SSC - JEn 2013 (Objective Paper)

1. The lintels are preferred to arches because **[SSC-2013]**

(a) arches required more headroom to span the openings like doors, windows, etc.

(b) arches require strong abutments to withstand arch thrust

(c) arches are difficult in construction

(d) All of the above

2. The most suitable stone for building piers is **[SSC-2013]**

(a) granite (b) limestone

(c) marble (d) sandstone

3. Number of modular bricks required for one cubic metre of brick masonry are **[SSC-2013]**

(a) 400 (b) 450

(c) 550 (d) 500

4. The plasticity to mould bricks in suitable shape in contrivuted by **[SSC-2013]**

(a) Alumina (b) Lime

(c) Magnesia (d) Silica

5. The crushing strength of a first class brick is **[SSC-2013]**

(a) 3 N/mm^2 (b) 5.5 N/mm^2

(c) 10.5 N/mm^2 (d) 7.5 N/mm^2

6. Which of the following cements is suitable for use in urgent repairs of existing massive concrete structures such as large dams? **[SSC-2013]**

(a) Ordinary portland cement

(b) Low heat cement

(c) Rapid hardening cement

(d) Suitable resisting cement

7. For polishing mosaic floors we use **[SSC-2013]**

(a) Carbaolic acid (b) Muriatic acid

(c) Acetic acid (d) Oxalic acid

8. For 15 mm thick cement plastering 1 : 6 on 100 sq. m new brick work, quantity of cement required is **[SSC-2013]**

(a) 0.200 m^3 (b) 0.247 m^3

(c) 0.274 m^3 (d) 0.343 m^3

9. The base material for distemper is **[SSC-2013]**

(a) Chalk (b) Lime

(c) Clay (d) Lime putty

10. The amount of water used in performing setting time test of cement is (assuming p = standard consistency of cement) **[SSC-2013]**

(a) 0.60 p (b) 0.65 p

(c) 0.80 p (d) 0.85 p

11. Gypsum used in cement manufacturing acts as **[SSC-2013]**

(a) accelerator (b) air entering agent

(c) plasticizer (d) retarder

12. The woodworks should be measured to nearest **[SSC-2013]**

(a) 0.001 m (b) 0.002 m

(c) 0.003 m (d) 0.004 m

13. Anti-siphonage pipe is connected to **[SSC-2013]**

(a) Main soil pipe (b) Bottom of P trap W.C

(c) Top of P trap W.C. (d) Side of Water Closest

14. The main principle of field surveying is to work from **[SSC-2013]**

(a) higher level to lower level

(b) lower level to higher level

(c) part of whole

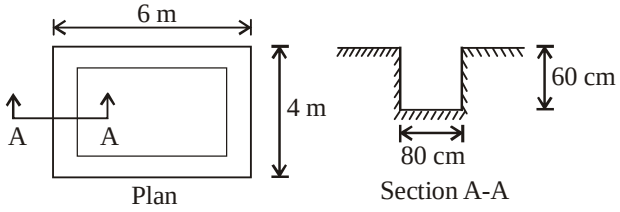
(d) whole to part

15. If 'i' is the rate of interest expressed in decimal and 'n' is the number of years, then coefficient of annual find I_c is **[SSC-2013]**

(a) $I_c = \dfrac{\left[(1+i)^n - 1\right]}{(1+i)-1}$ (b) $I_c = \dfrac{i}{(1+i)^n - 1}$

(c) $I_c = \dfrac{i}{(1-i)^n + 1}$ (d) $I_c = \dfrac{i}{(1+i)^n + 1}$

16.



The above figure represents plan and section of an excavation layout. The volume of earthwork in excavation of foundation trench is **[SSC-2013]**

(a) 6.528 cu.m (b) 8.064 cu.m
(c) 8.832 cu.m (d) 9.600 cu.m

17. If d be the diameter of MS or tor steel bars in mm, the standard weight (in kg) per metre of the bar is **[SSC-2013]**

(a) $0.00618\ d^2$ (b) $0.00618\ d$
(c) $0.00816\ d^2$ (d) $0.00816\ d$

18. A level line is a **[SSC-2013]**

(a) line parallel to the mean spheroidal surface of the earth
(b) line passing through centre of cross hairs and centre of eye-piece
(c) line passing through objective lens and the eye piece
(d) horizontal line

19. Ranging is defined as **[SSC-2013]**

(a) measuring the distance from starting point
(b) establishing intermediate points on a chain line
(c) the distance between end points
(d) a point on a chain line

20. Compute the angle between the lines AB and AC, If their respective bearings are 52°30' and 328°45'. **[SSC-2013]**

(a) 276°15' (b) 6°15'
(c) 111°15' (d) 83°45'

21. The Whole circle Bearing of a line is 287°15'. The Reduced Bearing of the lime is **[SSC-2013]**

(a) S 107° 15' W (b) S 17°15' W
(c) N 72°45' W (d) S 107° 15' E

22. A line joining some fixed points on the main survey lines is called **[SSC-2013]**

(a) check line (b) tie line
(c) chain line (d) base line

23. Which of the following methods of contouring is most suitable for hilly terrian? **[SSC-2013]**

(a) Direct method (b) Square method
(c) Cross-section method (d) Tacheometric method

24. The angle between true meridian and the magnetic meridian at the time of observations is known as **[SSC-2013]**

(a) Orientation (b) Magnetic declination
(c) Magnetic bearing (d) Dip

25. 'Offsets' are **[SSC-2013]**

(a) Lateral measurements from chain line
(b) Ties or check lines which are perpendicular to chain line
(c) Sets of minor measurements in chain surveying
(d) Chain lines which go out of alignment

26. The fore bearings of the lines AB and BC are 40° and 120° respectively. The included angle between AB and BC is **[SSC-2013]**

(a) 40° (b) 60°
(c) 80° (d) 100°

27. If the sum of northing of a traverse exceeds the sum of southing by 1 m and sum of easting exceeds the sum of westings by 1 m, the resultant closing error and its true bearing are respectively **[SSC-2013]**

(a) $\sqrt{2}$ m , N 45°E (b) 1 m, N 45°E
(c) 2 m, N 45° W (d) 2 m, N 45°E

28. If in a closed traverse, the sum of the north latitudes is more than the sum of the south latitudes and also the sum of west departures is more than the sum of east departures, the bearing of thew closing line is in the **[SSC-2013]**

(a) SE quadrant (b) NE quadrant
(c) NW quadrant (d) SW quadrant

29. A 300 mm square bearing plate settles by 15 mm in a plate load test on a cohesive soil when the intensity of loading is 0.2 N/mm^2. The settlement of a prototype shallow footing 1 m square under the same intensity of loading is **[SSC-2013]**

(a) 15 mm (b) 80 mm
(c) 50 mm (d) 167 mm

30. The specific speed for a turbine has the dimensions of **[SSC-2013]**

(a) $F^{1/2}\ L^{-3/4}\ T^{-3/2}$ (b) T^1
(c) $F^{1/2}\ L^{-5/2}\ T^{-3/2}$ (d) $F\ L^{-3/4}\ T^{-3/2}$

31. Sand particles are made of **[SSC-2013]**
(a) Kaolinite (b) Illite
(c) Montmorillonite (d) Quartz

32. A shallow foundation is defined as a foundation which **[SSC-2013]**
(a) has low bearing capacity
(b) has a depth of embedment less than its width
(c) is resting on the gournd surface
(d) causes less settlement

33. If the volume of voids is equal to the volume of solids in a soil mass, then the values of porosity and voids ratio respectively are **[SSC-2013]**
(a) 1.0 and 0.0 (b) 0.0 and 1.0
(c) 1.5 and 1.0 (d) 1.0 and 0.5

34. The lime stablization is very effective in treating **[SSC-2013]**
(a) Sandy soils (b) Silty soils
(c) Non-plastic soils (d) Plastic clayey soil

35. In open channel flows, the characteristic length commonly used in defining the Reynolds number is the **[SSC-2013]**
(a) depth of flow (b) wetted perimeter
(c) hydraylic radius (d) area/top width

36. Bulk modulus of a fluid is the ratio of **[SSC-2013]**
(a) shear stress to shear strain
(b) increase in volume to the viscosity of fluid
(c) increase in pressure to the volumetric strain
(d) critical velocity to the velocity of fluid

37. The buoyancy depends upon the **[SSC-2013]**
(a) pressure with which the liquid is displaced
(b) weight of the liquid displaced
(c) viscosity of the liquid
(d) compressibility of the liquid

38. The discharge over a rectangular notch is **[SSC-2013]**
(a) inversely proportional to $H^{3/2}$
(b) directly proportional to $H^{3/2}$
(c) inversely proportional to $H^{5/2}$
(d) directly proportional to $H^{5/2}$

39. The most economical section of a rectangular channel is one having hydraulic radius equal to **[SSC-2013]**
(a) twice the depth (b) half the breadth
(c) half the depth (d) twice the breadth

40. In a rectangular channel, the ratio of the specific energy at ..... $_c$ to the critical depth y_c is **[SSC-2013]**
(a) 2.0 (b) 1.0
(c) 1.5 (d) 1.25

41. The water utilizable by plants is available the form of **[SSC-2013]**
(a) gravity water (b) hydroscopic water
(c) capillary water (d) chemical water

42. A surge tank is provided in hydripower schemes to **[SSC-2013]**
(a) reduce water hammer pressures
(b) reduce frictional losses
(c) increase the net head
(d) strengthen the penstocks

43. In a two-dimensional flow fluid, if a velocity potential function ϕ exists which satisfies the relation $\frac{\partial^2\phi}{\partial x^2}+\frac{\partial^2\phi}{\partial y^2}=0$, then the flow is **[SSC-2013]**
(a) steady incompressible
(b) steady laminar and incompressible
(c) irrotational and incompressible
(d) turbulent and incompressible

44. Reynolds number is the ratio of the inertia force to the **[SSC-2013]**
(a) surface tension force (b) viscous force
(c) gravity force (d) elastic force

45. A river training work is generally required when the river is **[SSC-2013]**
(a) aggrading type (b) meandering type
(c) degrading type (d) both (A) and (C)

46. The populations of a town as per census records were 200000, 210000 and 230000 for the years 1981, 1991 and 2001 respectively. The population of the town as per geometric mean method in the year 2009 is **[SSC-2013]**
(a) 244872 (b) 285872
(c) 246820 (d) None of the above

47. If the stopping distance and average length of a vehicle are 18 m and 6 m respectively, then the theoretical maximum capacity (vehicles per hour) of a traffic lane at a speed of 10 m/sec is **[SSC-2013]**

(a) 1500 (b) 2000
(c) 2500 (d) 3000

48. In highway construction on superelevated curves, the rolling shall proceed from **[SSC-2013]**

(a) sides towards the centre
(b) centre towards the sides
(c) lower edge towards the upper edge
(d) upper edge towards the lower edge

49. The permissible limit of arsenic in drinking water as per the huidelines of WHO is **[SSC-2013]**

(a) 0.01 ppm (b) 0.01 ppb
(c) 0.05 ppm (d) 0.05 ppb

50. Which one of the following sequences is the most suitable for treating raw durface water to make it suitable for drinking purpose? **[SSC-2013]**

(a) Screening → filtration → sedimentation → disinfection
(b) Screening → disinfection → sedimentation → filtration
(c) Screening → sedimentation → disinfection → filtration
(d) Screening → sedimentation → filtration → disinfection

51. At the point of contraflexure **[SSC-2013]**

(a) Bending moment is minimum
(b) Bending moment is maximum
(c) Bending moment is zero
(d) Bending moment is zero and its sign changes

52. A beam fixed at both ends carries a uniformly distributed load on entire length. The ration of bending moment at the support to the bending moment at mid span is given by **[SSC-2013]**

(a) 0.5 (b) 1.0
(c) 1.5 (d) 2.0

53. In case of biaxial stress, the maximum value of shear stress is given by **[SSC-2013]**

(a) Difference of the normal stress
(b) Half the difference of the normal stresses
(c) Sum of the normal stresses
(d) Half of the sum of the normal stresses

54. From a circular plate of diameter 6.0 cm, a circle out whose diameter is a darius of the plate. The distance of centre of gravity of the remainder from the centre of circular plate is **[SSC-2013]**

(a) 2.0 (b) 1.5
(c) 1.0 (d) 0.5

55. In a section undergoing pure bending, the neutral surface is subjected to **[SSC-2013]**

(a) compression strain (b) tensile strain
(c) zero strain (d) None of the above

56. The ability of a material to absorb energy till the breaking or rupture takes place is known as **[SSC-2013]**

(a) Hardness (b) Toughness
(c) Brittleness (d) Softness

57. A concentrated load W acts at the centre of a simply supported beam of length L. If the load is changed to a uniformly distributed load over the entire span, then the ratio of maximum deflection under concentrated load and under uniformly distributed load will be **[SSC-2013]**

(a) 1.2 (b) 1.3
(c) 1/4 (d) 8/5

58. The shear diagram of a cantilever beam subjected to a concentrated load at the free end is given by a/an **[SSC-2013]**

(a) Triangle (b) Rectangle
(c) Parabola (d) Ellipse

59. Deflection of the free end of a cantilever beam having a concentrated load W at mid span is given by **[SSC-2013]**

(a) $WL^3/3$ EI (b) 5 $WL^3/24$ EI
(c) 5 $WL^3/48$ WI (d) $WL^3/48$ EI

60. Of the several prismatic beams of equal lengths and of same material, the beam that can carry maximum load in flexure is the one having maximum **[SSC-2013]**

(a) Depth of section (b) Area of cross-section
(c) Section modulus (d) Moment of inertia

61. The maximum deflection of a simply supported beam of effective span L and subjected to a central concentrated load W is given by **[SSC-2013]**

(a) $WL^3/8\ EI$ (b) $WL^3/24\ EI$

(c) $WL^3/48\ EI$ (d) $5\ WL^3/384\ EI$

62. In a Mohr's circle of $\sigma - \tau$ plane (σ = normal stress, τ = shear stress), the vertical diameter represents **[SSC-2013]**

(a) Maximum shear stress

(b) Maximum normal stress

(c) Principal stress

(d) Minimum normal stress

63. A singly supported beam is carrying distributed load of 'zero' intensity over one support to linearly varying nature of intensity 'w' over the other support. The shape of BMD will be **[SSC-2013]**

(a) linear (b) parabolic

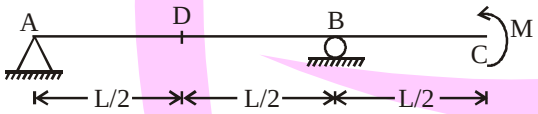
(c) cubical parabolic (d) zero

64. The maximum dimension of a core section for a trctangular cross-section under eccentric loading on a column (b × d) is **[SSC-2013]**

(a) b/6 (b) d/6

(c) d/8 (d) b/2 and d/3

65. Shear force at the mid-span point D in the following beam is **[SSC-2013]**



(a) zero (b) 2 M/L

(c) M/L (d) 3 M/L

66. Two identical simply supported beams of span '*l*' are subjected to equal load 'W'. One beam id carrying the load 'W' at its centre (as carrying it in the form of u.d.l. over the entire span. The ratio of their mid-span bending moment will be **[SSC-2013]**

(a) $\frac{1}{2}$ (b) 2

(c) 4 (d) 8

67. Angle of twist of a circular shaft under the action of a torsional moment T is given by **[SSC-2013]**

(a) GJ/TL (b) TL/GJ

(c) TJ/GL (d) TG/JL

68. A structure which offers negligible or zero ressitance on bending at any point is known as **[SSC-2013]**

(a) Beam (b) Girder

(c) Lintel (d) Cable

69. The curvature at any point $\left(\frac{1}{R}\right)$ along the curve representing the deformed shape of a beam is given by **[SSC-2013]**

(a) $\pm\left(dy/dx\right)/\left[1+\frac{d^2y}{dx^2}\right]^{1/2}$

(b) $\pm\left(d^2y/dx^2\right)/\left[1+\frac{dy}{dx}\right]^{3/2}$

(c) $\pm\left(d^2y/dx^2\right)/\left[1+\frac{d^2y}{dx^2}\right]^{1/2}$

(d) $\pm\left(dy/dx^2\right)/\left[1+\frac{d^2y}{dx^2}\right]^{2}$

70. The moment required to rotate the near and end of a prismatic beam through unit angle, without translation, the far end being fixed is **[SSC-2013]**

(a) EI/L (b) 2 EI/L

(c) 3 EI/L (d) 4 EI/L

71. A retaining wall of trapezoidal section having base which 'b' retains earth at its back. For no tension to be developed at base, the resultant force will intersect the base from centre line of the line, within a distance of **[SSC-2013]**

(a) b/3 (b) b/4

(c) b/5 (d) b/6

72. The initial setting time of Ordinary Portland Cement (OPC) is **[SSC-2013]**

(a) 10 min (b) 30 min

(c) 45 min (d) 60 min

73. The equivalent stiffness of two springs of stiffness S_1 and S_2 joined in sereies is given by S = **[SSC-2013]**

(a) $S_1S_2/(S_1 + S_2)$ (b) $(S_1/S_2)/(S_1 + S_2)$

(c) $S_1 + S_2$ (d) $S_1 S_2$

74. Buckling load for an axially loaded column with both ends fixed is given by **[SSC-2013]**

(a) π^2EI/l^2 (b) $2\pi^2EI/l^2$

(c) $4\pi^2EI/l^2$ (d) $\pi^2EI/(4l^2)$

75. Poisson's ratio μ is defined as the ratio of **[SSC-2013]**
(a) axial strain to transverse strain
(b) axial strain to shear strain
(c) transverse strain to axial strain
(d) shear stain to axial strain

76. In a thin cylinder shell, the ratio of longitudinal stress to hoop stress is **[SSC-2013]**
(a) 0.5 (b) 1.0
(c) 1.5 (d) 2.0

77. The grade of concrete M 20 means that characteristic compressive strength of 15 cm cubes after 28 days is given by **[SSC-2013]**
(a) 10 N/mm^2 (b) 15 N/mm^2
(c) 20 N/mm^2 (d) 25 N/mm^2

78. You are asked to construct a massive concrete dam. The type of cement you will use is **[SSC-2013]**
(a) Ordinary portland cement
(b) Rapid hardening portland cement
(c) Low heat cement
(d) Blast furnace slag cement

79. The object of curing is not to **[SSC-2013]**
(a) prevent the loss of water by evaporation
(b) reduce the shrinkage of cement concrete
(c) preserve the properties of concrete
(d) reduce the strength of concrete

80. Which of the following is added for quick setting of cement? **[SSC-2013]**
(a) Gypsum (b) Alum
(c) Zinc sulphate (d) Aluinium sulphate

81. High percentage of C_3S and low percentage of C_2S in a cement will result in **[SSC-2013]**
(i) rapid hardening
(ii) high early strength with high heat generation
(iii) more resistance to chemical attact
The correct answer is
(a) Only (i) (b) Only (iii)
(c) Both (i) and (ii) (d) Both (ii) and (iii)

82. As per IS 456, splitting tensile-strength (f_{cr}) of concrete may be estimated from compressive stength as **[SSC-2013]**
(a) $f_{cr} = 0.65\sqrt{f_{ck}}$ (b) $f_{cr} = 0.7\sqrt{f_{ck}}$
(c) $f_{cr} = 0.75\sqrt{f_{ck}}$ (d) $f_{cr} = 0.8\sqrt{f_{ck}}$

83. Maximum admissible water-cement ratio for mild environmental exposure should be **[SSC-2013]**
(a) 0.55 (b) 0.50
(c) 0.45 (d) 0.40

84. Air entrainment in the concrete increases **[SSC-2013]**
(a) workabilty
(b) strength
(c) the effect of temperature variation
(d) the unit weight

85. The minimum horizontal distance between two main reinforcement bars shouls be **[SSC-2013]**
(a) diameter of larger bar or 5 mm more than the nominal maximum size of coarse aggregate, whichever is higher
(b) 5 mm more than the nominal size of the aggregate only
(c) 5 mm more than the diameter size of the aggregate only
(d) None of the above

86. During the manufacture of Portland cement, gypsum or Plaster of Paris is added to **[SSC-2013]**
(a) increase the strength of cement
(b) modify the colour of cement
(c) reduce heat of hydration of cement
(d) adjust setting time of cement

87. Minimum percentage of tension steel in an RCC beam for Fe 500 steel is **[SSC-2013]**
(a) 0.12 (b) 0.17
(c) 0.22 (d) 0.80

88. As per IS 456, the effective length cantilever shall be taken as **[SSC-2013]**
(a) clear span
(b) clear span + effective depth/2
(c) clear span + effective depth
(d) clear span + effective width

89. If the modular ratio is 'm', stress ratio in steel and concrete is 'r', then the critical neutral axis constant 'k' is given by **[SSC-2013]**

(a) $m/(m - r)$ (b) $m/(m + r)$

(c) $(m + r)/m$ (d) m^2/r

90. For two way action, i.e. punching shear, the calculated shear stress, τ_y, should satisfy the following relation $\tau_y \le k_s\tau_c$, where τ_c according to working stress method is expressed as **[SSC-2013]**

(a) $0.1\sqrt{f_{ck}}$ (b) $0.16\sqrt{f_{ck}}$

(c) $0.25\sqrt{f_{ck}}$ (d) $0.4\sqrt{f_{ck}}$

91. Diagonal tension in a reinforced concrete beam **[SSC-2013]**

(a) is maximum at neutral axis

(b) decreases below neutral axis and increases above neutral axis

(c) increases below neutral axis and decreases above neutral axis

(d) remain constant throughout the depth

92. In a singly reinforced beam, if the permissible stress in concrete reaches earlier than the permissible stress in steel the beam section is called **[SSC-2013]**

(a) Under reinforced section

(b) Over reinforced section

(c) Balanced section

(d) Economic section

93. If σ_s is the stress in bar and τ_{bd} is the design bond stress, then the development length of a bar of diameter ϕ is given by **[SSC-2013]**

(a) $\frac{4\phi\sigma_s}{\tau_{bd}}$ (b) $\frac{\phi\sigma_s}{4\tau_{bd}}$

(c) $\frac{2\phi\sigma_s}{3\tau_{bd}}$ (d) $\frac{\phi\sigma_s}{3\tau_{bd}}$

94. Side face reinforcement shall be provided in the reinforced concrete beam when depth of web in the beam exceeds **[SSC-2013]**

(a) 500 mm (b) 750 mm

(c) 1000 mm (d) 1200 mm

95. A cantilever retaining wall should not be used for heights more than **[SSC-2013]**

(a) 4 m (b) 6 m

(c) 8 m (d) 10 m

96. The minimum edge and end distance from the centre of any hole to the nearest flame cut edge shall not be less than **[SSC-2013]**

(a) 1.5 times hole dia (b) 1.7 times hole dia

(c) 2 times hole dia (d) 1.5 times bolt/rivet dia

97. The distance between two rivets measured perpendicular to the direction of applied force is known as **[SSC-2013]**

(a) pitch (b) gauge

(c) staggered pitch (d) edge distance

98. For simply supported beam, the allowable deflection shall not exceed **[SSC-2013]**

(a) 1/325 of span (b) 1/350 of span

(c) 1/375 of span (d) 1/400 span

99. The beams supporting the stair steps, are generally known as **[SSC-2013]**

(a) headers (b) trimmers

(c) stringers (d) spandrel beam

100. Maxmimum size of a fillet weld for a plate of square edge is **[SSC-2013]**

(a) 1.5 mm less than the thickness of the plate

(b) one-half of the thickness of the plate

(c) thickness of the plate itself

(d) 1.5 mm more than the thickness of the plate

Answer Key									
1	D	2	A	3	D	4	A	5	C
6	B	7	D	8	D	9	A	10	D
11	D	12	B	13	C	14	D	15	B
16	B	17	A	18	A	19	B	20	D
21	C	22	B	23	D	24	B	25	A
26	D	27	A	28	C	29	C	30	A
31	D	32	B	33	None	34	D	35	C
36	C	37	B	38	B	39	C	40	C
41	C	42	A	43	C	44	B	45	B
46	B	47	A	48	C	49	A	50	D
51	D	52	D	53	B	54	D	55	C
56	B	57	D	58	B	59	C	60	C
61	C	62	A	63	B	64	D	65	C
66	B	67	B	68	D	69	B	70	D
71	D	72	B	73	A	74	C	75	C
76	A	77	C	78	C	79	D	80	D
81	C	82	B	83	A	84	A	85	A
86	D	87	D	88	C	89	B	90	B
91	C	92	B	93	B	94	B	95	B
96	B	97	B	98	A	99	C	100	A