PGCET-2014

CE

DAY and TIME	COURSE	SUBJECT
DAY-1 10.30 am to 12.30 pm SESSION : FORENOON	ME/M.Tech/M.Arch courses offered by VTU/UVCE/UBDTCE	CIVIL ENGINEERING

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
100	150 MINUTES	120 MINUTES

MENTION YOUR PGCET NO.					QUESTION BOOKLET DETAILS	
					VERSION CODE	SERIAL NUMBER
					A - 1	103617

DOs :

1. Check whether the PGCET No. has been entered and shaded in the respective circles on the OMR answer sheet.
2. Ensure whether the circles corresponding to course and the specific branch have been shaded on the OMR answer sheet.
3. This Question Booklet is issued to you by the invigilator after the **2nd Bell i.e., after 10.25 a.m.**
4. The Serial Number of this question booklet should be entered on the OMR answer sheet.
5. The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
6. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts :

1. **THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.**
2. **The 3rd Bell rings at 10.30 a.m., till then;**
   - Do not remove the paper seal / polythene bag of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. This question booklet contains 75 (items) questions and each question will have one statement and four answers. (Four different options / responses.)
2. After the **3rd Bell is rung at 10.30 a.m.,** remove the paper seal / polythene bag of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
3. During the subsequent 120 minutes:
   - Read each question (item) carefully.
   - Choose one correct answer from out of the four available responses (options / choices) given under each question / item. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **only one response** for each item.
   - **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALL POINT PEN against the question number on the OMR answer sheet.**
4. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
5. After the **last Bell is rung at 12.30 pm,** stop marking on the OMR answer sheet and affix your **left hand thumb impression** on the OMR answer sheet as per the instructions.
6. Hand over the **OMR ANSWER SHEET** to the room invigilator as it is.
7. After separating the top sheet, the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
8. Preserve the replica of the OMR answer sheet for a minimum period of **ONE year.**
9. Only **Non-programmable** calculators are allowed.

Marks Distribution

PART-1 : 50 QUESTIONS CARRY ONE MARK EACH (1 TO 50)
PART-2 : 25 QUESTIONS CARRY TWO MARKS EACH (51 TO 75)

[Turn Over

CIVIL ENGINEERING

PART – 1

Each question carries one mark. **(50 × 1 = 50)**

1. The principle of super position is applicable when
   (A) Deflections are linear functions of applied forces
   (B) Material obeys Hooke's law
   (C) Affected by small deformations
   (D) None of the above

2. Chemically, marble is known as
   (A) Sedimentary rock (B) Metamorphic rock
   (C) Calcarious rock (D) Silicious rock

3. The minimum force required to slide a body of weight W on a rough horizontal plane is (where θ is angle of internal friction)
   (A) $W\sin\theta$ (B) $W\cos\theta$
   (C) $W\tan\theta$ (D) None of the above

4. The portion of the brick cut across the width is called as
   (A) Closer (B) Half brick
   (C) Bed (D) Bat

5. If the Young's modulus of a material is twice the modulus of rigidity, the Poisson's ratio of the material is
   (A) -1 (B) -0.5
   (C) 0.5 (D) Zero

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6. Rate of change of shear force is equal to

(A) Shear force (B) Deflection

(C) Slope (D) Loading

7. When a first class brick is immersed in cold water for 24 hours, it should not absorb water by weight more than

(A) 10% (B) 15%

(C) 20% (D) 25%

8. Maximum grade of concrete recommended for RCC by IS 456-2000 for moderate exposure is

(A) M15 (B) M20

(C) M25 (D) M30

9. Size of the fine aggregate should not exceed _____ mm.

(A) 2 (B) 3

(C) 3.75 (D) 4.75

10. Wall constructed with stores to protect the slopes of cutting in natural ground from the action of weathering agents is called

(A) Retaining wall (B) Breast wall

(C) Buttress (D) Parapet wall

11. The wedge shaped bricks forming an arch ring are called

(A) Soffits (B) Voussoirs

(C) Haunch (D) Spandrels

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12. The first reading taken on a bench mark with levelling staff inverted is entered in the field book as

(A) +ve fore sight (B) –ve fore sight

(C) –ve back sight (D) +ve back sight

13. If the staff is not held vertically at a levelling station, the reduced level calculated from the observation would be

(A) True RL (B) More than true RL

(C) Less than true RL (D) None of the above

14. In a whole circle bearing system, S25° 15′ E corresponds to

(A) 115° 15' (B) 154° 45'

(C) 205° 15' (D) 334° 15'

15. Closed contours with higher value inwards represents

(A) Depression (B) Hillock

(C) Plain surface (D) None

16. In a well conditioned triangle, no angle should be less than

(A) 30° (B) 40°

(C) 50° (D) 60°

17. When the velocity distribution is uniform over the cross section, the correction factor for the momentum is

(A) Zero (B) 1

(C) 4/3 (D) 2

18. The weight per unit volume of a liquid at a standard temperature and pressure is called

(A) Specific weight (B) Mass density

(C) Specific gravity (D) None

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19. The losses are more in

(A) Laminar flow (B) Transition flow

(C) Turbulent flow (D) Critical

20. The major loss of energy in long pipes is due to

(A) Sudden enlargement (B) Sudden contraction

(C) Gradual enlargement (D) Friction

21. When the metacentre of a floating body is lower than the centre of gravity, then the body will be in

(A) Unstable equilibrium (B) Stable equilibrium

(C) Neutral equilibrium (D) None are correct

22. A propped cantilever of span 'L' carries a uniformly distributed load of 'W' per unit run over its entire span. The value of prop reaction to keep the beam horizontal is

(A) WL/3 (B) 3WL/8

(C) WL/2 (D) 5WL/8

23. The maximum value of Poisson's ratio is

(A) 0.30 (B) 0.40

(C) 0.50 (D) 0.60

24. What is the minimum percentage of main reinforcement in RCC beam for Fe-415 grade steel ?

(A) 0.20 (B) 0.30

(C) 0.40 (D) 0.50

25. According to Indian standards the grading of fine aggregates is divided into

(A) 2 zones (B) 3 zones

(C) 4 zones (D) 5 zones

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26. The effective length of a chimney of 20 m height is taken as

(A) 10 m (B) 20 m

(C) 28.28 m (D) 40 m

27. The basic perfect frame is a

(A) Triangle (B) Rectangle

(C) Square (D) Hexagon

28. A RCC beam is tested in the laboratory, the first crack in the bending zone represents

(A) Modulus of elasticity (B) Modulus of rigidity

(C) Bulk modulus (D) Modulus of rupture

29. Modulus of elasticity of M 20 grade concrete is

(A) 25491 MPa (B) 20491 MPa

(C) 30491 MPa (D) 15491MPa

30. A beam of rectangular cross section is 100 mm wide and 200 mm deep. If the section is subjected to a shear force of 20 kN, then the maximum shear stress in the section is

(A) 1 MPa (B) 1.125 MPa

(C) 1.33 MPa (D) 1.5 MPa

31. Steel beam theory is used

(A) Design of simple steel beam

(B) Steel beams encased in concrete

(C) Doubly reinforced beams ignoring compressive strength of concrete

(D) Beams, if shear exceeds four time the allowable shear stress

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32. The maximum deflection of a fixed beam having central point load P is

(A) $PL^3/392EI$ (B) $PL^3/292EI$

(C) $PL^3/192EI$ (D) $PL^3/92EI$

33. Economical depth of plate girder corresponds to

(A) Minimum weight (B) Minimum depth

(C) Minimum stress (D) Minimum radius of gyration

34. If the resultant load passes through the shear centre of the built up steel section it will not produce

(A) Bending (B) Tension

(C) Compression (D) Torsion

35. The ratio of volume of voids to the total volume of the given soil mass is known as

(A) Porosity (B) Voids ratio

(C) Specific gravity (D) Water content

36. Black cotton soil exhibit large swelling and shrinkage due to presence of the following clay minerals :

(A) Kaolinite (B) Illite

(C) Montomorillonite (D) Holloysite

37. The angle of internal friction

(A) varies with the density of sand.

(B) varies with normal direct pressure.

(C) depends upon the particle shape and roughness.

(D) All the above.

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38. The process in which chlorination is done beyond the break point is called

(A) Pre chlorination (B) Post chlorination

(C) Super chlorination (D) Break point chlorination

39. For a given discharge, efficiency of sedimentation tank can be increased by

(A) Increasing depth of tank (B) Decreasing depth of tank

(C) Increasing surface area of tank (D) Decreasing surface area of tank

40. The most common cause of acidity in water is

(A) Carbon dioxide (B) Oxygen

(C) Hydrogen (D) Nitrogen

41. If the diameter of the main pipe is taken less than the economic diameter, then

(A) Head loss will be high (B) Cast of pipe will be less

(C) Both of (A) and (B) (D) None of the above

42. The portion of a road surface, which is used by vehicular traffic, is known as

(A) Carriage way (B) Shoulder

(C) Express way (D) All of these

43. The side slope of embankment for a railway track is taken as

(A) 1:1 (B) 1.5:1

(C) 2:1 (D) 2.5:1

44. The highest point on the road surface is called

(A) Crown (B) Camber

(C) Gradient (D) Berm

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45. Which test is performed for quick determination of quality of subgrade soil ?

(A) CBR
(B) Stripping
(C) Thread
(D) None of these

46. The super elevation is

(A) Directly proportional to the velocity of the vehicles
(B) Inversely proportional to the velocity of vehicles
(C) Directly proportional to the width of the pavement
(D) Inversely proportional to the width of the pavement

47. The performance of a well is measured by its

(A) Seepage capacity
(B) Specific yield
(C) Storage coefficient
(D) None of these

48. A perched aquifier is essentially found within

(A) Unconfined aquifier
(B) A confined aquifier
(C) An acquiclude
(D) None of these

49. Average delta of rice crop is nearly

(A) 30 cm
(B) 60 cm
(C) 120 cm
(D) 150 cm

50. If electrical conductivity of water is in between 250 to 750 mho/cm at 25° C, then it is classified as

(A) Low salinity
(B) Medium salinity
(C) High salinity
(D) Very high salinity

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PART – 2

Each question carries two marks. **(25 × 2 = 50)**

51. The horizontal shear acting on an element induces vertical shear, because of

(A) horizontal force is in equilibrium.

(B) horizontal and vertical force is in equilibrium.

(C) horizontal and vertical forces is in equilibrium along with moment equilibrium.

(D) only moment equilibrium.

52. For a given material bulk modulus is 140 kN/m^2 and modulus of rigidity is 80 kN/m^2. The value of Poisson's ratio is

(A) 0.2 (B) 0.26

(C) 0.25 (D) 0.33

53. A rigid bar fixed at both ends is heated from normal temperature to 10 °C higher, then what kind of stress is induced in the material of the bar

(A) Bending stresses (B) Shear stresses

(C) Compressive stresses (D) Tensile stresses

54. If the RL of the bench mark is 100.00 m the back sight is 1.215 m and fore sight is 1.870 m, the RL of the forward station is

(A) 99.345 (B) 100.345

(C) 100.655 (D) 101.870

55. The main plate of a transit is divided into 1080 equal divisions. 60 divisions of the vernier coincide exactly with 59 divisions of the main plate. The transit can read angles accurate upto

(A) 5″ (B) 10″

(C) 15″ (D) 20″

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56. A slab of wood 4 m × 4 m × 1 m, specific gravity 0.50 floats in water with 400 kg mass on it. The volume of the slab submerged in cubic meters is

(A) 1.6 (B) 6.4

(C) 8.4 (D) 10.0

57. Two pipes of same length and diameters d and 2d respectively are connected in series. The diameter of an equivalent pipe of same length is

(A) Less than d (B) Between d and 1.5d

(C) Between 1.5d and 2d (D) Greater than 2d

58. If the friction factor of the laminar flow through a circular pipe is 0.1, then the Reynold's no. of the flow will be

(A) 2000 (B) 320

(C) 640 (D) 64

59. If the resultant of two forces has the same magnitude as either of the force, then the angle between the two forces is

(A) 30° (B) 45°

(C) 60° (D) 120°

60. If the deflection at the free end of a uniformly loaded cantilever beam is 15 mm and the slope of the deflection curve at the free end is 0.02 radian, then the length of the beam is

(A) 0.8 m (B) 1.0 m

(C) 1.2 m (D) 1.5 m

61. If the depth of a simply supported beam is doubled and width made half, then the deflection of the beam decreases by a factor

(A) 2 (B) 4

(C) 6 (D) 8

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62. A simply supported beam having point load P at 1/3 span and uniform flexural rigidity. The deflection under the point load is

(A) $\frac{PL^3}{243EI}$ (B) $\frac{2PL^3}{243EI}$

(C) $\frac{3PL^3}{243EI}$ (D) $\frac{4PL^3}{243EI}$

63. Two ISMC 400 channels placed back to back at a spacing of 26 cm carry an axial load of 1600 kN, the lacing system should be designed to resist transverse shear of

(A) 16 kN (B) 40 kN

(C) 80 kN (D) 160 kN

64. Mohr's circle for the state of stress defined by $\begin{bmatrix} 30 & 0 \\ 0 & 30 \end{bmatrix}$ MPa is a circle with

(A) Centre at (0, 0) and radius 30 MPa

(B) Centre at (0, 0) and radius 60 MPa

(C) Centre at (30, 0) and radius 30 MPa

(D) Centre at (30, 0) and radius zero

65. When both ends of a column are fixed, the crippling load is P. If one end of the column is made free, the value of crippling load will be changed to

(A) P/16 (B) P/4

(C) P/2 (D) 4P

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66. A cantilever beam fixed at A and free at B is loaded with a point load 'P' at B. The first half portion from fixed end is rigid while other half has flexural rigidity EI. Identify the correct combination of deflection at free end B and bending moment at fixed end A respectively

(A) $\frac{PL^3}{3EI}$, 2PL

(B) $\frac{PL^3}{3EI}$, PL

(C) $\frac{PL^3}{24EI}$, PL

(D) $\frac{PL^3}{24EI}$, 2PL

67. A dry soil has a mass of specific gravity 1.35. If the specific gravity of solid is 2.7, then the voids ratio will be

(A) 0.5

(B) 1.0

(C) 1.5

(D) 2.0

68. In an unconfined compression test on a saturated clay, the undrained shear strength was found to be 6000 N/m^2. If a sample of the soil is tested in an undrained condition in triaxial compression at a cell pressure of 20000 N/m^2, the major principal stress at failure will be

(A) 48000 N/m^2

(B) 32000 N/m^2

(C) 24000 N/m^2

(D) 12000 N/m^2

69. A clay layer of thickness 10 cm and initial void ratio 0.5 undergoes settlement so that the final void ratio is 0.2. The settlement of the layer in cm is

(A) 1.0

(B) 1.5

(C) 2.0

(D) 4.5

70. The population of a town in 3 consecutive years are 5000, 7500 and 8400 respectively. The population of the town in the fourth consecutive year according to geometrical increase method is

(A) 9500

(B) 9800

(C) 10100

(D) 10920

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71. A water treatment work treats 6000 m^3 of water per day. If it consumes 20 kg chlorine per day, then chlorine dosage would be

(A) 2.33 mg/*l* (B) 5 mg/*l*

(C) 4 mg/*l* (D) 3.3 mg/*l*

72. The length of a valley curve formed by two gradient –3% and +2% for a rate of change of centrifugal acceleration 0.6 m/sec^2, for a design speed of 100 kmph is

(A) 16 m (B) 42 m

(C) 85 m (D) None of the above

73. As per IRC, the minimum length of transition curve for a mountainous terrain road with radius of curvature 100 m and design speed of vehicle 100 kmph is

(A) 270 m (B) 200 m

(C) 100 m (D) 170 m

74. The rainfall in four successive 12 hours period on catchment are 4, 8, 9 and 3 cm. If infiltration index for the storm is 0.5 cm/hr, then the total surface runoff will be

(A) 0 cm (B) 5 cm

(C) 12 cm (D) 18 cm

75. Total capacity of a reservoir is 25 million cubic metres and dead storage is 5 million cubic metres. If average volume of sediments deposition is 0.1 million cubic metre per year, then usefulness of reservoir will start reducing after

(A) 50 years (B) 150 years

(C) 200 years (D) 250 years

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(FINAL ANSWER KEY) CIVIL ENGINEERING

Q.NO.	A1	A2	A3	A4
1	A	C	D	C
2	C	C	A	C
3	A	B	D	A
4	D	B	G	C
5	D	A	D	A
6	D	B	C	C
7	C	A	C	A
8	C	C	A	A
9	D	D	D	A
10	B	A	A	B
11	B	B	C	A
12	C	C	D	C
13	C	A	C	B
14	B	C	C	A
15	B	D	A	C
16	A	A	C	A
17	B	D	A	D
18	A	G	C	D
19	C	D	A	D
20	D	C	A	C
21	A	C	A	C
22	B	A	B	D
23	C	D	A	B
24	A	A	C	B
25	C	C	B	C
26	D	D	A	C
27	A	C	C	B
28	D	C	A	B
29	G	A	D	A
30	D	C	D	B
31	C	A	D	A
32	C	C	C	C
33	A	A	C	D
34	D	A	D	A
35	A	A	B	B
36	C	B	B	C
37	D	A	C	A
38	C	C	C	C
39	C	B	B	D
40	A	A	B	A
41	C	C	A	D
42	A	A	B	G
43	C	D	A	D
44	A	D	C	C
45	A	D	D	C
46	A	C	A	A
47	B	C	B	D
48	A	D	C	A
49	C	B	A	C
50	B	B	C	D

Q.NO.	A1	A2	A3	A4
51	D	C	D	C
52	B	B	B	B
53	C	C	D	B
54	A	D	A	C
55	D	B	C	G
56	C	B	B	D
57	B	D	B	C
58	C	B	C	C
59	D	D	G	B
60	B	A	D	A
61	B	C	C	D
62	D	B	C	B
63	B	B	B	C
64	D	C	A	A
65	A	G	D	D
66	C	D	B	C
67	B	C	C	B
68	B	C	A	C
69	C	B	D	D
70	G	A	C	B
71	D	D	B	B
72	C	B	C	D
73	C	C	D	B
74	B	A	B	D
75	A	D	B	A