Question Paper and Final Answer Keys for the post of Junior Engineer (Civil)

Written Recruitment Examination for filling up of the post of Junior Engineer (Civil) in APWD was held on 26/02/2023 from 9.30 am to 11.30 am at Port Blair. The Question Paper and the Final Answer Keys of the written examination received from the agency engaged for conduct of examination based on the claims & objections is hereby published.

FINAL ANSWER KEY FOR THE POST OF JUNIOR ENGINEER (CIVIL)

SET-A

Q.No	Correct Option	Q.No	Correct Option	Q.No	Correct Option	Q.No	Correct Option
1	C	26	D	51	C	76	B
2	C	27	C	52	D	77	C
3	B	28	D	53	A	78	C
4	C	29	C	54	B	79	B
5	B	30	B	55	A	80	-
6	B	31	A	56	A	81	B
7	D	32	A	57	C	82	B
8	C	33	B	58	D	83	A
9	D	34	C	59	C	84	C
10	D	35	C	60	B	85	A
11	B	36	D	61	D	86	D
12	A	37	B	62	A	87	D
13	B	38	A	63	A	88	D
14	C	39	D	64	D	89	D
15	C	40	B	65	A	90	C
16	A	41	B	66	D	91	C
17	B	42	C	67	A	92	C
18	B	43	B	68	D	93	B
19	B	44	B	69	A	94	C
20	B	45	A	70	C	95	C
21	C	46	C	71	A	96	A
22	B	47	B	72	A	97	D
23	C	48	A	73	A	98	A
24	C	49	C	74	A	99	C
25	A	50	A	75	C	100	B

Note: Q. No. 80 is treated as Null & Void due to Error in the Question/Option, hence evaluation of OMR is done out of 99 Questions

WRITTEN EXAMINATION FOR THE POST: JUNIOR ENGINEER (CIVIL) - (SET - A)

1. Portland cement manufacture from pure white chalk and clay but free from iron-oxide is known as

(A) Quick setting cement
(B) Rapid Hardening Cement
(C) White Cement
(D) Low Heat Portland cement

2. The tendency of a stone is to split along
(A) Texture
(B) Fracture
(C) Cleavage
(D) Structure

3. The compound of Portland cement which contributes to the strength after two to three years is
(A) Tricalcium Silicate
(B) Di-calcium Silicate
(C) Tricalcium Aluminate
(D) Tetracalcium Alumino Ferrite

4. Initial setting of cement is caused due to
(A) Tricalcium Silicate
(B) Di-calcium Silicate
(C) Tricalcium Aluminate
(D) Tetracalcium Alumino Ferrite

5. Seasoning of timber is essential to remove
(A) Knots from timber
(B) Sap from timber
(C) Twisted fibre from timber
(D) Roughness of timber

6. In paints, the pigment is responsible for
(A) Durability
(B) Colour
(C) Smoothness
(D) Glassy face

7. The most durable varnish is
(A) Water varnish
(B) Spirit varnish
(C) Turpentine varnish
(D) Oil varnish

8. Plastic bitumen is generally used for
(A) Road pavements
(B) Expansion joints
(C) Crack fillings
(D) Contraction joints

9. For a good building stone, its specific gravity should be greater than
(A) 1.5
(B) 1.7
(C) 2.2
(D) 2.7

10. The curvature of the earth's surface is taken into account only if the extent of survey is more than
(A) 100 sq.km
(B) 160 sq.km
(C) 200 sq.km
(D) 260 sq.km

11. The main principle of surveying is to work
(A) From part to the whole
(B) From whole to the part
(C) From higher level to the lower level
(D) From lower level to the higher level

12. Determining the difference in elevation between two points on the surface of the earth is known as
(A) Differential levelling
(B) Levelling
(C) Simple levelling
(D) Longitudinal levelling

13. During levelling if back sight is more than foresight
(A) The forward staff is at lower point
(B) The back staff is at lower point
(C) The difference in level cannot be ascertained
(D) The difference in level can be ascertained

14. The boundary of water of a still lake represents the
(A) Level surface
(B) Horizontal surface
(C) Contour line
(D) A concave surface

15. In setting up a plane table at any station
(A) Levelling is done first
(B) Centering is done first
(C) Both levelling and centering are done simultaneously
(D) Orientation is done first

16. The angle of intersection of a curve is the angle between
(A) Back tangent and forward tangent
(B) Prolongation of back tangent and forward tangent
(C) Forward tangent and long chord
(D) Back tangent and long chord

17. The chord of a curve less than peg interval is known as
(A) Small chord
(B) Sub-chord
(C) Normal chord
(D) Short chord

18. An ideal vertical curve to join two gradients is
(A) Circular
(B) Parabolic
(C) Elliptical
(D) Hyperbolic

19. A steady uniform flow is through
(A) A long pipe at decreasing rate
(B) A long pipe at constant rate
(C) An expanding tube at constant rate
(D) An expanding tube at increasing rate

20. In fluids, steady flow occurs when
(A) Conditions of flow change steadily with time
(B) Conditions of flow do not change with time at a point
(C) Condition of flow remains the same at adjacent point
(D) Velocity vector remains constant at a point

21. The upper surface of the weir over which water flows is known as
(A) Vein
(B) Nappe
(C) Sill
(D) Orifice

22. The phenomenon occurring in an open channel when a rapidly flowing stream abruptly changes to a slowly flowing stream causing a distinct rise of liquid surface is
(A) Water hammer
(B) Hydraulic jump
(C) Critical discharge
(D) Friction Head loss

23. Bernoulli's theorem is applicable in the case of
(A) Compressible liquid in streamlined flow
(B) Compressible liquid in turbulent flow
(C) Incompressible liquid in streamlined flow
(D) Incompressible liquid in turbulent flow

24. The maximum bending moment for a simply supported beam with a uniformly distributed load w/unit length is
(A) wl/2
(B) $wl^2/4$
(C) $wl^2/8$
(D) $wl^2/12$

25. The point of contraflexure is the point where
(A) Bending moment changes sign
(B) Bending moment is maximum
(C) Bending moment is minimum
(D) Shear Force is zero

26. The moment of inertia of a circular section about any Diameter D, is
(A) $\pi D^2/64$
(B) $\pi D^4/32$
(C) $\pi D^3/64$
(D) $\pi D^4/64$

27. The moment of inertia of a rectangular section of width B and depth D about an axis passing through C.G and parallel to its width is
(A) $BD^2/6$
(B) $BD^3/6$
(C) $BD^3/12$
(D) $B^2D/6$

28. The maximum deflection due to a load W at the free end of a cantilever of length L and having flexural rigidity EI
(A) $WL^2/2EI$
(B) $WL^2/3EI$
(C) $WL^3/2EI$
(D) $WL^3/3EI$

29. The maximum deflection due to a uniformly distributed load w/unit length over entire span of cantilever of length l and of flexural rigidity EI, is
(A) $wl^4/12EI$
(B) $wl^4/3EI$
(C) $wl^4/8EI$
(D) $wl^3/3EI$

30. The maximum deflection of a simply supported beam of span L, carrying an isolated load W at the centre of the span, flexural rigidity being EI, is
(A) $WL^3/8EI$
(B) $WL^3/48EI$
(C) $WL^3/24EI$
(D) $WL^3/3EI$

31. The ratio of shear stress and shear strain of an elastic material is
(A) Modulus of Rigidity
(B) Poisson's ratio
(C) Young's modulus
(D) Modulus of Elasticity

32. The moment diagram for a cantilever carrying a concentrated load at its free end is
(A) Triangle
(B) Rectangle
(C) Parabola
(D) Cubic parabola

33. How many components does a harbor comprise of?
(A) 5
(B) 10
(C) 15
(D) 20

34. _____ is a type of utility-based harbor.
(A) River harbour
(B) Artificial harbour
(C) Commercial harbour
(D) Canal harbour

35. The solid parallel platform in a harbour with berthing facility on one side only is:
(A) Pier
(B) Quay
(C) Wharf
(D) Jetty

36. Which of the below does not affect the site-selection of an airport site?
(A) Adequate access
(B) Air traffic potential
(C) Sufficient airspace
(D) Number of ground staff

37. Which of the following ensures standardization of Air Traffic Management services worldwide?
(A) FAA
(B) ICAO
(C) IAO
(D) DGCA

38. Who are not required to contact the Air Traffic Management for navigation?
(A) Visual Flight Rules operator
(B) Pilot
(C) Instrument Flight Rules operator
(D) Co-Pilot

39. Transition curves are provided on the approach to horizontal curves in order to
(A) increase jerk to allowable levels
(B) minimize the length of the horizontal curve
(C) simplify the laying out and construction of the horizontal curve
(D) reduce jerk to allowable levels

40. The ideal form of curve for the summit curve is
(A) Spiral
(B) Parabola
(C) Circle
(D) Lemniscates

41. Bituminous materials are commonly used in highway construction because of their good
(A) tensile and compression properties
(B) binding and water proofing properties
(C) shear strength and tensile properties
(D) bond and tensile properties

42. The penetration test for bitumen is conducted at a temperature of
(A) 60°C
(B) 37°C
(C) 25°C
(D) 50°C

43. Alligator or map cracking is the common type of failure in
(A) concrete pavements
(B) bituminous surfacing
(C) gravel roads
(D) WBM construction

44. In highway pavements emulsions are mainly used in
(A) surface dressing
(B) patching and maintenance
(C) bitumen macadam
(D) asphaltic concrete

45. If the total number of commercial vehicles per day ranges from 3000 to 6000, the minimum percentage of commercial traffic to be surveyed for axle load is
(A) 15
(B) 20
(C) 25
(D) 30

46. Bitumen is derived from
(A) destructive distillation of coal tar
(B) destructive distillation of petroleum
(C) fractional distillation of petroleum
(D) naturally occurring ores

47. As per IS 456 – 2000 for the design of reinforced concrete beam, the maximum allowable shear stress (τ_{max}) depends on the
(A) grade of concrete and grade of steel
(B) grade of concrete only
(C) grade of steel only
(D) grade of concrete and percentage of reinforcement

48. The lateral ties in a reinforced concrete rectangular column under axial compression are used to
(A) avoid the buckling of the longitudinal steel under compression
(B) provide adequate shear capacity
(C) provide adequate confinement to concrete
(D) reduce the axial deformation of the column

49. In a plate girder, the web plate is connected to the flange plates by fillet welding. The size of the fillet welds is designed to safely resist
(A) the bending stresses in the flanges.
(B) the vertical shear force at the section.
(C) the horizontal shear force between the flanges and the web plate.
(D) the forces causing buckling in the web.

50. Which of the following elements of a pitched roof industrial steel building primarily resists lateral load parallel to the ridge?
(A) bracings
(B) purlins
(C) truss
(D) columns

51. A steel beam supporting loads from the floor slab as well as from wall is termed as
(A) Stringer beam
(B) Lintel beam
(C) Spandrel beam
(D) Header beam

52. 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

53. Which of the following is a type of Chemical Weathering?
(A) Oxidation
(B) Wedging
(C) Abrasion
(D) Temperature effect

54. When Cu > 4 and Cc lies between 1 and 3 the soil can be classified as
(A) Uniformly graded soil
(B) Well graded soil
(C) Gap graded soil
(D) Coarse-grained soil

55. Match the following:

Compaction equipment's	Usage
1) Tampers	i. for cohesive and non-cohesive soils
2) Pneumatic tyred rollers	ii. for clays
3) Sheep foot roller	iii. For confined trenches
4) Vibratory compactors	iv. For granular soils

(A) 1 – iii, 2 – i, 3 – ii, 4 – iv
(B) 1 – iv, 2 – iii, 3 – ii, 4 – i
(C) 1 – iii, 2 – ii, 3 – iv, 4 – i
(D) 1 – ii, 2 – i, 3 – iii, 4 – iv

56. Soil is said to be highly permeable when
(A) $K > 10^{-1}$ cm/sec
(B) $K > 10^{-3}$ cm/sec
(C) $K < 10^{-1}$ cm/sec
(D) $K < 10^{-3}$ cm/sec

57. The symbol 'SM' indicates
(A) Sandy silt
(B) Medium silt
(C) Silty sand
(D) Medium sand

58. Identify the **INCORRECT** pair from the following
(A) Alluvial soils - Transported by running water
(B) Lacustrine soils - Deposited at the bottom of lakes
(C) Talus - soil transported by gravitational force
(D) Loess - soil transported by glaciers

59. If the actual observed value of standard penetration resistance N is greater than 15 in a fine sand layer below water table, then equivalent penetration resistance will be
(A) $15 + \frac{(N+15)}{2}$
(B) $15 - \frac{(N+15)}{2}$
(C) $15 + \frac{(N-15)}{2}$
(D) $15 + \frac{(15-N)}{2}$

60. Match the following

Type of Boring	Usage
1) Auger boring	I. For drilling holes
2) Rotary drilling	II. Advancing holes in the ground
3) Core drilling	III. drilling holes in clay
4) Percussion drilling	IV. Sampling for highways, railways etc.,

	1	2	3	4
(A)	IV	I	III	II
(B)	IV	III	I	II
(C)	II	III	I	IV
(D)	I	II	III	IV

61. Sieve analysis on a dry soil sample of mass 1000 g showed that 980 g and 270 g of soil pass through 4.75mm and 75 μ sieves, respectively. The liquid limit and plastic limits of the soil fraction passing through 425 μ sieves are 55% and 25% respectively. The soil may be classified as _____

(A) GC
(B) SM
(C) GM
(D) SC

62. In water treatment, slow sand filters when compared to rapid sand filters produce

(A) lesser contaminated effluent
(B) More contaminated effluent
(C) Equally contaminated effluent
(D) Cannot be judged

63. The presence of silver, (Ag) in drinking water causes

(A) Argyria
(B) Hypertension
(C) Anaemia
(D) Blue baby disease

64. Manhole covers are circular in shape to

(A) strengthen the cover
(B) make entry convenient
(C) for architectural reasons
(D) prevent falling of cover into a manhole

65. Match the Characteristics of water in Group – A with the corresponding test used for measuring in Group – B

Group A	Group B
P. Color	1. Nephelometer
Q. Turbidity	2. EDTA
R. Ph	3. Tintometer
S. Hardness	4. Potentiometer

	P	Q	R	S
(A)	3	1	4	2
(B)	4	3	1	2
(C)	1	4	3	2
(D)	2	1	3	4

66. While analysing the cost of a building, water charges are added on those items which require water in construction and these charges are generally added at the rate of about

(A) 20% of the total cost
(B) 10% of the total cost
(C) 5% of the total cost
(D) 1% of the total cost

67. The order of booking dimensions is

(A) Length, breadth, height
(B) Breadth, length, height
(C) Height, breadth, length
(D) Length, height, breadth

68. Pick up the item of work NOT included in the plinth area estimate

(A) Wall thickness
(B) Room area
(C) W.C. area
(D) Courtyard area.

69. The unit of measurement for a half brick wall is:
(A) Square metre
(B) Cubic metre
(C) metre
(D) Cubic foot

70. The expected out turn for earthwork in excavation in ordinary soil per mazdoor per day is
(A) 1.00 cubic meter
(B) 2.00 cubic meter
(C) 3.00 cubic meter
(D) 4.00 cubic meter

71. The most reliable Estimate is
(A) Detailed estimate
(B) Plinth area estimate
(C) Preliminary estimate
(D) Cube rate estimate

72. When the life of a building is over, the demolished materials (like steel, bricks, etc) will retrieve a certain value. What is the value called?
(A) Scrap value
(B) Book value
(C) Market value
(D) Potential value

73. Group – I contains some properties of concrete/cement and Group II contains a list of some tests on concrete/cement. Match the property with the corresponding test.

Group I	Group II
P. Direct tensile strength of concrete	1. Cylinder splitting test
Q. Workability of concrete	2. Surface area test
R. Bond between steel and concrete	3. Vee – bee tests
S. Fineness of cement	4. Fineness modulus test
	5. Pullout test

	P	Q	R	S
(A)	1	3	5	4
(B)	5	2	1	3
(C)	2	3	1	4
(D)	2	1	5	3

74. The minimum cement content to be used in Reinforced cement concrete for mild exposure is
(A) 300 kg/m^3
(B) 320 kg/m^3
(C) 340 kg/m^3
(D) 450 kg/m^3.

75. Nominal cover to main reinforcement in case of slabs with mild exposure should be
(A) 30 mm
(B) 25 mm
(C) 20 mm
(D) 40 mm

76. The individual variation in compressive strength of three cubes in the sample should not exceed
(A) ±10%
(B) ±15%
(C) ±20%
(D) ±25%

77. Which of the following pairs are incorrect with reference to ordinary Portland cement?

(i) Initial setting time - 30 minutes
(ii) Final setting time – 10 hours
(iii) Normal consistency – 10%
(iv) All are correct

(A) iv
(B) ii and iii
(C) iii only
(D) i and iii

78. The most commonly used admixture to accelerate the initial setting time of concrete is

(A) Gypsum
(B) Calcium Carbonate
(C) Calcium Chloride
(D) Calcium Ferrate

79. A sand is said to be unsuitable for construction if it has a Fineness Modulus of more than.

(A) 2.9
(B) 3.2
(C) 3.9
(D) 4.0

80. Type of work & Slump recommended

Type of Work	Slump Recommended
1. Concrete for road works	20 - 28mm
2. Ordinary RCC work	50 - 100mm
3. Mass concrete	75 - 175mm
4. Columns – retaining walls	12 - 25mm

Which of the following pairs are correctly matched

(A) 1,3 and 4
(B) 1 and 3
(C) 3 and 4
(D) 2 and 4

81. In each question given below, identify the word which is **similar in meaning** (synonym) to the question word.

BRIEF

(A) Limited
(B) Short
(C) Small
(D) Little

82. In each question given below, identify the word which is **opposite in meaning** (antonym) to the question word.

ARTIFICAL

(A) Truthful
(B) Natural
(C) Solid
(D) Simulated

83. Find the correctly spelt words.

(A) Efficient
(B) Treatmeant
(C) Beterment
(D) Employd

84. Read the sentence to find out whether there is any grammatical error in it. The error, if any will be in one part of the sentence. The letter of that part is the answer. If there is no error, the answer is 'D'. (Ignore the errors of punctuation, if any).

(A) An Indian ship
(B) laden with merchandise
(C) got drowned in the Pacific Ocean.
(D) No error

85. In the first 10 overs of a cricket game, the run rate was only 3.2. What should be the run rate in the remaining 40 overs to reach the target of 282 runs?

(A) 6.25
(B) 6.5
(C) 6.75
(D) 7

86. Which one of the following is not a prime number?

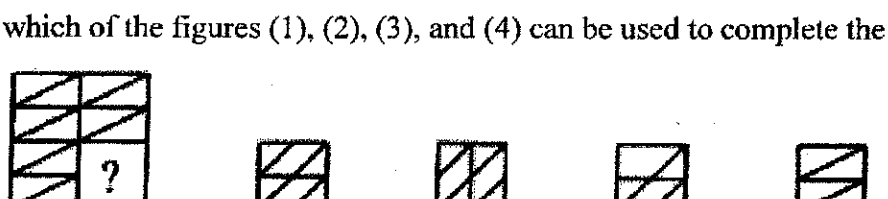
(A) 31
(B) 61
(C) 71
(D) 91

87. What should come in the place of question mark in the following series?

3, 8, 6, 14, ?, 20

(A) 11
(B) 10
(C) 8
(D) 9

88. Find out which of the figures (1), (2), (3), and (4) can be used to complete the figure (X) ?



(X) (1) (2) (3) (4)

(A) 1
(B) 2
(C) 3
(D) 4

89. Arrange the words given below in a meaningful sequence.

1. Police	2. Punishment	3. Crime
4. Judge	5. Judgement	

(A) 3, 1, 2, 4, 5
(B) 1, 2, 4, 3, 5
(C) 5, 4, 3, 2, 1
(D) 3, 1, 4, 5, 2

90. Choose the alternative which closely resembles the water image of the given combination.

A1M3b

(1) A1M3P
(2) A1M3P
(3) A1M3P
(4) A1M3P

(A) 1
(B) 2
(C) 3
(D) 4

91. In which state was the country's first high-quality lithium reserve discovered?

(A) Mizoram
(B) Rajasthan
(C) Jammu & Kashmir
(D) Tamil Nadu

92. In which city, for the first time, India and the US organized 'Exercise Tarkash' in response to nuclear, chemical, and biological terrorist attacks?

(A) Kanpur
(B) Ajmer
(C) Chennai
(D) Bikaner

93. The ratio of width to its length in our National flag is

(A) 3:5
(B) 2:3
(C) 2:4
(D) 3:4

94. The Central Building Research Institute of CSRI is located at.

(A) Delhi
(B) Chennai
(C) Roorkee
(D) Kanpur

95. Which among the following is **NOT** located in Andaman & Nicobar Island?

(A) Mahatma Gandhi Marine National Park
(B) Campbell Bay
(C) Guindy National Park
(D) North Button Island National Park

96. Which of the following is the official language of Andaman and Nicobar Island?

(A) Hindi
(B) Tamil
(C) Telugu
(D) Bengali

97. The capital of the Andaman and Nicobar Islands Port Blair is located in which of the following part of Andaman Island?

(A) Middle Andaman
(B) North Andaman
(C) Little Andaman
(D) South Andaman

98. Which one is the state bird of Andaman Nicobar Islands.

(A) Wood Pigeon
(B) Woodpecker
(C) Common Blackbird
(D) Stock dove

99. Which one is the state animal of Andaman Nicobar Islands?

(A) Platypus
(B) Tapir
(C) Dugong
(D) Manatee

100. Which Island contains the only active volcano in South Asia?

(A) Smith Island
(B) Barren Island
(C) Neil Island
(D) Narcondam Island