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6th Sem / Auto

Subject:- Design of Automotive Components

Time : 3Hrs. M.M. : 100

SECTION-A

Note: Multiple choice questions. All questions are compulsory (10x1=10)

Q.1 Which of the following reduces the stress concentration? (CO1)

a) Use of multiple notches
b) Removal of undesired material
c) Drilling additional holes
d) All of the above

Q.2 Which of the following ergonomic factor is encountered in engineering applications? (CO1)

a) Thermal radiations b) Fatigue
c) Lubrication failure d) Corrosion

Q.3 Maximum normal stress theory is used for (CO2)

a) Brittle material b) Plastic material
c) Ductile material d) Non-ferrous material

Q.4 For cast iron components, which of the following strength are considered to be the failure criterion? (CO2)

a) Ultimate tensile strength
b) Endurance limit
c) Yield Strength
d) None of the above

Q.29 A force of 400N is applied on a helical spring to compress the spring by a length of 8 cm Find the stiffness of the spring. (CO5)

Q.30 Describe the major stresses in spiral gear. (CO1)

Q.31 Explain the various loads acting on a connecting rod. (CO1)

Q.32 Describe the various stresses induced in the piston. (CO1)

Q.33 A shaft of single plate clutch is to be designed to transmit 9 KW at 900 rpm. Find Diameter of the shaft. allowable Shear stress of shaft, $t 1 = 40 N/mm^2$. (CO5)

Q.34 How is the design data book helpful in design of cylinders? (CO6)

Q.35 Explain the concept of standardisation. (CO6)

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

Q.36 Explain the various types of stresses induced in the mechanical components. (CO1)

Q.37 Design a cast iron protective type flange coupling to transmit 30 kilowatt at 900 RPM from an electric motor to a compressor. The service factor may be observed as 1.35. The following permissible stresses may be used: Shear stress for shaft Bolt and key material = 40 Mpa; crushing stress for Bolt and key = 80 Mpa, Shear stress for cast iron = 8MPa (CO2,3,4,5)

Q.38 Explain the complete procedure to design of a clutch plate. (CO2,3,4,5, 6)

Q.5 Shafts are subjected to_____ forces (CO5)
a) Tensile b) Crushing
c) Shear d) Compressive

Q.6 Which stress in induced in cylinder wall due to side thrust of the piston? (CO1)
a) Axial stress b) Longitudinal stress
c) Bending stress d) Circumferential stress

Q.7 Which of the following is not a type of coupling (CO5)
a) Hooke's joint b) Spigot & Socket
c) Oldham d) Flange

Q.8 Mechanical springs are used to (CO1)
a) apply force b) Store energy
c) measure force d) all of these

Q.9 If number of coils are 8 and wire diameter of spring 3mm, then solid length is given by ? (CO5)
a) 11 mm b) 24 mm
c) 12 mm d) 48 mm

Q.10 The gears that have teeth parallel to the axis of rotation and are used for perpendicular shaft are called (CO5)
a) Spur gear b) Bevel gear
c) Helical gear d) Worm gear

SECTION-B

Note: Objective type questions. All questions are compulsory. (10x1=10)

Q.11 Define strain. (CO1)

Q.12 Write the unit of stress. (CO1)

Q.13 Which theory is suitable for the safe design of machine components made of ductile materials (CO3)

Q.14 Bell crank lever arms are subjected to bending moment. (True/False) (CO1)

Q.15 Name any one material used for flywheel. (CO4)

Q.16 A spring of stiffness constant k is cut in two equal parts. The stiffness constant of new spring will be k/2. (True/False) (CO5)

Q.17 Define interchangeability. (CO4)

Q.18 Pistons are usually made of_____(Name the material) (CO4)

Q.19 The main leaf of a leaf spring bears about 50% of the total on the spring.(True/False) (CO5)

Q.20 Name the type of gears used in constant mesh gear box. (CO4)

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

Q.21 Write the factors which affect the selection of materials. (CO4)

Q.22 Define various types of external loads. (CO1)

Q.23 Describe the concept of standardization. (CO4)

Q.24 Give the importance of ergonomics in design. (CO5)

Q.25 Write the design procedure of rear axle for bending. (CO5)

Q.26 Describe the modes of failure of propeller shaft. (CO2)

Q.27 Draw a neat labeled diagram of a rocker arm and state the method of calculation of diameter of shaft (CO5)

Q.28 Define bore, stroke, piston ring, piston pin, crank shaft. (CO4)