

UPPSC-AE (Assistant Engineer) Sample Test Paper

Civil Engineering

1. Quick setting cement is produced by adding
 - (a) less amount of gypsum in very fine powdered form
 - (b) more amount of gypsum in very fine powdered form
 - (c) aluminium sulphate in very fine powdered form
 - (d) pozzolana in very fine powdered form
2. Pick up the correct statement from the following:
 - (a) Adding 5% to 6% of moisture content by weight, increases the volume of dry sand from 18% to 38%
 - (b) The bulking of fine sand is more than that of coarse sand
 - (c) If the percentage content of moisture exceeds 10%, increase in bulk of sand starts increasing
 - (d) All the above
3. A prime coat is given to steel work with
 - (a) an oxide of iron paint
 - (b) a mixture of white lead and lead paint
 - (c) a special paint
 - (d) cement paint
4. Ground glass
 - (a) is made by grinding its one side
 - (b) is made by melting powdered glass paints surface
 - (c) is used for getting light without transparency
 - (d) all the above
5. Pick up the correct composition of bitumen from the following:

	Carbon	Hydrogen	Oxygen
(a)	87%	11%	2%
(b)	80%	16%	4%
(c)	75%	20%	5%

 - (d) None of these
6. Two forces act an angle of 120° . If the greater force is 50 kg and their resultant is perpendicular to the smaller force, the smaller force is
 - (a) 20 kg
 - (b) 25 kg
 - (c) 30 kg
 - (d) 35 kg
7. If two forces each equal to T in magnitude act at right angles, their effect may be neutralized by a third force acting along their bisector in opposite direction whose magnitude will be
 - (a) 2T
 - (b) $\frac{1}{2}T$
 - (c) $\sqrt{2}T$
 - (d) 3T
8. The height at which the end of a rope of length l should be tied so that a man pulling at the other end may have the greatest tendency to overturn the pillar, is

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- (a) $\frac{3}{4}l$ (b) $\frac{1}{2}$ (c) $\frac{l}{2}$ (d) $\frac{2}{\sqrt{3}}l$
9. A square hole is punched out of a circular lamina, the diagonal of the square being the radius of the circle. If r is the radius of the circle, the C.G. of the remainder from the corner of the square on the circumference will be
 (a) $\frac{r(\pi+0.25)}{\pi-0.5}$ (b) $\frac{r(\pi-0.5)}{\pi+0.25}$ (c) $\frac{r(\pi-0.25)}{\pi-0.5}$ (d) $\frac{r(\pi+0.25)}{\pi+0.5}$
10. M.I. of solid sphere, is
 (a) $\frac{2}{3}Mr^2$ (b) $\frac{2}{5}Mr^2$ (c) Mr^2 (d) $\frac{\pi r^4}{2}$
11. In simple harmonic motion, acceleration of a particle is proportional to
 (a) rate of change of velocity (b) displacement (c) velocity (d) direction
12. The stress necessary to initiate yielding, is considerably
 (a) more than that necessary to continue it (b) less than that necessary to continue it
 (c) more than that necessary to stop it (d) less than that necessary to stop it
13. A simply supported beam carrying a uniformly distributed load over its whole span, is propped at the center of the span so that the beam is held to the level of the end supports. The reaction of the prop will be
 (a) half the distributed load (b) $\frac{3}{8}$ th distributed load
 (c) $\frac{5}{8}$ th the distributed load (d) distributed load
14. The length of a column which gives the same value of buckling load by Euler and Rankine-Gordon formula, is equal to
 (a) $\frac{\pi^2 EK}{fa - \pi^2 E_a}$ (b) $\sqrt{\frac{\pi^2 EK}{fa - \pi^2 E_a}}$
 (c) $\sqrt{\frac{\pi^2 EK^2}{\pi^2 E_a - fa}}$ (d) none of these
15. For structural analysis, Maxwell's reciprocal theorem can be applied to:
 (a) plastic structures (b) elastic structures
 (c) symmetrical structures (d) all the above
16. In the figure given below, the rivets with maximum stress, are:

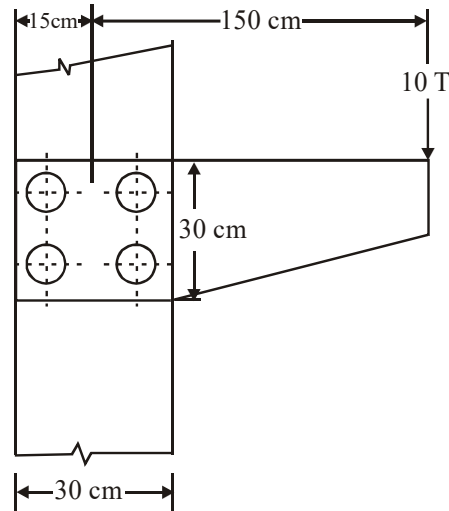
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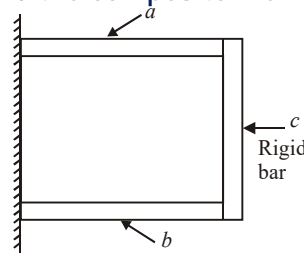
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- (a) 1 and 2 (b) 1 and 3 (c) 3 and 4 (d) 2 and 4
17. A composite member shown in the figure below, was formed at 25°C and was made of two material a and b . If the coefficient of thermal expansion of a is more than that of b and the composite member is heated upto 45°C , then



- (a) a will be in tension and b in compression (b) both will be in compression
 (c) both will be in tension (d) a will be in compression and b in tension
18. The principal stresses at a point are 100, 100 and -200 kgf/cm^2 , the octahedral shear stress at the point is:
 (a) $100\sqrt{2} \text{ kg/cm}^2$ (b) $200\sqrt{2} \text{ kg/cm}^2$ (c) $300\sqrt{2} \text{ kg/cm}^2$ (d) $400\sqrt{2} \text{ kg/cm}^2$
19. For the loaded beams shown in Figure.

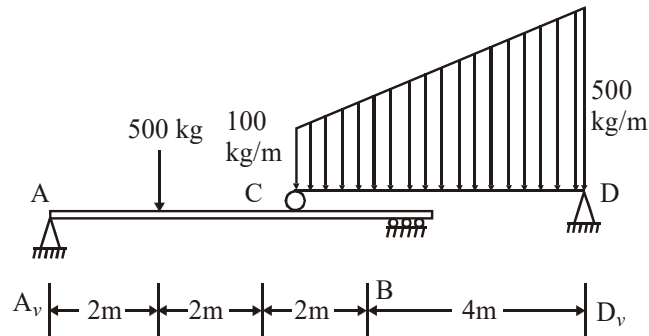
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Match List I with List II and select a suitable answer by using the codes given below the lists.

List I (Support reaction)

- A. A_v
 B. B_v
 C. C_v
 D. D_v

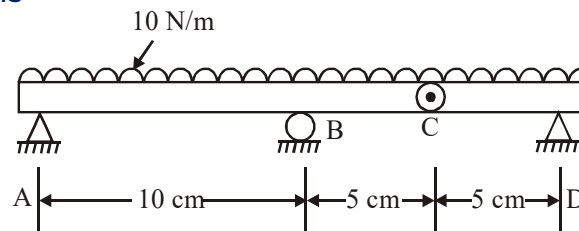
List II (Magnitude)

1. 800 kg
 2. 1000 kg
 3. 700 kg
 4. 600 kg

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	4	1	2	3
(c)	4	3	1	2
(d)	3	2	4	1

20. The reaction for the support B of a compound beam loaded as shown in the figure below is



- (a) 5000 N (b) 10,000 N (c) 1250 N (d) 15,000 N
21. The force in CD of the truss shown in the figure, is

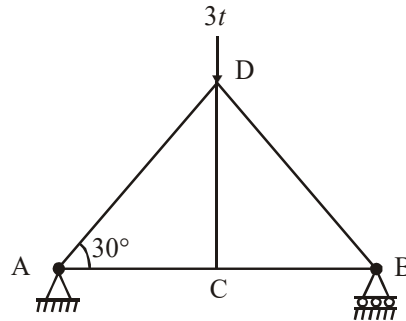
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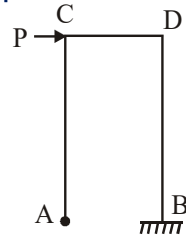
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- (a) $3t$ compression (b) $3t$ tension (c) zero
 (d) $1.5t$ compression
22. If a solid shaft (diameter 20 cm, length 400 cm, $N = 0.8 \times 10^5 \text{ N/mm}^2$) when subjected to a twisting moment, produces maximum shear stress of 50 N/mm^2 , the angle of twist in radians, is
 (a) 0.001 (b) 0.002 (c) 0.0025 (d) 0.003
23. The deflection curve for the portal frame shown in the figure is



- (a)
- (b)
- (c)
- (d)

24. A three hinged arch of span 20 m and rise 5 m is loaded as shown in the figure below. The horizontal thrust H, is

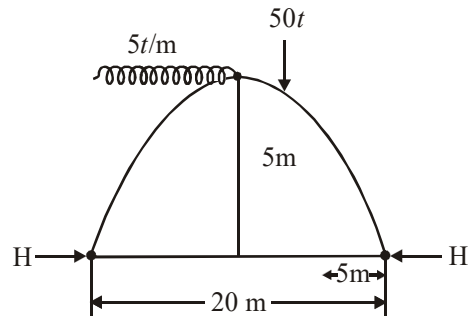
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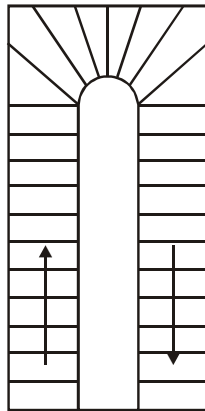
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- (a) $50 t$ (b) $75 t$ (c) $100 t$ (d) $150 t$
25. Stiffeners are used in a plate girder
 (a) to reduce the compressive stress (b) to reduce the shear stress
 (c) to take the bearing stress (d) to avoid bulking of web plate
26. According to I.S. : 456, slabs which span in two directions with corners held down, are assumed to be divided in each direction into middle strips and edge strips such that the width of the middle strip, is
 (a) half of the width of the slab (b) tow-third of the width of the slab
 (c) three-fourth of the width of the slab (d) four-fifth of the width of the slab
27. The diameter of the column head support a flat slab, is generally kept
 (a) 0.25 times the span length
 (b) 0.25 times the diameter of the column
 (c) 4.0 cm larger than the diameter of the column
 (d) 5.0 cm larger than the diameter of the column
28. A foundation is called shallow if its depth, is
 (a) one-fourth of its width (b) half of its width
 (c) three-fourth of its width (d) equal to its width
29. The stairs shown in the figure below is



- (a) a straight stair (b) a dog legged stair
 (c) an open stair (d) a geometrical stair

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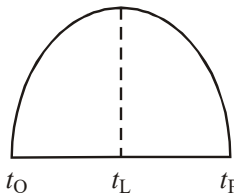
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30. If M_d and M_l are the maximum bending moments due to dead load and live load respectively and F is the total effective pressure, for a balanced design of a pre-stressed concrete beam of steel, is
 (a) $e = \frac{M_d}{F} + \frac{M_l}{2F}$ (b) $e = \frac{M_d}{2F} + \frac{M_l}{F}$ (c) $e = \frac{M_d}{2F} + \frac{M_l}{3F}$ (d) $e = \frac{M_l}{3F} + \frac{M_l}{2F}$
31. The commercial name of white and coloured cement in India, is
 (a) colocrete (b) rainbow cement (c) silvicrete (d) all the above
32. If 20 kg of coarse aggregate is sieved through 80 mm, 40 mm, 20 mm, 10 mm, 4.75 mm, 2.36 mm, 1.18 mm, 600 micron, 300 micron and 150 micron standard sieves and the weights retained are 0 kg, 2 kg, 8 kg, 6 kg, 4 kg respectively, the fineness modulus of the aggregate, is
 (a) 0.73 (b) 7.35 (c) 7.40 (d) 7.45
33. The datum temperature for maturity by Plowman, is
 (a) 23° C (b) 0° (c) -5.6° C (d) -11.7° C
34. Expansion joints are provided if the length of concrete structures exceeds
 (a) 10 m (b) 15 m (c) 15 m (d) 45 m
35. If TL is the latest allowable event occurrence time, total activity slack(s), is equal to
 (a) LST-EST (b) LFT-EFT (c) TL-EFT (d) all the above
36. The three time estimates for the activities of a PERT are as under



Activity	t_o	t_L	t_p
1	4	7	9
2	5	7	8
3	4	7	10
4	3	7	10

The frequency distribution curve shown in the above figure corresponds to
 (a) activity 1 (b) activity 2 (c) activity 3 (d) activity 4

37. For a circular sewer of diameter D running partially full with central angle α ,
 (a) $\frac{d}{D} = \frac{1}{2} \left(1 - \cos \frac{\alpha}{2} \right)$ (b) $\frac{a}{A} = \left[\frac{\pi}{360^\circ} - \frac{\sin \alpha}{2\pi} \right]$
 (c) $\frac{p}{P} = \frac{\alpha}{360^\circ}$ (d) all the above

38. For the open drain ($N = 0.025$) shown in the figure, the discharge is

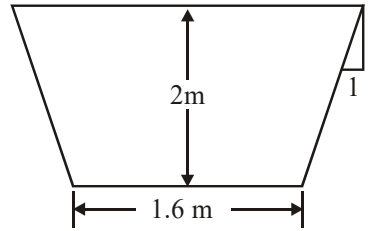
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- (a) 26.88 cumecs (b) 27.88 cumecs
(c) 28.88 cumecs (d) 29.88 cumecs

39. Boussinesq's equation for ascertaining unit pressure at a depth H on sewers due to traffic loads, is

(a) $p_t = \frac{3H^3P}{2\pi Z^5}$ (b) $p_t = \frac{2H^3P}{3\pi Z^5}$ (c) $p_t = \frac{3H^3P}{2Z^5}$ (d) $p_t = \frac{2\pi H^3P}{3Z^5}$

40. The non-clog pump which permits solid matter to pass out with the liquid sewage, is

- (a) centrifugal pump (b) reciprocating pump
(c) pneumatic ejector (d) none of these

41. The detention time of a circular tank of diameter d and water depth H, for receiving the sewage Q per hour, is

(a) $\frac{d^2(0.011d + 0.785H)}{Q}$ (b) $\frac{d(0.022d + 0.085H)}{Q}$
(c) $\frac{d(0.785d + 0.011H)}{Q}$ (d) $\frac{d(0.285d + 0.011H)}{Q}$

42. Assuming L as the length of over land flow in kilometers from the critical point to the mouth of the drain, and H the total fall of level, then the time of concentration (T_t) is:

(a) $\left(0.885 \frac{L^3}{H}\right)^{0.385}$ (b) $\left(0.385 \frac{L^3}{H}\right)^{0.885}$
(c) $\left(0.385 \frac{L^2}{H}\right)^{0.885}$ (d) $\left(0.885 \frac{L^2}{H}\right)^{0.385}$

43. According to Robert E. Horton, the equation of infiltration capacity curve, is _____ (where letters carry their usual meanings.)

(a) $f = f_c(f_o - f_c) e^{-kt}$ (b) $f = f_t - (f_o - f_c) e^{-kt}$
(c) $f = ft + (f_o - f_c) e^{-kt}$ (d) $f = f + (f_o - f_c) e^{-kt}$

44. The area enclosed by the adjacent isohyets of a catchment basin are shown under:

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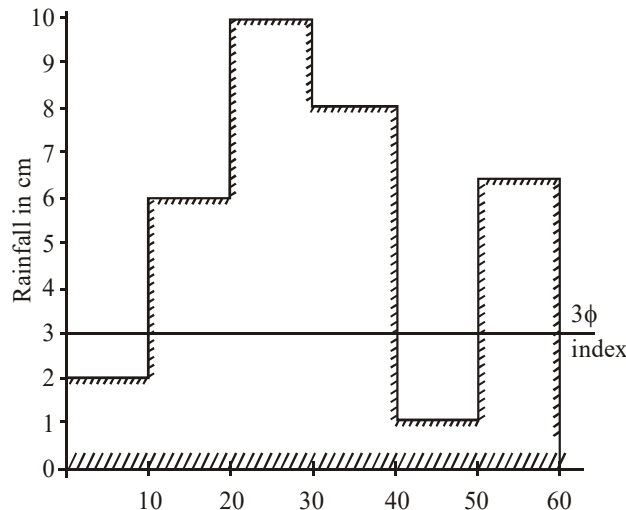
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Isohyets in cms	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90
Area in sq. km	1500	2500	3000	2000	1000

The average depth of annual precipitation in the catchment basin will be
 (a) 60.0 cm (b) 60.5 cm (c) 61.5 cm (d) 63.5 cm

45. Pick up the incorrect statement from the following:
 (a) At two meteorologically homogeneous stations, the average annual precipitation is same
 (b) If the average annual precipitation at two places is same these are meteorologically homogeneous stations
 (c) Neither (a) nor (b) (d) Both (a) and (b)
46. The rate of rainfall for successive 10 minute periods of a 60 minute duration storm, are shown in the figure below



If the value of ϕ_{index} is 3 cm/hour, the run off will be

- (a) 2 cm (b) 3 cm (c) 4 cm (d) 5 cm
47. The field capacity of a soil is 25%, its permanent wilting point is 15% and specific dry unit weight is 1.5. If the depth of root zone of a crop, is 80 cm, the storage capacity of the soil, is
 (a) 8 cm (b) 10 cm (c) 12 cm (d) 14 cm
48. The scour depth D of a river during flood, may be calculated from the Lacey's equation

(a) $D = 0.47 \sqrt{\frac{Q}{f}}$ (b) $D = 0.47 \left(\frac{Q}{f}\right)^{\frac{1}{2}}$

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$$(c) D = 0.47 \left(\frac{Q}{f} \right)^{\frac{1}{3}} \quad (d) D = 0.47 \left(\frac{Q}{f} \right)^{\frac{1}{3}}$$

49. The sensitivity of a rigid module, is
 (a) 2.00 (b) 1.50 (c) 1.00 (d) 0
50. If H and d are the water depth and drop in the bed level at a Sarda fall, the width B of the trapezoidal crest, is given by
 (a) $B = 0.22\sqrt{H+d}$ (b) $B = 0.33\sqrt{H+d}$
 (c) $B = 0.44\sqrt{H+d}$ (d) $B = 0.55\sqrt{H+d}$
51. Hydrometer readings are corrected for:
 (a) temperature correction (b) meniscus correction
 (c) dispersing agent correction (d) temperature, meniscus and dispersing agent corrections
52. The critical exist gradient of seepage water in soils, increases with
 (a) an increase in specific gravity (b) a decrease in specific gravity
 (c) a decrease in void ratio (d) both (a) and (c)
53. If S_s and n are the specific gravity of solids and porosity of soil then the critical exit gradient is
 (a) $(1+n)(S_s+1)$ (b) $(1-n)(S_s-1)$
 (c) $(1+n)(S_s-1)$ (d) $(1-n)(S_s+1)$
54. An infinite slope is inclined at angle i and has its angle of internal friction ϕ , the stability number S_a , is
 (a) $\frac{\cos^2 i}{\tan i - \tan \phi}$ (b) $\frac{\sin^2 i}{\tan i - \tan \phi}$
 (c) $(\tan i - \tan \phi) \cos^2 i$ (d) $(\tan i - \tan \phi) \sin^2 i$
55. If L is the length of vehicles in metres, C is the clear distance between two consecutive vehicles (stopping sight distance), V is the speed of vehicles in km/hour, the maximum number N of vehicles/hour, is
 (a) $N = \frac{1000V}{L+C}$ (b) $N = \frac{L+C}{1000V}$ (c) $N = \frac{1000L}{C+V}$ (d)
 $N = \frac{1000C}{L+V}$
56. Before providing super-elevation on roads, the portion of the carriageway between the crown and the outer edge is made
 (a) to have a reduced fall (b) horizontal
 (c) to have slope of the camber on the other half of the carriageway
 (d) none of these
57. If the coefficient of friction on the road surface is 0.15 and a maximum super-elevation 1 in 15 is provided, the maximum speed of the vehicles on a curve of 100 metre radius, is

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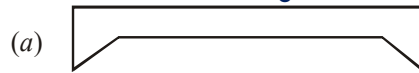
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- (a) 32.44 km/hour (b) 42.44 km/hour
 (c) 52.44 km/hour (d) 62.44 km/hour

58. Pick up the most uncommon cross-section of cement concrete pavements from those shown figure



Straight slope section



Double trapezoidal section



Parabolic section



Rectangular section

59. The distance traveled by revolving the wheel of a vehicle more than its circumferential movement, is known as

- (a) slip (b) skid (c) neither (a) nor (b) (d) both (a) and (b)

60. Traffic surveys are carried out

- (a) to know the type of traffic
 (b) to determine the facilities to traffic regulations
 (c) to design proper drainage system
 (d) all the above

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Discussion of the Questions Paper : Classroom No.4 , Monday 4-6pm

RESPONSE SHEET

Name :

Phone :

Date of exam : _____

Q.No.	Answer	Q.No.	Answer	Q.No.	Answer	Q.No.	Answer

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5		20		35		50	
6		21		36		51	
7		22		37		52	
8		23		38		53	
9		24		39		54	
10		25		40		55	
11		26		41		56	
12		27		42		57	
13		28		43		58	
14		29		44		59	
15		30		45		60	

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Scholarship Test-1

CIVIL-CE
ANSWER-KEY

TestCode : 001CE

1	2	3	4	5	6	7	8	9	10
a	d	b	d	a	b	c	c	c	c
11	12	13	14	15	16	17	18	19	20
b	a	c	b	b	d	d	a	c	d
21	22	23	24	25	26	27	28	29	30
c	c	d	d	d	c	a	d	d	b
31	32	33	34	35	36	37	38	39	40
d	b	d	d	d	c	d	c	a	a
41	42	43	44	45	46	47	48	49	50
a	a	c	d	b	b	c	c	d	d
51	52	53	54	55	56	57	58	59	60
d	d	b	d	a	c	c	b	b	d

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