

B.E (Semester- VIII) Examination, Oct.2020

Automotive System design

Sub code: 67791

Max. Mark-

Duration:

Instructions:

1. Attempt any 25 questions.

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| Q1) | In a single plate clutch, considering uniform pressure, $T = n\mu WR$. What is R equal to? A) $2(r_1^3 + r_2^3) / 3(r_1^2 + r_2^2)$ B) $2(r_1^3 - r_2^3) / 3(r_1^2 - r_2^2)$ C) $(r_1 - r_2)/2$ D) $(r_1 + r_2)/2$ |
| Q2) | The torque which a clutch can transmit, depends upon the (A) coefficient of friction (B) spring force (C) contact surfaces (D) all of the above |
| Q3) | For a new friction lining, uniform wear theory is used. A) True B) False C) For both new and old lining D) Not use for any clutch lining |
| Q4) | Multi disk clutches are dry clutches. A) Plasma clutches B) Wet clutches C) Yes D) Depends on the lubrication used |
| Q5) | Clutch and coupling perform the same action. A) Both being permanent joints |

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| | <p>B) No they are different type of joints C) Both being temporary joints D) None of the listed</p> |
| Q6) | <p>In a single plate clutch, the pressure is uniformly distributed. If the outer and inner radii are 100 mm and 70 mm respectively, find the value of R. A) 76.39 mm B) 23.48 mm C) 85.88 mm D) 34.98 mm</p> |
| Q7) | <p>A plate clutch consists of 1 pair of contacting surfaces. The inner and outer diameter of the friction disk is 100mm and 200mm respectively. The coefficient of friction is 0.2 and permissible intensity of pressure is 1.5N/mm². Assuming uniform wear theory, calculate the torque transmitting capacity of the clutch. A) 412.23N-m B) 353.43N-m C)334.53N-m D)398.34N-m</p> |
| Q8) | <p>A plate clutch consists of 1 pair of contacting surfaces. The inner and outer diameter of the friction disk is 100mm and 200mm respectively. The coefficient of friction is 0.2 and permissible intensity of pressure is 1.5N/mm². Assuming uniform pressure theory, calculate the power transmitting capacity of the clutch at 80rad/s. A) 27kW B) 32kW C)39kW D)44kW</p> |
| Q9) | <p>Which of the following is the need of the gearbox? A) To vary the speed of the vehicle B) To vary the torque of the vehicle C)To vary the power of the vehicle D)To vary the acceleration of the vehicle</p> |
| Q10) | <p>In which of the gearbox sun and planet gear set is used? A) Constant-mesh gearbox B) Sliding mesh gearbox C)Synchromesh gearbox D)Epicyclical gearbox</p> |
| Q11) | <p>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</p> |

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| | <p>gear ratio.</p> <p>A) 3.53</p> <p>B) 4.54</p> <p>C)4.85</p> <p>D)5.20</p> |
| Q12) | <p>In a simple gear train, if the number of idle gears is odd, then the motion of driven gear will</p> <p>A) be same as that of driving gear</p> <p>B) be opposite as that of driving gear</p> <p>C)depend upon the number of teeth on the driving gear</p> <p>D)none of the mentioned</p> |
| Q13) | <p>In a clock mechanism, the gear train used to connect minute hand to hour hand, is</p> <p>A) epicyclic gear train</p> <p>B) reverted gear train</p> <p>C)compound gear train</p> <p>D)simple gear train</p> |
| Q14) | <p>A differential gear in automobiles is used to</p> <p>A) reduce speed</p> <p>B) assist in changing speed</p> <p>C)provide jerk-free movement of vehicle</p> <p>D)help in turning</p> |
| Q15) | <p>A compression coil spring is having a following specification: Mean coil Diameter= 50 mm; wire diameter= 5 mm; No. of active coils= 20; If this spring is subjected to an axial load of 500 N. Calculate the maximum shear stress (neglect the curvature effect) to which the spring material is neglected.</p> <p>A) $\tau = 584.76$ MPa</p> <p>B) $\tau = 734.76$ MPa</p> <p>C) $\tau = 634.76$ MPa</p> <p>D) $\tau = 534.76$ MPa</p> |
| Q16) | <p>The two gears are said to have conjugate motion if</p> <p>A) They have constant angular velocity ratio</p> <p>B) Variable angular velocity ratio</p> <p>C)Infinitely small angular velocity ratio</p> <p>D)None of the mentioned</p> |
| Q17) | <p>_____ is used for a shaft that supports rotating elements like wheels, drums or rope sleeves.</p> <p>A) Spindle</p> |

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| | <p>B) Axle C)Shaf D)None of the listed</p> |
| Q18) | <p>Counter shaft is a _____ shaft. A) secondary B) Primary C) Main D) Tertiary</p> |
| Q19) | <p>Which of the following act on shafts? A) Torsional moment B) Bending Moment C)Both torsional and bending D)None of the mentioned</p> |
| Q20) | <p>The following provides a smooth means of disengagement and engagement between the engine and the remainder of transmission system (A) Clutch (B) Gearbox (C)Propeller shaft (D)Differential</p> |
| Q21) | <p>A semielliptical laminated vehicle spring to carry a load of 2948 N is to consist of 7 leaves 73.5 mm wide, two of the leaves extending the full length of the spring. The spring is to be 1090 mm length and attached to the axle by U bolts 76.2 mm apart. These bolts tighten the central position of the spring so rigidly that they may be considered equivalent to a band having a width equal to the distance between the bolts. The leaves are to be if silico manganese steel. Assuming an allowable stress of 350 N/mm² Determine the thickness for the leaves & deflection. A) $t = 6.71\text{mm}, \delta = 59.945\text{ mm}$ B) $t = 5.71\text{mm}, \delta = 49.945\text{ mm}$ C) $t = 4.71\text{mm}, \delta = 79.945\text{ mm}$ D) $t = 3.71\text{mm}, \delta = 45.945\text{ mm}$</p> |
| Q22) | <p>Axle which form compact unit with gearbox, clutch and engine are called (A) Tandem axle (B) power packed axle (C)compact axle (D)none of the above</p> |
| Q23) | <p>The torque at the driving wheels gives rise to a propulsive force between wheels and road, known as (A) tractive force</p> |

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| | <p>(B) driving effort (C)braking thrust (D)none of the above</p> |
| Q24) | <p>Sideways forces are absorbed by (A) Coil springs (B) Torsion bars (C)Air springs (D)Leaf springs</p> |
| Q25) | <p>The following is a type of leaf springs (A) three Quarter elliptic (B) semi elliptic (C)quarter elliptic (D)all of the above</p> |
| Q26) | <p>Spring shackles are used to join (A) chassis frame and spring (B) Spring and Axle (C)chassis frame and axle (D)all of the above</p> |
| Q27) | <p>A helical spring is made up from a wire of 6 mm diameter and has outside diameter of 75 mm. The permissible shear stress is 350 N/mm². Find the deflection per active turn & the axial load which the spring can carry. A) Deflection = 9.95 mm/turn, Axial Load= 382.48 N B) Deflection = 10.95 mm/turn, Axial Load= 382.48 N C) Deflection = 9.95 mm/turn, Axial Load= 392.48 N D) Deflection = 9.95 mm/turn, Axial Load= 282.48 N</p> |
| Q28) | <p>The stabilizers (sway bars) are (A) alloy steel bars (B) used to connect shock absorber operating arms (C)placed parallel to cross members (D)all of the above</p> |
| Q29) | <p>Un-sprung weight is (A) Weigh of vehicle (B) Weigh of chassis frame (C)Weight of wheels (D)Weight of wheels and axles</p> |
| Q30) | <p>Following data refers to two stage gear box Power to be transmitted=10kw Input shaft speed = 1440rpm Output shaft speed =72 rpm</p> |

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| <p>First stage reduction ratio=5 Teeth on the first stage pinion=20 Determine speed and teeth on each gear</p> <p>A) $Z_1=20, Z_2=100, Z_3=20, Z_4=80, N_1=1440\text{rpm}, N_2\&N_3=288\text{rpm}, N_4=72\text{rpm}$</p> <p>B) $Z_1=30, Z_2=110, Z_3=20, Z_4=80, N_1=1440\text{rpm}, N_2\&N_3=488\text{rpm}, N_4=82\text{rpm}$</p> <p>C) $Z_1=30, Z_2=100, Z_3=20, Z_4=80, N_1=1440\text{rpm}, N_2\&N_3=288\text{rpm}, N_4=82\text{rpm}$</p> <p>D) $Z_1=20, Z_2=120, Z_3=20, Z_4=80, N_1=1440\text{rpm}, N_2\&N_3=388\text{rpm}, N_4=92\text{rpm}$</p> |
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ANSWER

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| Q1) | Answer: B |
| Q2) | (Ans: D) |
| Q3) | (Ans: B) |
| Q4) | (Ans: B) |
| Q5) | Ans: B |
| Q6) | Answer: C |
| Q7) | Ans B |
| Q8) | Ans D |
| Q9) | Ans: B |
| Q10) | Ans: D |
| Q11) | Ans: A |
| Q12) | Ans: A |
| Q13) | Ans: B |
| Q14) | Ans: D |
| Q15) | Answer-D |
| Q16) | Ans:A |
| Q17) | Ans: A |
| Q18) | Ans: A |
| Q19) | Answer: C |
| Q20) | Ans: A |
| Q21) | Answer-B |
| Q22) | Ans: B |
| Q23) | Ans: A |
| Q24) | Ans: D |
| Q25) | Ans: D |
| Q26) | Ans: A |
| Q27) | Answer-A |
| Q28) | Ans: D |
| Q29) | Ans: D |

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| Q30) | Ans:A |
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