ODISHA PUBLIC SERVICE COMMISSION
Recruitment to the Posts of AEE(Civil) in Panchayati Raj Dept[Advt. No. 04 of 2020-21]
Question paper-II of the Computer Based Main Written Examination held on 24.08.2021

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
1	In solid mechanics the strength of materials may be regarded as	The statics of deformable or elastic bodies	The statics of strength and stiffness of bodies	The statics of rigid bodies	The statics of modulus of resilience
2	A prismatic bar is subjected to axial tension. What is the aspect angle Which defines an oblique section on which the normal and shearing stresses are equal ?	90^o	45^o	135^o	180^o
3	Modulus of resilience can be defined as	Strain energy / volume	Kinematic energy / Potential energy	Volume / Energy	Potential energy / Moment of Inertia
4	A prismatic steel rod of length L and cross sectional area A hangs vertically under its own weight. What is the strain energy stored in the bar , if its unit weight per unit volume is y (E is Young's Modulus) ?	y^2AL^3 /6E	$y\ AL^2$ / $6E^3$	y^2AL^2 / 6E	y^2AL / $6E^2$
5	In plane strain problem	The loading is in two directions	There is no normal and shear stresses on the two planes (X and Y) perpendicular to the Z direction	The stress vector is zero across a particular plane	The loading is axisymmetric and does not very in axial direction
6	A cantilever beam of length 5.0 m, subjected to a uniformly distributed load of 20kN/m. The bending moment at its free end is equal to	20 kNm	10kNm	Zero	200 kNM
7	In an element $\sigma_x = -\sigma_y = 30$ kPa, if E = 210kPa and $\mu = 0.25$, the shearing strain is	0.0025	0.0030	0.0035	None of the above
8	The ratio of depth to width of a strongest beam that can be cut out of a cylindrical log of wood with homogeneous and isotropic properties is	1.414	1.25	0.707	0.504

ODISHA PUBLIC SERVICE COMMISSION
Recruitment to the Posts of AEE(Civil) in Panchayati Raj Dept[Advt. No. 04 of 2020-21]
Question paper-II of the Computer Based Main Written Examination held on 24.08.2021

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
9	Using the Maximum Stress theory, Maximum Strain theory and Maximum shear theory of failures, the ratios of the diameter of circular shaft is as follows	1 : 1.09 :1.26	1 : 1.52 : 2.15	1: 1 : 1	1 : 2.17 : 3.52
10	if a circular shaft is subjected to a torque T and bending moment M, the ratio of maximum bending stress to maximum shear stress is	2T/M	M/T	M/ 2T	2M/T
11	Consider the following statements: The theory of simple bending assumes that; 1. the material of the beam is homogeneous, isotropic and obeys Hooke's law. 2. the plane section remains plane after bending. 3. each cross section of the beam is symmetric about the loading plane. 4. Young's moduli are the same in tension and compression Of the above statements which are correct ?	1 and 2 only	1,3 and 4 only	2,3 and 4 only	1,2,3 and 4
12	If the depth of a beam of rectangular section is reduced to half, strain energy stored in the beam due to bending becomes	8 time	4 time	1 /4 time	1 / 8 time
13	A steel wire of 20 mm diameter is bent into a circular shape of 10 m radius. If the Young's modulus of elasticity of the wire is 2 x 10^6kg/cm^2, then the maximum stress induced in the wire is	2 X 10^3 Kg / cm^2	3 X 10^3 Kg / cm^2	4 X 10^3 Kg / cm^2	5 X 10^3 Kg / cm^2
14	if the area under the shear force diagram curve for a beam between two points C and D is "X", then the difference between the moments at the two points C and D will be equal to	X /4	X/3	X/2	X
15	The Poisson's ratio of structural steel is	0.3m	1.0m	1.2m	None of the above
16	A beam of uniform strength has constant	Shear Force	Bending Moment	Cross Sectional area	deflection
17	A three hinged parabolic arch of 20m span is subjected to 10kN/m uniformly distributed load. What is the value of BM at 5m from left support ?	Zero	243kNm	200kNm	100kNm

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
18	A fixed beam has how many number of kinematic indeterminacy ?	3	0	2	1
19	Choose the correct statements and answer (i) The displacement method is more useful when degree of kinematic indeterminacy is less than the static indeterminacy (ii) The force method is more useful when degree of static indeterminacy is less than the kinematic indeterminacy (iii) The force method is more useful when degree of kinematic indeterminacy is less than the static indeterminacy (iv) The displacement method is more useful when degree of static indeterminacy is less than the kinematic indeterminacy	(i) and (ii)	(i) and (iii)	(ii) and (iii)	(iii) and (iv)
20	A propped cantilever of span L is subjected to a concentrated load at mid-span. If Mp is plastic moment capacity of the beam , the value of the collapse load will be	4 Mp/L	8 Mp/L	16 Mp/L	6 Mp/L
21	The Muller-Breslau principle can be used to	Determine the shape of the influence line	Indicates the parts of the structure to be loaded to obtain the maximun effect	Calculate the ordinates of the influence lines	All of the above
22	When a structure is just on the point of collapse, the necessary and sufficient conditions attending collapse are (i) Equilibrium condition (ii) Yield condition (iii) Mechanism condition Choose the correct answer	In lower bound theorem (i) and (iii) are considered	In upper bound theorem (i) and (iii) are considered	In lower bound theorem (ii) and (iii) are considered	In lower bound theorem (ii) and (iii) are considered
23	The carry over factor in a prismatic member whose far end is hinged is	0	1 / 2	3 /4	1
24	A structure is statically indeterminate to second degree. What is the maximun number of plastic hinges required to make this structure a mechanism ?	1	4	3	2
25	If a 100 kNm external moment rotates the near end "A" of a prismatic beam without translation. What is the value of moment induced at far fixed end "B"	50 kNm in opposite direction of applied moment 100kNm	50 kNm in same direction of applied moment 100kNm	100 kNm in opposite direction of applied moment 100 kNm	100 kNm in same direction as applied moment 100 kNm

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
26	Due to some point load anywhere on a fixed beam, the maximun free bending moment is M. The sum of fixed end moment is	M	1.5 M	2.0 M	3.0M
27	In slope deflection equations , the deformations are considered to be caused by	torsion	Axial forces	Shear force	Bending moment
28	If in a rigid jointed space frame, (6m+r) > 6j, where "j" are the number of joints, "r" are the number of unknown reactions and "m" are the number of structural members, then the frame is	Stable and statically determinate	Unstable	Stable and statically indeterminate	None of the above
29	At a joint of a frame four members have joined and three of the members have distribution factors for moment distribution as 0.21, 0.29, and 0.35. What is the value of distribution factor for fourth menber ?	0.75	0.15	0.02	0.25
30	A simply supported beam of length L carries a load varying uniformly from zero at left end to maximum at right end. The maximum bending moment occurs at a distance of	1/3 from left end	1/√3 from left end	1/√3 from right end	1/3 from right end
31	The development length of bars of diameter ϕ , as per IS : 456 - 1978 is given by (Where σ_s = stress in bar τ_{bd} = design bond stress	$4\phi\sigma_s/\tau_{bd}$	$\phi\sigma_s/4\tau_{bd}$	$2\phi\sigma_s/3\tau_{bd}$	$\phi\sigma_s/3\tau_{bd}$
32	Which statement is not correct for over reinforced concrete section	Steel is not fully stressed	Neutral axis lies below the neutral axis for balanced section	Compressive stress in concrete at extreme fiber reaches its maximum permissible stress value	Steel is stressed to its maximum permissible stress

ODISHA PUBLIC SERVICE COMMISSION
Recruitment to the Posts of AEE(Civil) in Panchayati Raj Dept[Advt. No. 04 of 2020-21]
Question paper-II of the Computer Based Main Written Examination held on 24.08.2021

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
33	Choose the correct one	Modular ratio for M30 concrete is less than M20 concrete	Nodular ratio for M25 concrete is greater than M20 concrete.	Modular ratio is same for all grade of concrete	As per IS : 456-1978, in calculation of modular ratio between elastic moduli of steel and concrete the long term effect such as creep is not taken into consideration
34	A doubly reinforced beam is considered less economical than a singly reinforced beam because	Concrete is not stressed to full value	Tensile steel required is more than that for a balanced section	Shear reinforcement is more	Compressive steel is under - stressed
35	In limit state design, the maximum limit imposed by IS : 456-1978 on the redistribution of moments in statically indeterminate beams is	10%	15%	20%	30%
36	A reduction facror C_r to load carrying capacity of a long column is given by	$C_r = (1.25 - L_e/24b)$	$C_r = (1.00 - L_e/48b)$	$C_r = (1.25 - L_e/48b)$	$C_r = (1.5 - L_e/48b)$
37	Minimum clear cover (in mm) to the main steel bar in footing, column, beam and slab are respectively	75,40,25,15	40,75,15,25	30,20,25,15	50,40,30,20
38	In prestressed concrete	Forces of tension and compression change but lever arm remains unchanged	Forces of tension and compression remain unchanged but lever arm changes with the moment	Both forces of tension and compression and lever arm change	Both forces of tension and compression and lever arm remain unchanged

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
39	In design of two-way slab restrained at al edges, torsional reinforcement required is	0.75 times the area of steel provided at midspan in the same direction	0.375 times the area of steel provided at midspan in the same direction	0.375 times the area of steel provided in the shorter span	Not required
40	The slump recommended for mass concrete is about	20mm to 50 mm	50 mm to 100 mm	100 mm to 125 mm	125 mm to 150 mm
41	When shear stress exceeds the permissible limit in a slab , then it is reduced by	Decreasing the depth	Providing shear reinforcement	Using high strength steel	Increasing the depth
42	In counter fort retaining walls, the main reinforcement in the stem at support is	Not provided	Provided only on inner face	Provided only on front face	Provided both on inner and front faces
43	Most common method of prestressing used for factory production is	Long line method	Freyssinet system	Magnel - Blaton system	Lee - Macall system
44	Limit state of serviceability for deflection including the effects due to creep, shrinkage and temperature occurring after erection of partitions and application of finishes as applicable to floors and roofs is restricted to	Span / 150	Span / 200	Span / 250	Span / 350
45	For bars in tension, a standard hook has an anchorage value equivalent to a straight length of (Where ϕ is diameter of hook)	8ϕ	12ϕ	16ϕ	24ϕ
46	The channels or angles in the compression chords of the steel truss girder bridges are turned outward in order to increase	Cross-sectional area	Section modules	Torsional constant	Radius of gyration
47	Horizontal stiffener in a plate girder is provided to safeguard against	Shear buckling of web plate	Compression buckling of web plate	Yielding	All of the above

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
48	As per IS : 800, the maximum bending moment for design of purlins can be taken as (where W is total distributed load including the wind load on the purlins and L is centre distance of support) ?	WL/6	WL/8	WL/10	WL/12
49	Minimum spacing of vertical stiffeners for plate girder is limited to (Where 'd' is the distance between flange angles)	d/4	d/3	d/2	d/6
50	As per IS: 875, for the purposes of specifying basic wind velocity, the country has been divided into	4 zones	5 zones	6 zones	7 zones
51	As per IS :800, for compression flange, the outstand of flange plates should not exceed , if"t" is thickness of thinnest flange plate	12t	16t	20t	25t
52	Intermediate vertical stiffeners in a plate girder need to be provided, if the depth of web exceeds ("t" is thickness of web)	50t	85t	200t	250t
53	The number of seismic zones in which the country has been divided are	3	5	6	7
54	The lacing bars in a steel column should be designed to resist	Bending moment due to 2.5% of the column load	Shear force due to 2.5 % of the column load	2.5% of column load only	Both 1 and 2
55	Given that the effective area of a tension member is A_e and the yield stredd is σ_y. In order to obtain the ultimate strength of the tension member, as per the plastic design concept ; $A_e \sigma_y$ is to be multiplied by	1.1	0.95	0.85	0.75
56	Battens provided for a compression member shall be designed to carry a transverse shear equal to	2.5% of axial force in member	5% of axial force in member	10% of axial force in member	20% of axial force in member

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
57	Shear buckling of web in a plate girder is prevented by using	Vertical intermediate stiffener	Horizontal stiffener along the neutral axis	Bearing stiffener	None of the above
58	The thickness of web for unstiffened plate girder with clear distance "d" between the flanges shall not be less than	d / 200	d / 85	d / 100	d / 160
59	The effective length of a structural steel compression of length "L" effectively held in position and restrained against rotation at one end but neither held in position nor restrained against rotation at the other end, is member	L	1.2L	1.5L	2.0L
60	Economical depth of a plate girder is given by (where M , σ, and t_w are of usual meaning)	$\sqrt{(M/\sigma t_w)}$	$1.1\sqrt{(M/\sigma t_w)}$	$1.2\sqrt{(M/\sigma t_w)}$	$1.3\sqrt{(M/\sigma t_w)}$
61	Shrinkage cracks in masonry could be minimized by	Avoiding use of rich cement	Not delaying plaster work till masonry has dried after proper curing	By using English bond of bricks	By providing expansion joints
62	Cause of horizontal craks below RCC slab on top most storey	Deflection of slab and lifting up of edge of the slab	Arching of slabs	Expansion of slab	All of the above
63	Which is not correct for high alumina cement	It can withstand high temperature	It resist the action of acid	The initial setting time of this cement is more than 3.5hours	It can be used in mass concrete
64	Pulsed Eddy Current (PEC) type non destructive test is conducted to find	Thickness and to detect corrosion on ferrous material	Compressive strength of concrete used	Wire bond with concrete	Premeability of concrete
65	Modulus of rupture of concrete is a measure of	Compressive strength	Direct tensile strength	Split tensile strength	Flexural tensile strength

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
66	Compressive strength of brick is	4.3 to 6.9 MPa	2 to 3 MPa	15 to 20 MPa	20 to 25 MPa
67	Bulking of sand is maximum if moisture content is about	2%	3%	4%	5%
68	For a given aggregate content, increasing water-cement ratio in concrete it	Decreases shrinkage	Increases shrinkage	Does not change shrinkage	None of the above
69	The approximate ratio between the strength of cement concrete at 7 days and 28 days is	3/4	2/3	1/2	1/3
70	Sum of tread and rise (in mm) for a staircase must lie between	300 to 350	400 to 450	500 to 550	600 to 650
71	In a concrete mix the fineness modulus of coarse aggregate is 7.6, the fineness modulus of fine aggregate is 2.8 and economical value of the fineness modulus of combined aggregate is 6.4, then the proportion of fine aggregate is	66.67%	25%	50%	33.33%
72	To make one cubic meter of 1:2:4 by volumen concrete , the volume of coarse aggregate required is	$0.85m^3$	$0.95m^3$	$0.90m^3$	$0.75m^3$
73	The role of super plasticizer in a cement paste is to	disperse the particle	disperse the particle and to remove the air bubbles	Retard setting	disperse the particle and to remove the air bubbles and to retard setting
74	Choose the most correct statement with regards to Queen Closure	Brick laid with its breadth parallel to the face or direction of wall	Brick having the same length and depth as the other bricks but half the breadth	Brick with half the width at one end and full width at the other	To break the continuity of vertical joints and to provide proper bond in brick masonry work
75	The type of bond provided in brick masonry for carrying heavy load is	English bond	Single Flemish bond	Double Flemish bond	Zigzag bond

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
76	Which of the following is a weakness of bar chart	Interdependencies of activities	Project progress	Time Uncertainties	All of the above
77	The earthwork quantities are calculated	By mid-sectional method	By mean-sectional method	By Prismodial method	All of the above methods
78	In 1.0 Cubic meter of 1:2:4 cement concrete , how many bags of cement (approximately) is required ?	6.6	16.6	26.6	36.6
79	The detailed estimate of the cost of the project is done by	Unit-quantity method	Total-quantity method	BOQ method	By first two methods
80	In the time-cost optimization, using CPM method for network analysis, the crashing of the activities along the critical path is done starting with the activity having	shortest duration	least cost slope	longest duration	highest cost slope
81	There are three parallel paths in a part of a network between a bursting node and the next merging node with only one activity in each path. The minimum number of dummy arrows needed will be	3	2	1	0
82	In long wall and short wall method of estimation which one of the following is correct	Short wall length in-to-in = centre to centre length - one breadth	Short wall length in-to-in = centre to centre length + one breadth	Long wall length out-to-out = centre to centre length + one breadth	Long wall length out-to-out = centre to centre length - two breadth
83	The direct cost of a project with respect with respect to normal time is	Minimum	Maximum	Zero	infinite
84	If the optimistic time, most likely time and pessimistic time for activity X are 10, 18 and 20 respectively and for activity B are 12, 18, and 30 respectively, then	expected time of activity X is greater than the expected time of activity Y	expected time of activity Y is greater than the expected time of activity X	expected time of activity X is same as that of the expected time of activity Y	none of the above is correct

ODISHA PUBLIC SERVICE COMMISSION
Recruitment to the Posts of AEE(Civil) in Panchayati Raj Dept[Advt. No. 04 of 2020-21]
Question paper-II of the Computer Based Main Written Examination held on 24.08.2021

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
85	Slack time refers to	an activity	an event	both event and activity	Critical event only
86	The probability of competition of any activity within its expected time is	50%	84.1%	67%	100%
87	The PERT calculations yield a project length of 75 weeks, with a variance of 9. Within how many weeks would you expect the project to be completed with probabilility of 95%, Take probabilityt factor Z equal to 1.65 for 95% probability	54.95	56.6	60	79.95
88	In Analysis of rates which is/are included from the following	Cost of quantities of materials	Cost of labour and other miscellaneous expenditures	Contractor's profit	All of the above
89	Cost slope	(crash cost - normal cost) / crash time	Crash cost / (normal time - crash time)	(crash cost - normal cost) / normal time	(crash cost - normal cost) / (normal time crash time)
90	Free float is mainly used to	identify the activities which can be delayed without affecting the total float of preceding activity	identify the activities which can be delayed without affecting the total float of succeeding activity	Establish priorities	identify the activities which can be delayed without affecting the total float of either of preceding or succeeding activities
91	The line of action of the buoyancy force acts through the	Centre of gravity of the submerged body	Centroid of the volume of any floating body	Centroid of the displaced volume of fluid	Centroid of the volume of fluid vertically above the body

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
92	Choose the correct statement	Standard Project Flood (SPF) is always greater than Probable Maximum Flood (PMF)	PMF >SPF	The catchment characteristics decides whether PMF is greater than SPF	PMF = SPF
93	What is the limitation of Rational formula for flood peak estimation ?	Duration of rainfall intensity should be less than the time of concentration	Rainfall intensity must be constant over the entire watreshed during the 90% time of rainfall duration	It gives base of hydrograph but not the peak of hydrograph	Formula is applicable to watershed area up to 50 square kilometers
94	Why in flood routing the peak of outflow hydrograph is less than the peak of inflow hydrograph	As the velocity of flood wave increases with time	due to the effect of storage and channel friction	As the outflow hydrograph contains more volume of water than inflow hydrograph	As the time base of the outflow hydrograph reduces.
95	In sequent peak method for calculating reservoir capacity, which one of the following is the correct statement	The difference between the first peak and the through following it is the reservoir storage required under normal condition	Cumulative inflow volume is plotted in Y- axis against time in X-axis.	The cumulative difference of inflow and demand is plotted in Y-axis against cumulative inflow in X - axis	The difference in summation of trough gives storage required under normal inflows

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
96	In Newton formulation the law of fluid friction	Shear stress is proportional to shear stress	Shear stress is inversely proportional to shear stress	Shear stress is proportional to shear strain	Shear stress is proportional to rate of shear strain
97	An object weights 289.2N in air and 186.9N in water. What is the relative density of the material of the object ?	2.83	2.45	2.15	2.00
98	The pressure 44.1 K Pa is equivalent to	5.94m of water	0.33m of mercury	154.84 kN/m^2 absolute	15.84 m of water absolute
99	Choose the correct value of friction factor (f) of the circular pipe for the laminar flow with Reynold's Number 640	0.1	0.15	0.20	0.25
100	In supercritical open channel flow	The critical depth is always above normal depth	The critical depth and normal depth merges	Critical depth is always below the normal depth	Insufficient information for any comment
101	The differential gauge attached to Pitot tube shows 76mm deflection of mercury, when placed against the flow direction of water in the river. What is the value of velocity of river water ?	3.344m/s	4.17m/s	2.87m/s	4.19m/s
102	The main function of a divide wall is to	Control the silt entry in the canal	Prevent river floods from entering the canal	Separate the under sluices from weir proper	Provide smooth flow at sufficiently low velocity
103	The hydraulic mean depth laid at an longitudinal slope of 0.004 is 0.837. What is the minimum size of stone that will remain at rest ?	3.70 cm	4.50 cm	5.30 cm	6.45 cm

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
104	The rainfall in four successive 12 hours period on a catchment are 40, 80, 90, and 30mm. If the infiltration index for the soil is 5mm/hr, then the total surface run off will be	0	50mm	120mm	180mm
105	A confined aquifer 2.0 km wide discharges $0.06m^3$/day/km to a dry river in the month of April. What is the value of transmissivity of aquifer, if the slope of the piezometric surface is 0.375 m/km	$0.08m^2$/day	$0.16m^2$/day	$0.32m^2$/day	$0.04m^2$/day
106	The non-scouring limiting velocity (in m/s) for cement concrete sewers is	4.5 to 5.5	3.5 to 4.5	3.0 to 4.0	2.5 to 3.0
107	The dissolved oxygen level in natural unpolluted waters at normal temperature is found to be of the order of	1 mg/liter	10 mg/liter	100 mg/liter	1000 mg/liter
108	For a given discharge, the efficiency of sedimentation tank can be increased by	Decreasing surface area of the tank	Increasing the depth of the tank	Decreasing the depth of the tank	Increasing surface area of the tank
109	The process in which the chlorination is done beyond the break point is known as	Pre chlorination	Post chlorination	Break point chlorination	Super chlorination
110	Select the correct statement	5 day BOD is the ultimate BOD	5 day BOD is greater than 4 day BOD keeping other conditions same	BOD does not depend on time	5 day BOD is less than 4 day BOD keeping other conditions same
111	The working condition of imhoff tanks are	Aerobic only	Anaerobic only	Aerobic in lower compartment and aerobic in lower compartment	Anaerobic in lower compartment and aerobic in upper compartment

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
112	Sludge volume index is defined as the ratio of	Percentage of sludge by volume to percentage of suspended solids by weight	Percentage of sludge by volume to percentage total solids by weight	Percentage of suspended solids by weight to percentage of sludge by volume	Percentage of total solids by weight to percentage of sludge by volume
113	In the two pipe system of house plumbing, the pipes required are	One soil pipe, one waste pipe and one vent pipe	One soil pipe, two waste pipe and one vent pipe	One soil pipe, one waste pipe and two vent pipe	two soil pipe, one waste pipe and one vent pipe
114	Select the primary air pollutants among the following:	Sulpher dioxide and nitrogen oxides	Ozonr and carbon monoxiden	Sulpher dioxide and ozonr	Nitrogen and ozone
115	When Environmental Lapse Rate (ELR) is more than Adiabatic Lapse Rate (ALR), then the environment is said to be	Stable	Unstable	Neutral	None of the above
116	Two samples of water X and Y have pH values of 4.4 and 6.4 respectively. How many times more acidic sample X is than sample Y ?	0	50	100	1000
117	Fresh sludge has moisture content 99% and after thickening , its moisture content reduces to 96 %. The reduction in volume of sludge is	3%	5%	75%	97.5%
118	Areosol is	Carbon particles of microscopic size	Dispersion of small solids or liquid particles in gaseous media	Finely divided particles of ash	Diffused liquid particles

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
119	A city supply of 15000 cubic meters of water per day is treated with a chlorine dosages of 0.5 ppm, For this purpose, the requirement of 25% bleaching powder per day would be	300 kg	75 kg	30 kg	7.5 kg
120	The detention period for oxidation ponds are usually kept as	4 to 8 hours	24 hours	10 to 15 days	3 months
121	The type of footing which is used to transmit heavy loads through steel columns is	Raft foundation	Grillage foundation	Well foundation	Isolated footing
122	Under a given load, a clay layer attains 30% degree of consolidation in100 days. The time taken by the same clay layer to attain 60 % degree of consolidation will be (in days)	1600	400	800	200
123	At a site having a deposit of dry sandy soil, an average soil of standard penetration resistance N equal to 6 was recorded. The compactness of the soil deposit can be described as	Loose	Dense	Medium	Very loose
124	The slope of the e-log p curve for a soil mass gives	Coefficient of consolidation, C_v	Coefficient of permeability, k	Coefficient of volume compressibility, m_v	Compressive index, C_c
125	The soils most susceptible to liquefaction are	Saturated gravels and cobbles	Saturated clays of uniform size	Saturated dense sands	Saturated fine and medium sands of uniform particle size
126	Contact pressuer beneath a rigid footing resting on cohesive soil is	More at edges compared to middle	Uniform throughout	Less at edges compared to middle	Zero at edges and maximum at middle
127	For a base failure, the depth factor D_f is	$D_f = 1.0$	$D_f > 1.0$	$D_f < 1.0$	0

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
128	Cohesive soils are	Good for backfill because of large lateral pressure	Good for backfill because of high lateral pressure	Poor for granular in nature and drains water quickly	Poor for backfill because of large lateral pressure
129	Select the incorrect statement	Unconfined compression test can be carried out on all types of soils	Stress distribution on the failure plane in the case of triaxial compression test is uniform	In a direct shear box test, the plane of shear failure is predetermined	Better control is achieved on the drainage of the soil in a triaxial compression test
130	The hydraulic head that would produce a quick condition in a sand stratum of thickness 1.5m, specific gravity 2.67 and void ratio 0.67 is equal to	1.5m	1.0m	2.1m	1.75m
131	In a deposit of normally consolidated clay	Effective stress and undrained strength increase with depth but water content decreases with depth	Effective stress ,water content and undrained strength decrease with depth	Effective stress and water content increases with depth but undrained strength decrease with depth	Effective stress and undrained strength decrease with depth but water content increases with depth
132	Coefficient of consolidation for clays normally	First increases and then decreases with increase in liquid limit	Increases with increase in liquid limit	Remains constant at all liquid limit	Decreases with increase in liquid limit

ODISHA PUBLIC SERVICE COMMISSION
Recruitment to the Posts of AEE(Civil) in Panchayati Raj Dept[Advt. No. 04 of 2020-21]
Question paper-II of the Computer Based Main Written Examination held on 24.08.2021

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
133	For a damped vibrating system with single degree of freedom resonance occurs at a frequency ratio of	0	1	Less than 1	Greater than 1
134	The ratio of bearing capacity of double Under Reamed pile to that of single under reamed pile is nearly	2	1.5	1.2	1.7
135	If the proportion of soil passing 75 micron sieve is 50% and the liquid limit and plastic limit are 40% and 20% respectively, then the group index of the soil is	6.5	65	38	3.8
136	The minimum design speed for hairpin bends in hills roads is taken as	10 kmph	20 kmph	30 kmph	40 kmph
137	Expansion joints in cement concrete pavements are provided at an interval of	18m to 21m	25m to 30m	10m to 15m	30m to 40m
138	For sandy soils the most common method of stabilization is	Soil lime stabilization	Soil bitumen stabilization	Soil cement stabilization	Mechanical stabilization
139	For the construction of water bound macadam roads, the correct sequence of opetations after spreading coarse aggregate is	Dry rolling, wet rolling, application of screening and application of filter	Dry rolling, application of filter ,wet rolling and application of screening	Dry rolling,application of screening, wet rolling and application of filter	Dry rolling,application of screening and application of filter and wet rolling
140	Traffic flow is calculated by	Multiplying measured density with measured travel speed	Multiplying measured traffic flow rate with road density	Multiplying road density with measured travel speed	Multiplying measured travel speed with road density

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
141	The maximum spacing of contraction joints in rigid joints in rigid pavements is	5.5 m	4.5 m	3.5 m	2.5 m
142	Select the correct statement	Minimum and maximun values of group index can be zero and 20 respectively	More the value of CBR , greater thickness of pavement will be required	More the value of group index, less thickness of pavement will be required	All of the above
143	Bitumen of grade 80/100 means	Its penetration value is 8 cm to 10cm	Its penetration value is 8 mm to 10mm	Its penetration value is 8 cm	Its penetration value is 0mm
144	The maximum design gradient for vertical profile of a road is	Ruling gradient	Limiting gradient	Minimum gradient	Exceptional gradient
145	The ruling design speed on a National Highway in plain terrain as per IRC recommendations is	60 kmph	45 kmph	120 kmph	100 kmph
146	In triangulation, the best shape of the triangle would be	Equilateral	Right angled isosceles triangle	Isosceles with two base angles of 65^{o} 14'	Isosceles with two base angles of 56^{o} 14'
147	The length of transition curve for a circular curve of radius 300m and for a design speed of 15 m/s, when the rate of change of centrifugal acceleration is $0.3m/s^2$,is	60.53m	45.25m	30.75m	37.5m

ODISHA PUBLIC SERVICE COMMISSION
Recruitment to the Posts of AEE(Civil) in Panchayati Raj Dept[Advt. No. 04 of 2020-21]
Question paper-II of the Computer Based Main Written Examination held on 24.08.2021

SL	QUESTION	OPTION 1	OPTION 2	OPTION 3	OPTION 4
148	If the bearing of a line MN is 60^{o} 30' and that of NO is 122^{o} of a closed traverse MNOPQ, then the measures of interior angle N is	154^{o}	$118^{0}30'$	$122^{0}00'$	$240^{0}30'$
149	A 3000m long line lying at an elevation of 450 m measures 10 cm on a vertical photograph. The focal length of the camera is 21 cm. The scale of the photograph for the area having an elevation of 1000 m will be	1 : 25008	1:27381	1: 37231	1:22222
150	Which of the following is not a part of a total station	Electronic transit theodolite	Electronic distance bar	Microprocessor	Subtensebar