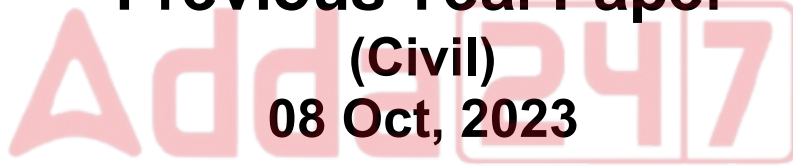


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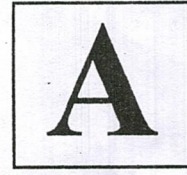
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Time Allowed – 2 hours (Two hours)

Maximum Marks – 100

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2. **ENCODE CLEARLY THE TEST BOOKLET SERIES A,B,C OR D AS THE CASE MAY BE IN THE APPROPRIATE PLACE IN THE ANSWER SHEET BY BLACK BALL POINT PEN ONLY.**
3. This Test Booklet contains 100 items (questions). Each question has four responses (answers). You will select the responses which you want to make on the Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the most appropriate. In any case, choose **ONLY ONE** response for each item.
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5. All items carry equal marks.
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Four options are given against each of the following questions. Select the correct option from the four options and encode it in the Answer Sheet by using **Black Ball Point Pen** only as per example given below :

Example P : Aunt Polly wanted to trap Tom _____ damaging confessions.

- (A) into (B) with (C) by (D) on

Example Q : Let's watch _____ movie ; I mean 'Pathar Panchali'.

- (A) a (B) an (C) the (D) No article is needed

PART - A

Direction for Question Nos. 1 to 4.

Choose the appropriate prepositions/articles for the blank spaces from the given alternatives.

1. Fix the portrait _____ the TV.

- (A) inside (B) over
(C) under (D) above

2. This will be very useful _____ me.

- (A) to (B) for
(C) with (D) of

3. Kolkata stands on _____ Ganges.

- (A) the (B) an
(C) a (D) No article is needed

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4. My brother has settled in _____ United States.

- (A) a (B) an
(C) the (D) No article is needed

Direction for Question Nos. 5 and 6

Find out words having the same or nearly the same meaning to the underlined words in the sentences from the given options.

5. Narayana Hemachandra's dress was rather queer.

- (A) Clumsy (B) Dirty
(C) Strange (D) Funny

6. Do not tread on the flower beds.

- (A) Jump (B) Walk
(C) Run (D) Cross

Direction for Question Nos. 7 and 8

Choose from the given options/words opposite in meaning to the underlined words in the sentences.

7. She has not strength enough to walk upstairs.

- (A) Weakness (B) Courage
(C) Diffidence (D) Promptness

8. We must get to the bottom of this mystery.

- (A) Profile (B) Border
(C) Height (D) Top

Direction for Question Nos. 9 and 10

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The underlined and lettered parts of each sentences below may contain an error in grammar, usage, words choice (diction). or expression (idiom). Read each sentence carefully and identify which item if any, contains an error. If it contains no error, answer is D.

9. At the conclusion of the meeting, the new members sweared that they would

A

B

never reveal the secret.

No error

C

D

(A) At the conclusion

(B) Sweared

(C) Never reveal

(D) No error

10. With the development of antitoxins and serums, there are hardly no cases of smallpox

A

B

or yellow fever anywhere in the world.

No error

C

D

(A) With the development

(B) No

(C) Anywhere

(D) No error

11. Tripura acceded to the Indian Union on

(A) 15th August, 1947

(B) 9th September, 1949

(C) 15th October, 1949

(D) 21st January, 1972

12. Who was the Chief Justice of the Supreme Court of India just before the Chief Justice of the Supreme Court of India, Shri D. Y. Chandrachud ?

(A) Justice S. N. Kaul

(B) Justice K. M. Joseph

(C) Justice C. R. Mathur

(D) Justice U. U. Lalit

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13. Where is the Kuno National Park situated ?

- (A) Uttar Pradesh (B) Madhya Pradesh
(C) Uttarakhand (D) Rajasthan

14. Where was the Venue of the 108th Indian Science Congress that was held in January, 2023 ?

- (A) Nagpur (B) Indore
(C) Pune (D) Hyderabad

15. In the year 2022, Maharaja Bir Bikram College of Tripura celebrated the

- (A) Silver Jubilee (B) Golden Jubilee
(C) Platinum Jubilee (D) Centenary

16. In which Cricket Tournament female umpire officiated for the first time in India ?

- (A) Duleep Trophy (B) Deodhar Trophy
(C) Vijay Hazra Trophy (D) Ranji Trophy

17. What is the fixed interest rate declared in 2023 for the 'Mahila Samman Bhachat Patra' ?

- (A) 7% (B) 7.5%
(C) 8% (D) 8.5%

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18. India's first ever Night Sky Sanctuary set up in which State to boost Astro Tourism ?

- (A) Ladakh (B) Jammu and Kashmir
(C) Uttarakhand (D) Himachal Pradesh

19. PM Narendra Modi has recently launched the World's longest river cruise 'Ganga Vilas' from Varanasi to

- (A) Guwahati (Assam) (B) Dibrugarh (Assam)
(C) Dhaka (Bangladesh) (D) Kolkata (West Bengal)

20. Which country has formally adopted the Euro as its currency, making it the 20th member State of European Union ?

- (A) Greece (B) Croatia
(C) Romania (D) Slovenia.

PART – B

21. The function of cleats in a roof truss is
- (A) To support the common rafter
 - (B) To support purlins
 - (C) To prevent the purlins from tilting
 - (D) All of the above
22. Average annual rainfall at any station is the average of annual rainfall over a period of
- (A) 7 years
 - (B) 14 years
 - (C) 28 years
 - (D) 35 years
23. The wedge shaped bricks forming an arch ring, are called
- (A) Soffits
 - (B) Voussoirs
 - (C) Haunches
 - (D) Spandrils
24. The 1st, 2nd and 3rd storey of a G+3 storied building have lateral stiffness as K_1 , K_2 , and K_3 respectively ; The 2nd storey can be considered as 'soft storey' if it satisfies the relation
- (A) $K_2 < 0.5K_3$
 - (B) $K_2 < 0.8K_1$
 - (C) $K_2 < 0.7K_3$
 - (D) $K_2 < 0.5K_1$
25. Which IS code is used for classification of timber for seasoning purposes ?
- (A) IS : 4970-1973
 - (B) IS : 1708-1969
 - (C) IS : 1141-1958
 - (D) IS : 399-1963

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26. A metal bar of 10 mm diameter when subjected to a pull of 23.5 kN gave an elongation of 0.3 mm on a gauge length of 200 mm. The Young's modulus of elasticity of the metal will nearly be
- (A) 200 kN/mm² (B) 300 kN/mm²
(C) 360 kN/mm² (D) 400 kN/mm²
27. In which type of flooring, grinding with the help of carborundum stones is necessary?
- (A) Ceramic flooring (B) Cement Concrete flooring
(C) Terrazo flooring (D) PVC Tiles flooring
28. The ratio of a given volume change in a soil expressed as percentage of the dry volume, to the corresponding change in water content is called
- (A) Specific gravity of soil solids
(B) Mass-specific gravity of soils
(C) Shrinkage ratio of soils
(D) Density ratio of soils
29. The seismic weight of a RCC framed hospital building is 8000 kN which is located in seismic zone V and designed as per ductility considerations. If spectral acceleration factor is 2.5, then the base shear on the building is
- (A) 1800 kN (B) 840 kN
(C) 1080 kN (D) 720 kN
30. A strata of 3.5m thick fine sand has a void ratio of 0.7 and specific gravity of 2.7. For a quick sand condition to develop in this strata, the water flowing in the upward direction would require a head of
- (A) 7m (B) 5.56m
(C) 5m (D) 3.5m

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31. The successive annual rainfall magnitudes at a place for a period of 10 years from 2001 to 2010, both inclusive, are 30.3, 41.0, 33.5, 34.0, 33.3, 36.2, 33.6, 30.2, 35.5 and 36.3 cm. The Mean and Median values of this annual rainfall series are, respectively
- (A) 33.8 cm and 34.39 cm (B) 34.39 cm and 33.8 cm
(C) 34.39 cm and 40.2 cm (D) 33.8 cm and 40.2 cm
32. A soil mass has coefficients permeability of a soil in horizontal and vertical directions are 3.46 and 1.5m/day, respectively. The base length of a concrete dam resting on this soil is 100m. When the flow net is developed for this soil with a 1 : 25 scale factor in the vertical direction, the reduced base length of the dam will be
- (A) 2.63m (B) 6.08m
(C) 4.00m (D) 5.43m
33. A channel designed by Lacey's theory has a velocity of 0.88m/sec. The silt factor is 1.1. Then hydraulic mean depth will be
- (A) 1.95 m (B) 1.76 m
(C) 1.63 m (D) 1.50 m
34. A sand sample has a bulk density of 20 kN/m^3 and a degree of saturation of 70%. If the specific gravity of soil grains is 2.65, the value of critical hydraulic gradient for the soil will be
- (A) 1.02 (B) 1.05
(C) 1.10 (D) 1.15
35. Group Symbols assigned to silty sand and clayey sand are, respectively
- (A) SS & CS (B) SM & CS
(C) SM & SC (D) MS & CS

36. If the percentage finer in a soil are more than 10%, the grain size analysis should include
- (A) Sieve analysis (B) Chemical analysis
(C) Sedimentation analysis (D) Biological analysis
37. Rapid setting cement contains relatively higher proportion of
- (A) C_3S (B) C_3A
(C) C_2S (D) C_4AF
38. Pozzolanas are rich in
- (A) Silica (B) Silica and Alumina
(C) Silica, Alumina and Alkali (D) Silica, Alumina, Alkali and Iron
39. The compressive strength of ordinary Portland cement after 3 days should not be less than
- (A) 50 kg/cm² (B) 115 kg/cm²
(C) 100 kg/cm² (D) 150 kg/cm²
40. Specific gravity of OPC is generally
- (A) 4.92 (B) 2.10
(C) 3.15 (D) 1.75
41. White cement should have least percentage of
- (A) Aluminum oxides (B) Iron oxides
(C) Silica (D) Magnesium oxide

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42. For construction used at village site, the local pond water must be
- (A) Sieved (B) Boiled and filtered
(C) Mixed with jaggery (D) Mixed with chlorine
43. Potassium thiocyanate is used to colour both the water sample and the standard solution for determination of
- (A) Iron (B) Manganese
(C) Calcium carbonate (D) None of these
44. An air vesel is provided at the summit in syphon to
- (A) increase velocity
(B) maintain pressure difference
(C) avoid interruption in the flow
(D) increase discharge
45. The appropriate percentage of water in sewage is
- (A) 90% (B) 99%
(C) 99.90% (D) 99.99%
46. The main gas liberated from an anaerobic sludge digester is
- (A) NH_3 (B) CO
(C) CO_2 (D) CH_4

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47. Which of the following is responsible for the corrosion of concrete sewer?

- (A) Chlorine (B) Nitrogen
(C) Oxygen (D) Septic condition

48. Pitot tube is used to measure

- (A) Velocity at stagnation point (B) Stagnation pressure
(C) Static pressure (D) Dynamic pressure

49. Each term of the Bernoulli's equation represents

- (A) Energy per unit weight (B) Energy per unit mass
(C) Energy per unit volume (D) Specific energy

50. Euler's equation for motion of liquids is based on the assumption that the

- (A) Flow in streamline
(B) Flow takes place continuously
(C) Flow is homogeneous and incompressible
(D) Flow is turbulent

51. What is the momentum correction factor for laminar flow in a circular tube?

- (A) 1 (B) 1.33
(C) 2.5 (D) 3.75

52. In a sutor weir, the discharge is proportional to

- (A) $H^{1/2}$ (B) $H^{5/2}$
(C) $H^{3/2}$ (D) H

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53. Which of the following is calculated with the help of Moody's equation ?
- (A) Discharge (B) Friction factor
(C) Pressure (D) Velocity of flow
54. The flow constant 'f' in Darcy Weisbach equation for head loss in pipe flow as a unit of
- (A) No unit-dimensionless (B) m
(C) m/sec (D) kg-m/sec
55. The ductility value of bitumen is
- (A) equal to that of tar (B) more than that of tar
(C) less than that of tar (D) None of these
56. What is the approximate bitumen content (expressed in percentage) in the refined asphalt ?
- (A) 5 (B) 20
(C) 36 (D) 52
57. The correction for slope in chaining is proportional to
- (A) \sqrt{h} (B) h^2
(C) h (D) h^3
58. Calculate the evaporation (mm) from a pond, if the pan evaporation is 45 mm, the pan coefficient is 0.70.
- (A) 13.5 (B) 19.28
(C) 31.5 (D) 64.28



59. Clay is an example of
- (A) Aquifer (B) Aquitard
(C) Aquifuge (D) Aquiclude
60. The minimum number of bars required in a rectangular column for an earthquake resistant design is
- (A) 4 (B) 6
(C) 8 (D) 10
61. The discharge capacity required at the outlet to irrigate 2600 ha of sugarcane having a kor depth of 17 cm and a kor period of 30 days is
- (A) $2.3\text{m}^3/\text{sec}$ (B) $1.71\text{m}^3/\text{sec}$
(C) $14.7\text{m}^3/\text{sec}$ (D) $0.18\text{m}^3/\text{sec}$
62. The field capacity of the soil is 25%, its permanent wilting point is 15% and the specific dry unit weight is 1.5. If the depth of root zone of crop is 80 cm, the storage capacity of the soil is
- (A) 8 cm (B) 10 cm
(C) 12 cm (D) 14 cm
63. In a concrete mix of proportion 1 : 3 : 6, the actual quantity of sand, which is judged to have undergone 15% bulking, per unit volume of cement, will be
- (A) 3.00 (B) 3.45
(C) 4.50 (D) 6.00

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64. Available moisture is the difference in water content of a soil between field capacity and _____.
- (A) Gravitational Water (B) Permanent Wilting Point
(C) Saturation Capacity (D) Ultimate Wilting Point
65. The economical spacing of trusses varies from
- (A) $L/3$ to $L/4$ (B) $L/4$ to $L/5$
(C) $L/4$ to $L/6$ (D) None of these
66. The sag tie in a truss is mainly used to reduce
- (A) Moment and deflection (B) Tension
(C) Weight of the truss (D) Compression
67. During inelastic collision of two particles, which one of the following is conserved?
- (A) total linear momentum only
(B) total kinetic energy only
(C) both linear momentum and kinetic energy
(D) neither linear momentum nor kinetic energy
68. Prying forces are
- (A) Shearing forces on the bolts because of the joints
(B) Tensile forces due to the flexibility of connected parts
(C) Bending forces on the bolts because of the joints
(D) Forces due to the friction between connected parts

69. A fine-grained soil has liquid limit of 60 and plastic limit of 20. As per the plasticity chart, according to IS classification, the soil is represented by the letter symbols

- (A) CL (B) CI
(C) CH (D) CL-ML

70. The presence of hardness in excess of permissible limit causes

- (A) Cardio-vascular problem (B) Skin discoloration
(C) Calcium deficiency (D) Increased laundry expenses

71. A vehicle moving at 40km/h speed was stopped by applying brake and the length of the skid marks was 12.2m. If the average skid resistance of the pavement is 0.70, the brake efficiency of the test vehicle will be nearly

- (A) 80% (B) 74%
(C) 68% (D) 62%

72. The property of clays by virtue of which they regain, if left alone for a time, a part of the strength lost due to remoulding at unaltered moisture content, is known as

- (A) Thixotropy (B) Sensitivity
(C) Consistency (D) Activity

73. The extra widening required for a two-lane national highway at a horizontal curve of 300 m radius, considering a wheel base of 8m and a design speed of 100 kmph is

- (A) 42m (B) 62m
(C) 82m (D) 92m

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74. Stability of hill slopes depends upon
- (A) Nature of the slope (B) Angle of the slope
(C) Geological conditions (D) All of these
75. The plane of survey plotted on a scale of 10m to 1 cm is reduced in such a way that line originally 10 cm long now measures 9 cm. The area of reduced plan is measured as 81 cm². The actual area (m²) of survey is
- (A) 10000 (B) 6561
(C) 1000 (D) 656
76. A hydraulic turbine develops 5000 kW under a head of 30 m when running at 100 rpm. This turbine belongs to the category of
- (A) Pelton wheel (B) Francis Turbine
(C) Kaplan Turbine (D) Propeller Turbine
77. A summit curve is formed at the intersection of a 3% upgrade and a 5% downgrade. What is the length of the summit curve in order to provide a stopping distance of 128 m ?
- (A) 271 m (B) 298 m
(C) 322 m (D) 340 m
78. Which one of the following different types of submerged soils is susceptible to liquefaction under earthquake shocks ?
- (A) Dense sand (B) Soft clay
(C) Loose silt (D) Fissured clay

79. A septic tank is

- (A) an aerobic method of on-site sewage treatment
- (B) an anaerobic method of on-site treatment
- (C) a physical method of water treatment
- (D) a physicochemical method of water treatment

80. The function of ballast in railway tracks is to

- (A) facilitate drainage
- (B) serve as an elastic support for the track structure
- (C) provide the necessary resilience against the dynamic effect of the loads
- (D) All of the above

81. In cement concrete pavements, tensile stress is due to

- (A) Bending or deflection under wheel loads
- (B) Difference in temperature of the top and bottom of pavement
- (C) Contraction of slab during falling temperature
- (D) All of the above

82. Khosla's formulae for assessing pressure distribution under weir floors are based on

- (A) Potential flow in permeable layers just beneath the floors
- (B) Boundary layer flow with pressure drop longitudinally
- (C) Conformal transformation of potential flow into the W plane
- (D) Simplification of 3-D flow

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83. Zero hardness of water is achieved by
- (A) Lime-soda process (B) Ion exchange treatment
(C) Excess lime treatment (D) Excess alum dosage
84. Mohs scale is used for stones to determine
- (A) Flakiness index (B) Durability
(C) Strength (D) Hardness
85. Which one of the following light weight element will be added to enhance the protective properties for X-ray shielding mortars ?
- (A) Sodium (B) Potassium
(C) Lithium (D) Calcium
86. A circular curve of radius R connects two straights with a deflection angle of 60° . The tangent length is
- (A) $0.577 R$ (B) $1.155 R$
(C) $1.732 R$ (D) $3.464 R$
87. As per IS 10500 : 2012, for drinking water in the absence of alternate source of water, the permissible limits for chloride and sulphate, in mg/L, respectively are
- (A) 250 and 200 (B) 1000 and 400
(C) 200 and 250 (D) 500 and 1000
88. Clay and silt content in a good brick earth must be at least
- (A) 50% (B) 40%
(C) 30% (D) 25%

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89. In a short cylindrical external mouthpiece, the vena contracta occurs at a distance _____ the diameter of the orifice from the outlet of orifice.
- (A) equal to (B) one-fourth of
(C) one-third of (D) one-half of
90. An uniform girder simply supported at its ends is subjected to a uniformly distributed load over its entire length and is propped at the centre so as to neutralise the deflection. The net B.M. at the centre will be
- (A) WL (B) WL/8
(C) WL/24 (D) WL/32
91. A steel rod of 2 cm diameter and 5 meters long is subjected to an axial pull of 3000 kg. If $E = 2.1 \times 10^6$, the elongation of the rod will be
- (A) 2.275 mm (B) 0.2275 mm
(C) 0.02275 mm (D) 2.02275 mm
92. The phenomenon of generation of lift by rotating an object placed in a free stream is known as
- (A) Coanda effect (B) Magnus effect
(C) Scale effect (D) Buoyancy effect
93. Hydraulic efficiency of Francis turbine is
- (A) Directly proportional to velocity of whirl at inlet and inversely proportional to net head on turbine.
(B) Directly proportional to velocity of whirl at inlet and net head on turbine.
(C) Inversely proportional to velocity at inlet and net head on turbine.
(D) Inversely proportional to velocity of whirl at inlet and directly proportional to net head on turbine.

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94. Which one of the following is an example of bodies where both drag and lift forces are produced ?
- (A) Hydrofiles
(B) A tall chimney exposed to wind
(C) Flow of water past a bridge pier
(D) Motion of aeroplanes, submarines, torpedose
95. Indian Meteorological department uses the standard gauges whose collectors have apertures of
- (A) 50 or 100 sq. cm area
(B) 100 or 150 sq. cm area
(C) 100 or 200 sq. cm area
(D) 250 or 500 sq. cm area
96. The main cause of meandering is
- (A) Presence of an excessive bed slope in the river
(B) Degradation
(C) The extra turbulence generated by the excess of river sediment during floods
(D) None of the above
97. If sleeper density is $M + 7$ for 13 m rails, the minimum depth of ballast under wooden sleepers (25 cm 13 cm), is
- (A) 15 cm
(B) 20 cm
(C) 25 cm
(D) 30 cm
98. "An Electromagnetic wave falls on to a boundary between two losses less homogeneous media with different refractive indices, a part of the wave is reflected back to the incident medium and the rest is transmitted on to the second media". This phenomenon is known as
- (A) Fresnel reflection
(B) Fresnel refraction
(C) Snell's law
(D) None of these

