QUESTION BANK	2016
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SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR

Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : SA-II (13A01505)

Course & Branch: B.Tech – CE

5M

5M

Year & Sem: III-B.Tech & I-Sem

Regulation: R13

$\underline{UNIT} - \underline{V}$

PLASTIC ANALYSIS

(a) Explain the lower and upper bound theorem.
 (b) Calculate the collapse load for the beam shown in figure below.



(a) Find the shape factor of a tubular section with outer diameter equal to twice the inner diameter.

(b) A portal frame ABCD with hinged foot has stanchions 4 m high and beam of 6 m span. There is horizontal point load of 40 kN at B. Whole the beam carries a point load of 120 kN at mid span. Using load factor of 1.5, establish collapse mechanism and calculate the collapse Moment. 5M

3. (a) Derive the moment curvature relationship in plastic analysis.
(b) Calculate the plastic moment capacity required for the continuous beam with working loads shown in figure.
6M



- 4. A T-section consists of a flange 150x10mm and a web of 140x10mm. The section modulus of the T-section is 54600mm3 This section is used as a simply supported beam of 4m span and carries a UDL of 25kN/m on the whole span. Determine the shape factor of the beam and also calculate the collapse load for the beam. Assume yield stress as 250 Mpa 10M
- 5. (a) Define plastic moment.

2M

(b) Calculate the plastic moment capacity required for the continuous beam with working

Structural Analysis-II

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loads shown in figure



- 6. A T-section consists of a flange 150x10mm and a web of 140x10mm. The section modulus of the T-section is 54600mm3. This section is used as a fixed beam of 7m span and carries a UDL of 180kN/m on the whole span. Determine the shape factor of the beam and also calculate the collapse load for the beam. Assume yield stress as 255 MPa. 10M
- 7. Write the assumptions for evaluating fully plastic moment. And also derive fully plastic moment M_P and shape factor S in general. 10M

ð.	Derive the shape factor for	
	a) Triangular section	5M
	b) Hollow circular section	5M
9.	Determine the shape factor for the rectangular and circular section.	10M
10.	a) Define plastic hinge and plastic moment capacity.	2M
	b) Define the collapse load and load factor	2M
	c) Give the assumptions for fully plastic moment of a section	2M
	d) A T-section consists of 20 mm web and 20 mm thick flange. Depth of the web	
	is 180 mm. Width of the flange is 120 mm. find the shape factor based on	
	Plastic analysis.	2M
	e) Idealized stresses in plastic analysis.	2M

8M

QUESTION BANK	2016
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<u>UNIT – V</u>

PLASTIC ANALYSIS

1.	For the plastic	c analysis, the	criteria for the	analysis	of a stru	ucture are based on	[]
	A) Working L	Load B) Yi	eld Load C)	Ultimate	Load	D) breaking load		
2.	The bending r	noment at a pl	astic hinge is	equal to			[]
	A) equal to z	ero						
	B) equal to y	ield moment o	f the section					
	C) equal to p	lastic moment	of the section					
	D) greater that	an plastic mom	ent of the sec	tion				
3.	The plastic m	odulus of a squ	are of section	of side '	d' is		[]
	A) d ³ /3	B) d ³ /	(4 C) d	³ /6	D) d ³ /2	2		
4.	The shape fac	tor of a diamo	nd section is:				[]
	A) 1	B) 1.5	C) 2	D)2.5				
5.	The shape fac	tor of an isosc	eles triangle fo	or bendin	g about	the axis parallel to t	the base	is:
							[]
	A) 1.5	B) 1.7	C) 2	D) 2.3	4			
6.	The shape fac	tor of a rectang	gular section i	s:			[]
	A) 1	B) 1.5	C) 2	D) 2.5	i			
7.	The ratio of lo	oad carrying ca	apacity of a fix	ked beam	to that	of a simply supporte	ed beam	having

Structural Analysis-II

					QUESTION	I BANK	2016
same maximu	um bending m	oment under U	UDL thro	oughout the	span is:	[]
A) 1.5	B) 1	C) 0.6667		D) 3			
8. Effects of s	hear force a	nd axial force	e on pla	astic mome	ent capacity c	of a struct	ure are
respectively	to					[]
A) Increase aC) Decrease a9. The moment	nd decrease and increase which makes	B) increaseD) decreaseall the fibers a	e and incr e and dec at the sec	ease crease tion to yield	l is known as	[]
A) Flexural	Rigidity	B) moment	t of resist	ance			
C) Plastic mo	oment capacity	D) Yield M	Ioment				
10. In plastic ana	lysis of struct	ures the follow	ving assu	mptions are	e made		
I. Plane section	on before ben	ding remains p	olane eve	n after bend	ling		
II. The relationship between compressive stress and compressive strain is the same as between tensile stress and tensile strain.							
III. The defec	ctions are sma	11					
Select the con	rrect answer c	ode from the b	below			[]
A) I and II and	re true but III	is wrong					
B) I and III are true but II is wrong							
C) II and III	are but I is wi	ong					
D) I, II and	III are true						
11. The shape fac A) 4R/3π	ctor of circula B) 4R/π	r section with r C)1	radius 'F 6/3π	C' is D)8/3π		[]
12. The shape fac	ctor of a diam	ond shaped see	ction for	bending ab	out its diametr	al arise is:	
						[]
A) 1.2	B) 1.5	C) 2	D) n	one of the a	bove		
13. The shape fac	ctor of a I sect	ion is:				[]
A) 1.2	B) 1.5	C) 2	D) n	one of the a	bove		
14. For the T-sec	tion 100mm >	x 100 mm x 10	mm, the	plastic neut	tral axis is	[]
uctural Analysis-II							Page

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Γ

A) In the flange B) at the junction of the flange and web

- C) In the web D) at the top of the flange
- 15. For a given structure and loading, if these exists any distribution of bending moment throughout the section which is both safe and statically admissible with a set of loads 'W' the value of W must be less than or equal to collapse load 'W_c'. The above theorem is known as
 - A) Kinematic theorem B) Static Theorem
 - C) Uniqueness theorem D) none of the above
- 16. The collapse load for a propped cantilever of span'L' subjected to a concentrated load W at mid span is []
 - A) $2M_P/L$ B) $3M_P/L$ C) $4M_P/L$ D) $6M_P/L$
- 17. Collapse load in a fixed beam of span L, carrying UDL over entire span and having plastic moment capacity M_p is []

Structural Analysis-II						Page 5
A) Unity B	3) zero	C) two	D) non	e of the above		
24. Shape factor is a	always greate	er than				[]
A) Zero B	s) M/2	C) 2M	D) non	e of the above.		
23. At mechanical h	inges, the res	isting moment	is			[]
A) Plastic hinge	es B) Elas	stic hinges C) N	Mechani	cal hinges D)	none	
22. The	permit rota	tion offering a	constant	resisting moment	.	[]
A) Circular secti	on B) trian	ngular section	C) Rec	tangular Section	D) none	;
21. The section with	the maximum	m shape factor	is the			[]
A) Load Factor		B) Shape Fact	or	C) Design Factor	D) none	;
20. The ratio of the c	collapse load	and the working	ng load.			[]
A) Load Factor		B) Shape Fact	or	C) Design Factor	D) none	;
19. The ratio of the J	plastic mome	nt of the sectio	on to the	yield moment of the	he section.	[]
A) $\frac{M}{I} = \frac{y}{\sigma} = \frac{E}{R}$	B) $\frac{M}{I}$	$\frac{\sigma}{y} = \frac{\sigma}{y} = \frac{z}{R}$		$C)\frac{M}{I} = \frac{\sigma}{y} = \frac{R}{E}$	D)	$\frac{M}{I} = \frac{R}{y} = \frac{E}{\sigma}$
18. Simple bending	equation is	, -	,	-		[]
A) $6M_P/L$ B	$3) 8M_P/L$	C) $8M_{P}/L^{2}$	D) 16M	$I_{\rm P}/L^2$		

 25. The stress in a beam is less if it section modulus is A) High B) medium C) low D) zero 26. A support over which the real beam is continuous will correspond to A) An internal hinge in the conjugate beam B) A hinged support in the conjugate beam C) A fixed support in the conjugate beam D) A discontinuity in the conjugate beam D) A discontinuity in the conjugate beam 27. If a basic structure is obtained by removing the roller support of an indeterminate structure the requirement the basic structure has to satisfy is that The deflection in the direction perpendicular to the supporting surface must be zero B) The displacement in any direction at that point must be zero C) The displacement in a real beam becomes in the conjugate beam a A) Nicle support B) hinged support C) Fixed support D) free end 28. The fixed support in a real beam becomes in the conjugate beam a A) Noller support B) hinged support C) Fixed support D) free end 29. The largest stress that a material can withstand without permanently deformed [] A) Yield point B) Elastic limit C) Plastic limit D) none 30. The strain that occurs before the yield point C) Plastic Strain D) none 31. The strain that occurs before the yield point with no increase in stress [] A) Tangential strain B) Elastic strain C) Plastic Strain D) none 						QUESTION BANK	20	16
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32. The strain that occurs after the yield point with no increase in stress []	A)) Tangential strain	n B) Ela	stic strain	C) Plastic Strain	D) none		
	32. Th	e strain that occur	rs after th	e yield point w	ith no increase in stre	ess	[]
A) Tangential strain B) Elastic strain C) Plastic Strain D) none	A)) Tangential strain	n B) Ela	stic strain	C) Plastic Strain	D) none		
33. The range in the plastic zone where additional stress is necessary to produce additional strain	33. Th	e range in the pla	stic zone	where addition	al stress is necessary	to produce addition	onal sti	rain
A) Tangential strain B) strain hardening C) Plastic Strain D) none []	A)) Tangential strain	n B) stra	ain hardening	C) Plastic Strain	D) none	[]
34. The moment that will just produce the yield stress in the outermost fibre of the section	34. T	he moment that w	vill just p	roduce the yield	l stress in the outerme	ost fibre of the sec	ction	
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			QUESTION BANK	< 20 ²	16		
A) Bending moment B) tw	isting moment	C) yield moment	D) none]]		
35. For a given structure and lo mechanism must be greater	ading to a set o than or equal to	of loads 'W' the value of collapse load 'W _c	ue of W found to a '.The above theore	ny assı m is kı	umed nown		
as				[]		
A) Kinematic theorem	B) Static The	orem					
C) Uniqueness theorem 36. Lower bound theorem also ca	D) none of the alled as	e above		[]		
A) Kinematic theorem	B) Static The	orem					
C) Uniqueness theorem	D) none of the	e above					
37. Upper bound thereom also c	alled as			[]		
A) Kinematic theorem	B) Static The	orem					
C) Uniqueness theorem38. Factor of safety	D) none of the	e above		[]		
A) Ultimate stress/ working	stess B) yield s	tress/ working stess					
C) both A and B	D) none of the	e above					
39. Number independent mecha r= no. of static indeterminac	nisms y, N= Number j	possible plastic hing	ges	[]		
A) N-r B) N+	-r C) N/r	r D)	none of the above				
40. External work done in plasti	c analysis			[]		
A) Load intensity X area of Triangle under the load							
B) Load intensity X displacement							
C) Force X displacement							
D) None of the above							
			Prepared by: J	.K.Elu	ımalai.		