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U359-151 (T1)

OCTOBER 2019/ IN-SEM (T1)

T. Y. B. TECH. (MECHANICAL ENGINEERING) (SEMESTER - I)

COURSE NAME: Design of Machine Elements -I

COURSE CODE: MEUA31171

(PATTERN 2017)

Time: [**1Hour**] [Max. Marks: **30**]

SOLUTION and Marking Scheme

Q.1) a) R=5121.97N,d1=20.24mm, l1=25.3mm, shear stress=7.96mm- [04 Mark]
Boss dimensions- inner dis=21mm, outer dis=42mm, length-26mm [2 Marks]

b) 1) Standards and Codes- 3 Marks 2) Aesthetic and Ergonomics-3 marks

c) Shear failure t=10mm and b=50mm [2 marks]
Bending Failuert=10.7 mm and b=50.35 (Plus) mm

OR

Q.2) a) Procedure 4 Marks, Example-02 Marks

b) Load=124.34 N, Inside dia of socket d2=mm, outside dia of socket d1=mm, Diameter of socket collar d4=130.44mm, a=30.2mm and c=28.04mm [1 Mark each]

c)σ =152 N/mm^2-(1 Mark,), σ=800/t- (1 Mark,), t= 5.26mm- (2 Marks)

Q.3) a) P2=1176.47N, T=330882.5Nm,P3=5000N, P3=2352.9N Max B.M.-1185625 N-mm and d=45.47 mm [1 Marks each]

b)

$\sigma_c = 76.67 N/mm2$

$\tau = 38.33 N/mm2$,1 marks each

ls = 32.61.98mm,

lc = 52.17 mm, Length of key = (Max. of ls and lc) = 53 mm -2 marks

c) Defination - 1 Marks , Requirement - 3 marks.

OR

Q.4) a)Shaft Diameter=30mm-[01 Mark]

Flange dimensions= dh=60mm, lh=45mm, D=90mm, tp=15mm, t=8mm, Do=136mm- [02 Marks].

No of bolt=3, Diameter=8mm, safe in shear-[03 Marks]

b)

$$\frac{T}{J} = \frac{G\theta}{L}$$

$$\theta = \frac{TL}{GJ} \times \frac{\Pi}{180}$$

$$\theta = \frac{TL}{G\frac{\pi}{32d^4}} \times \frac{\Pi}{180} \qquad d = \left[\frac{584TL}{G}\right]^{1/4}$$

Formula – 2 Marks and prove -2 Marks.

c) Derivation and prove [4 marks]

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