

.....*M.E Civil Engineering 1st Year*... EXAMINATION, 2018
(1st / 2nd Semester / Repeat / Supplementary / Annual / Bi-Annual)

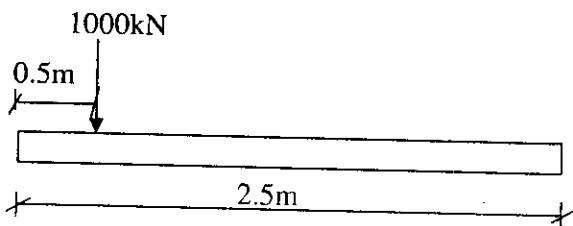
SUBJECT ...*Advanced Structural Design*
(Name in full)

PAPERXX.....

Time: ~~Two hours~~/~~Three hours~~/~~Four hours~~/~~Six hours~~

Full Marks 100
(60 marks for part I)

Use a separate Answer-Script for each part

No. of Questions	PART I	Marks
	<p style="text-align: center;">Answer question no 1 and any two from the rest</p> <p>1. A beam on elastic foundation with given loading is shown in Fig. 1. Find the bending moment and deflection at midpoint of the beam. The beam has square cross section of dimension 100mm. Modulus of elasticity of beam material and modulus of foundation (k_0) are 2000GPa and 0.25N/mm²/mm respectively.</p> <div style="text-align: center;">  <p style="text-align: center;"><i>Fig. 1</i></p> </div> <p>2. Derive the expressions for bending moment and direct tension on the vertical wall of a rectangular bunker. Also find bending moment and axial force on the hopper bottom of this bunker.</p> <p>3. Derive the expression for three edge shears in connection to folded plate. Also find the stresses due to the application of edge shear.</p> <p>4. Find bending moment, shear force and deflection of infinite beam with concentrated moment (M_0). The beam is resting on elastic foundation.</p>	<p style="text-align: center;">30</p> <p style="text-align: center;">15</p> <p style="text-align: center;">15</p> <p style="text-align: center;">15</p>

βx	$A_{\beta x}$	$B_{\beta x}$	$C_{\beta x}$	$D_{\beta x}$
0	1	0	1	1
0.02	0.9996	0.0196	0.9604	0.9800
0.04	0.9984	0.0384	0.9216	0.9600
0.10	0.9907	0.0903	0.8100	0.9003
0.20	0.9651	0.1637	0.6398	0.8024
0.30	0.9267	0.2189	0.4886	0.7077
0.40	0.8784	0.2610	0.3564	0.6174
0.50	0.8231	0.2908	0.2415	0.5323
0.60	0.7628	0.3099	0.1431	0.4530
0.70	0.6997	0.3199	0.0699	0.3796
$\pi/4$	0.6448	0.3224	0	0.3224
0.80	0.5854	0.3223	-0.0093	0.3131
0.90	0.5712	0.3185	-0.0657	0.2527
1.00	0.5083	0.3096	-0.1108	0.1988
1.10	0.4476	0.2963	-0.1457	0.1510
1.20	0.3899	0.2807	-0.1716	0.1091
1.30	0.3353	0.2636	-0.1897	0.0729
1.40	0.2849	0.2430	-0.2011	0.0419
1.50	0.2384	0.2226	-0.2068	0.0158
$\pi/2$	0.2079	0.2079	-0.2079	0
1.60	0.1959	0.2018	-0.2077	-0.0039
1.70	0.1576	0.1812	-0.2047	-0.0235
1.80	0.1234	0.1610	-0.1985	-0.0376
1.90	0.0932	0.1415	-0.1899	-0.0484
2.00	0.0667	0.1231	-0.1794	-0.0563
2.20	0.0244	0.0896	-0.1548	-0.0652
$3\pi/4$	0	0.0670	-0.1340	-0.0670
2.40	-0.0256	0.0613	-0.1282	-0.0669
2.60	-0.0254	0.0383	-0.1019	-0.0636
2.80	-0.0369	0.0304	-0.0737	-0.0573
3.00	-0.0423	0.0070	-0.0563	-0.0493
π	-0.0432	0	-0.0432	-0.0432
3.20	-0.0431	-0.0024	-0.0383	-0.0407
3.40	-0.0408	-0.0085	-0.0237	-0.0323
3.60	-0.0366	-0.0121	-0.0124	-0.0245
3.80	-0.0314	-0.0137	-0.0040	-0.0177
$5\pi/4$	-0.0279	-0.0139	0	-0.0139
4.00	-0.0258	-0.0139	0.0019	-0.0120
$3\pi/2$	-0.0090	-0.0090	0.0090	0
2π	0.0019	0	0.0019	0.0019

M.E. Civil Engineering - First Year - First Semester
Advanced Structural Design (SE)

Time: Three Hours

Full Marks 100

[IS 456 is allowed in the examination hall. Assume any other suitable values]

No. of questions	Part II (Answer Any two of the following questions.)	Marks (2X20=40)
1 (a)	Write a short note of reinforced concrete grids.	4
(b)	A reinforced concrete grid floor is to be designed to cover a floor area of size 8mX12m. The spacing of the ribs in perpendicular direction is 2m c/c and live load 3 kN/m ² . Adopt M25 grade of concrete and Fe500 HYSD bars. Analyze the grid floor by plate theory.	16
2	Design the exterior panel of a flat slab floor system for a ware house 20m by 20 m divided into 5m by 5m. Use M25 grade of concrete and Fe500 HYSD bars. Loading class = 5 kN/m ² . Column size=400 mm. Height of the storey=3.3 m Thickness of the slab in column strip=300mm Thickness of slab in middle strip=200mm.	20
3	Design an Intze type water tank of capacity 1.5 MLD, up to cylindrical tank wall. Adopt M25 grade of concrete and Fe415 grade of steel. The design of the tank should conform to IS 456 and IS 3370.	20