6th Sem / Branch : Automobile Engineering
Sub. : Design of AutomotiveComponents

Time : 3Hrs.   M.M. : 100

SECTION-A

Note: Multiple choice questions. All questions are compulsory

(10x1=10)

Q.1   The design, in which minor modifications are done in existing design, is called   (CO1)
   a)   Adaptive design   b)   New Design
   c)   Optimum design   d)   Rational design

Q.2   The radio of stress to strain within elastic limit is

(CO1)
   a)   Modulus of rigidity   b)   Modulus of elasticity
   c)   Bulk modulus   d)   Poisson's Ratio

Q.3   Ability of the material to absorb energy before the fracture takes place is called   (CO1)
   a)   Ductility   b)   Brittleness
   c)   Toughness   d)   Hardness

Q.4   Among maximum shear stress theory and distortion energy theory, which gives the higher value shear yield strength?

(CO3)
   a)   Maximum shear stress theory
   b)   Both give equal values
   c)   Distortion energy theory
   d)   Vary from material to material

Q.5   A bell crank lever may fail due to   (CO2)

Q.30   A foot lever is 1m from the centre of the shaft to the point of application of 800 N load. Find diameter of shaft if shear stress is 70 MPa.   (CO5)

Q.31   Explain the theories of failures used for design of single clutch plate.   (CO2, CO5)

Q.32   Enlist the requirements of piston material.   (CO4)

Q.33   Write the importance and scope of preferred numbers in machine design.   (CO6)

Q.34   List the various dimension considered for the design of an IC engine.   (CO6)

Q.35   Explain the various loads acting on a piston pin.

(CO1,CO5)

SECTION-D

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

Q.36   Describe complete design procedure for automobile components..   (CO1)

Q.37   A four stroke diesel engine has the following specifications:
Brake power = 5km; speed = 1200 rpm; Mechanical efficiency = 80%; indicated mean effective pressure = 0.35 N/mm^2. Determine: (I)bore and length of the cylinder; (ii) thickness of the cylinder head.   (CO3,CO4,CO5,CO6)

Q.38   A propeller shaft is required to transmit 45kW power at 500rpm. It is hollow shaft having inside diameter 0.6 times the outside diameter. It is made of plain carbon steel and the permissible shear stress in 84 N/mm^2. Calculate the inner and outer diameter of the shaft.   (CO3, CO4, CO5, CO6)

a) Compressive stress
b) Torsional stress
c) Tensile stress
d) Crushing stress

Q.6 Universal joint is used to connect two shafts (CO5)
a) Whose axes coincide
b) Whose axes intersect
c) Which lie in same plane
d) Which are parallel but in different planes

Q.7 How many classes of levers are there? (CO4)
a) 2   b) 4
c) 3   d) 5

Q.8 Which of the following function can be spring perform?
(CO5)
a) Absorb shock   b) Measure length
c) Store energy   d) All of these

Q.9 Which stress in induced in cylinder wall due to side thrust of the piston? (CO5)
a) Axial stress
b) Longitudinal stress
c) Circumferential stress
d) Bending stress

Q.10 There are _____ types of cylinder lines. (CO5)
a) 1   b) 3
c) 2   d) 4

SECTION-B

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

Q.11 The stresses produced due to increases in temperature are called_____ stresses. (CO1)

Q.12 Define design. (CO1)

Q.13 Brittle materials fail under fracture condition. (True/False) (CO2)

Q.14 Distortion energy theorem is not recommended for ductile materials. (True/False) (CO2)

Q.15 Define interchangeability. (CO4)

Q.16 The coefficient of friction in internally expanding brakes is constant. (True/False) (CO5)

Q.17 Name a material used for connecting rod. (CO4)

Q.18 The coefficient of friction is less in multi plate clutch. (True/False) (CO5)

Q.19 Write the type of stress which causes the failure of piston crown. (CO2)

Q.20 Define spring index. (CO5)

SECTION-C

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

Q.21 Define working stress and factor of safety. (CO1)

Q.22 List he types of external loads. (CO1)

Q.23 Describe maximum shear stress theory. (CO2)

Q.24 Explain stress-strain curve for ductile materials. (CO1)

Q.25 Give the importance of ergonomics in design. (CO5)

Q.26 Describe the design considerations for knuckle joint. (CO5)

Q.27 Describe the modes of failure of rear axle. (CO2)

Q.28 A pinion gear with 22 teeth and a module of 6mm has a rotational speed of 1200 rpm and drivers a gear at 660 rpm. Determine: (I)Number of teeth on the gear: (ii) the theoretical centre distance. (CO5)

Q.29 How is the design data book helpful in design of shafts? (CO6)