B.E (Semester-VIII) Examination,

Automotive System design

Sub code: 67791

Max. Mark-

Duration: - hrs

Instructions:

1. **Attempt all questions.**

Q1) In frictional clutch design, when the pressure is uniformly distributed over entire area, then the intensity of pressure is _____
A) W/ ($\pi(r_1^2 - r_2^2)$)
B) W/ ($\pi(r_1^2 + r_2^2)$)
C) W/ ($\pi(r_2^2 - r_1^2)$)
D) W/ ($\pi(r_2^2$ x $r_1^2)$)

Q2) A single plate clutch, having n = 2, has outer and inner radii 150 mm and 100 mm respectively. The maximum intensity of pressure at any point is 0.1 N/mm2. If the μ is 0.3, determine the power transmitted by a clutch at a speed 3000 r.p.m.
A) 74031 kW
B) 740.31 kW
C) 74.031 kW
D) 706.95 kW

Q3) A 3-Speed gear box having a gear ratio of 3.6 in bottom & reverse gear. The main shaft & lay shaft are 12 cm apart approximately. Take the module 3.25 mm. The top gear has got unity gear ratio. Find the exact gear ratio.
A) 3.53
B) 4.54
C)4.85
D)5.20

Q4) Coil springs absorb shocks by
(A) bending

(B) twisting
(C)compression
(D)tension

Q5) The live axle houses
(A) Final drive
(B) Differential
(C)half shafts
(D)All of the above

ANSWERSHEET

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Q1)	Answer: A Explanation: Pressure = Force / Area Therefore, the intensity of pressure considering uniform pressure is W/ (π(r12 – r22).
Q2)	Answer: C Explanation: Given : n = 2, r1 = 150 mm ; r2 = 100 mm ; p = 0.1 N/mm2 ; μ = 0.3 ; N = 3000 r.p.m. or $\omega = 2\pi \times 3000/60 = 314.16$ rad/s. Since the intensity of pressure (p) is maximum at the inner radius (r2), considering uniform wear, pmax x r2 = C or C = 0.1 × 100 = 10 N/mm. Axial thrust, W = 2 π C (r1 – r2) = 2π × 10 (150 – 100) = 3142 N Mean radius = R = (r1 + r2)/2 = 125 mm = 0.125 m. We know that torque transmitted, T = n.μ.W.R = 2 × 0.3 × 3142 × 0.125 = 235.65 N-m Thus, power transmitted, P = T.ω = 235.65 × 314.16 = 74031 W = 74.031 kW.
Q3)	Ans: A $T_A + T_B = T_C + T_D = T_E + T_F = 120*2/3.25$ $G_2 = \sqrt{G_1 G_3}$ $n_1 = \frac{T_B}{T_A} \times \frac{T_D}{T_C}$ n_1=3.4:1 n_2=1.846:1 n_3=1:1 Exact Reduction = 3.53
Q4)	Ans: C
Q5)	Ans: D