safety factors for dead load and imposed load combination for limit state of serviceability are

- (a) 1.0 and 1.0 (b) 1.5 and 1.5
 (c) 1.2 and 1.2 (d) 1.0 and 0.8

Q.26. Loss of prestress due to friction occurs

- (a) Only in pre-tensioned beams
 (b) Only in post-tensioned beams
 (c) In both pre-tensioned and post-tensioned beams
 (d) None of the above

Q.27. High carbon content in the steel causes

- (a) Increase in tensile strength and ductility
 (b) Decrease in both tensile strength and ductility
 (c) Increase in tensile strength but decrease in ductility
 (d) Decrease in tensile strength but increase in ductility

Q.28. Assertion: In R.C. design, the nominal shear stress t_v should not exceed $t_{c \text{ max}}$ specified by code.

Reason: If t_v exceeds $t_{c \text{ max}}$, there will be compression. Failure of concrete instead of ductile failure of steel.

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true but R is not the correct explanation of A
 (c) A is true but R is false
 (d) A is false but R is true

Q.29. Assertion: In column transverse reinforcements should be provided. Reason: If transverse reinforcements are not provided column will buckle and fail.

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true but R is not the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

Q.30. Mild steel cannot be used for pressing since

- (a) Its strength is low
- (b) Percentage loss of prestress is high
- (c) It cannot be anchored easily
- (d) Both (a) and (c)

Q.31. The following statements are about characteristics of yield line pattern in a slab.

A: Yield lines are straight lines.

B: Yield lines either terminate at the boundary of the slab or at the intersection of other yield lines. C: Each segment of slab will be having axes of rotation all along its periphery. In the above statements

- (a) A, B and C are correct
- (b) Only A and B are correct
- (c) Only B and C are correct
- (d) Only A and C are correct

Q.32. The following are the statements about lug angle used to connected heavily loaded tension member to gusset plates.

- (i) The length of end connection is reduced
 - (ii) By using lug angles there will be saving in the gusset plate
 - (iii) Cost of connection increases due to additional fasteners and angle required
- (a) only (i) and (ii) are correct.
 - (b) only (i) and (iii) are correct.
 - (c) only (ii) and (iii) are correct.
 - (d) all the three are correct.

Q.33. Which one of the following is not a correct statement about lug angle connection?

- (a) By using lug angle, there will be saving in gusset plate.

(b) The connection of lug angle to main member shall preferably start in advance of the member to the gusset plate.

(c) Minimum of two bolts are used for connecting lug angle to the gusset plate.

(d) Maximum of five bolts should be used in the connection.

Q.34. Load carrying capacity of compression member depends upon

- (a) Cross-sectional area
- (b) End condition
- (c) Slenderness ratio
- (d) All the above

Q.35. IS 800–2007, divides sections into _____ number of buckling classes.

- (a) 3
- (b) 4
- (c) 5
- (d) 6

Q.36. The most economical section for a compression member is

- (a) Rectangular
- (b) I-shaped
- (c) Circular
- (d) Hollow circular

Q.37. For compression members most preferable I-section is

- (a) Light beam
- (b) Junior beam
- (c) Medium beam
- (d) Heavy beam

Q.38. Lacing and battening of columns is to increase _____ of column.

- (a) Sectional area
- (b) least radius of gyration
- (c) Section modulus
- (d) none of the above

Q.39. In case of bolted lacing, the width of lacing bars shall be _____ times the nominal diameter of the bolt.

- (a) 2
- (b) 3
- (c) 4
- (d) 6

Q.40. Assertion: Trusses comprise triangular figures. Reason: A pin-jointed stable figure is a triangle

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false
- (d) A is false but R is true