न ब्रह्म nipal D BY LIF	Manipal Ins (A Cons	stitute of Techno stituent Institute of Manipa	ology, Manipal 🖓 Il University)	ENOWLEDGE IS POWER							
	:	SECOND SEMESTER N	1.TECH								
	END SEME	END SEMESTER EXAMINATIONS MAY /JUNE 2016									
	ADVANCED STRENGTH OF MATERIALS [CIE 554] (OPEN ELECTIVE)										
	Time: 3 Hours	2016	MAX. MARKS: 50								
		Instructions to Cand	idates:								
	<ul> <li>Answer any FIV</li> <li>Assume missing</li> </ul>	<b>E FULL</b> questions. ng data if any, suitably									
1A.	For the beam loaded a	as shown in FIG. Q1A, draw t	the SFD and BMD								
1B.	A symmetric I-section of overall depth 120mm, width of both flanges 60mm, thickness of both flanges and web 15 mm each, carries a shear force of 50 kN. Draw the shear stress distribution diagram. (05+05)										
2A.	Determine the principal moments of inertia of the unequal angle section 90x60x10 mm shown in FIG. 02A.										
2B.	A cantilever of span 2.4 m has a symmetric I-section as its cross-section. It carries a point load 200 N at the free end at an angle of 20° as shown in FIG. Q2B. Determine the bending stresses at the corners A and B at the fixed end of the beam. (05+05)										
3A.	Determine the shear c	center for the symmetric section	on shown in FIG. Q3A.								
<b>3B.</b>	Derive the Winkler-B	ach formula as applicable to	beams curved in the plane of loa	ading. (05+05)							
4A.	Draw the typical shear stress distribution diagrams and write the expressions for maximum shear stress and angle of twist for the following cases of solid sections subjected to torsion: (i) Rectangle (ii) Ellipse, and (iii) Equilateral Triangle.										
4B.	A solid elliptical section is subjected to a torque of 3 kNm. If the shear stress is not to exceed 90 MN/m <sup>2</sup> determine: (i) Lengths of major and minor axes, if the major axis is 1.3 times the minor, (ii) Angle of twist per meter length. Take G= 80 GPa. If the same torque i to be transmitted using a solid circular section made of the same material, determine it diameter and the angle of twist it suffers per meter length $(05\pm05)$										
5A.	A shaft of a hollow set forms a square of 30 material and torsiona hollow square section of the solid shaft (ii) I G= 80 GPa.	quare section is of 5 mm wal 0 mm side. It is to be replac 1 rigidity. If the stress concer is 1.6 and the twisting mome Maximum shear stress, and ar	l thickness, and the centre-line ced by a solid circular shaft of ntration factor at the inner com ent applied is 1.25 kNm find: (i) ngle of twist/m length in both sh	of its wall f the same hers of the Diameter hafts. Take							
5B.	A circular open steel Q5B, is subjected to Determine the resulta	ring of inner radius 270 mm, o a compressive load of 1 nt stresses developed at A and	and having a cross section show 50 kN applied on a vertical d B on the principal horizontal of	wn in FIG. diameter. diameter.							

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	6A.	Write a short note on beam of infinite l	Write a short note on beam of infinite length subjected to a concentrated load.								
	6B.	Draw the SFD, BMD, and TMD for cantilevered beam, in the form of a quadrant of a circle curved in plan, carrying a UDL throughout its length.									

(05+05)

