

Besem-VII (CBRS)

Auto (AD) NOV-DEC-15

4/12/2015

AUTO

Sub:- AD

QP Code : 5951

(3 Hours)

[Total Marks : 80

- N. B. : (1) Question No. 1 is compulsory.
(2) Attempt any **Three** questions from remaining.
(3) Use of Design Data Hand book is permitted.
(4) Assume suitable data if required.



1. Attempt any **four** of the following

20

- Explain the design considerations of Piston and Cylinder.
- Design a helical compression spring for a maximum load of 1000N for a deflection of 25 mm. Assuming the value of spring index as 5 and maximum permissible shear stress for spring as 420 N/mm². Take modulus of rigidity = 84kN/mm².
- What are the different materials used in advanced automotive body structures.
- Prepare a list of materials, specifying their characteristic used in automotive brake lining and clutch lining.
- Design a propeller shaft for an automotive engine developing 30kW at 1500 rpm. The lower gear ratio being 3.5 and the diameter ratio 0.55. Assume a shear stress of 56 MPa for the material of the shaft.

2. (a) Design a cast iron piston for a single acting four stroke diesel engine with the following data:

10

- | | |
|-------------------------------|----------------|
| Cylinder bore | = 200 mm |
| Stroke | = 250 mm |
| Speed | = 600 rpm |
| Brake mean effective pressure | = 0.60MPa |
| Maximum gas pressure | = 4 MPa |
| Fuel consumption | = 0.30 kg/KW/h |

Id ratio for bush in small end in connecting rod may be assumed as 1.5

(b) An automotive engine has an output of 80 kW at 3000 rpm.

10

The mean diameter of the clutch is 200 mm with a permissible pressure of 0.2 N/mm². Friction lining is of asbestos with $\mu = 0.22$. What should be the inner diameter of the disc? Take both the sides of the plate with friction lining as effective. There are 8 springs and axial deflection in spring is limited to 10 mm. Design the spring. Assume $G = 80 \text{ kN/mm}^2$ and $C = 6$

[TURN OVER



3. (a) A truck spring has 12 number of leaves, two of which are full length leaves. The spring supports are 1.05 m and the central bend is 85 mm wide. The central load is to be 5.4 kN with a permissible stress of 280 N/mm^2 . Determine the thickness and width of the steel spring leaves. The ratio of the total depth to width of the spring is 3. Also determine the deflection of the spring. 10
- (b) Design a connecting rod for a high speed diesel engine using the following data: 10
- | | |
|-----------------------------------|------------|
| Cylinder bore | = 125 mm |
| Stroke | = 140 mm |
| Length of connecting rod | = 350 mm |
| Speed | = 2000 rpm |
| Mass of reciprocating parts | = 1.5 kg |
| Maximum gas pressure | = 3 MPa |
| Factor of safety against buckling | = 5 |
4. (a) Explain the design consideration of connecting rod. 5
- (b) Design a centre crankshaft for single cylinder vertical engine using the following data: 15
- | | |
|---|------------|
| Cylinder bore | = 125 mm |
| Stroke | = 150 mm |
| (L/r) ratio | = 4.5 |
| Speed | = 2000 rpm |
| Weight of flywheel cum belt pulley | = 1 kN |
| Maximum gas pressure | = 3 MPa |
| Total belt pull | = 2 kN |
| Width of hub for flywheel cum belt pulley | = 200 mm |
- The torque on the crankshaft is maximum when the crank turns through 22° from TDC and at this position the gas pressure inside the cylinder is 2.5 MPa. The belts are in horizontal direction.
5. (a) Why are connecting rods made of I sections? Name the materials used for connecting rod and crankshaft 5

[TURN OVER

- (b) Design the valve gear mechanism for the exhaust valve of a petrol engine using the following data: 15

Cylinder bore	= 250 mm
Stroke	= 300 mm
Speed	= 500 rpm
Effective length of each arm	= 165 mm
Angle between two arms	= 165°
Maximum gas pressure	= 3.5 MPa
Seat angle of valve	= 45°
Mass of valve	= 0.5 kg
Back pressure when the exhaust valve opens	= 0.4 MPa
Maximum suction pressure	= 0.03 MPa
The valve opens 33° before TDC and closes 1° after BDC. The valve is to open and close with constant acceleration and deceleration for each half of the lift.	

6. (a) A sliding mesh gearbox contains 4 pairs of gears for providing 4 forward speed and a reverse speed. Speed ratio of clutch shaft gear and lay shaft gear is 2. Calculate the number of teeth in all the gears with the assumptions that minimum number of teeth required for any gear to avoid interference is 18. Finally, calculate actual gear ratios. 10

The gearbox should have the following speed ratios approximately:

First gear = 5

Second gear = 3.38

Third gear = 2.25

Fourth gear = 1

Reverse speed gear = 3.5

- (b) A car weighing 1100 kg is moving on a level road at a speed of 65 km/h, when the brakes are applied and the car stops in 4 seconds. Brakes are applied on all four wheels. The radius of tyre is 220 mm. If the weight of each brake drum assembly is 12 kg and specific heat capacity is 460 J/kg $^\circ\text{C}$. Determine 10

(i) Braking distance,

(ii) Torque capacity of each brake

(iii) Total energy absorbed by each brake if K.E. of rotating parts is 10% of K.E. of moving vehicles.

(iv) Temperature rise of brake drum assembly.

AUTO

QP Code : 6012

Duration : 3hrs

Maximum Marks :- 80

N.B.

1. Question no 1 is compulsory.
2. Answer any THREE out of remaining FIVE questions.
3. Answer to the question should be grouped and written together.

Q1] Attempt any four questions.

- a) Explain product life cycle with suitable example.
- b) Write a note on Man-Machine interaction.
- c) Explain the brain storming process.
- d) What is the importance of physiological and psychological factors at work?
- e) Explain Design for Maintainability.
- f) Write a note on creative thinking.



20

Q2] a) What is product architecture and its implications?

08

b) Discuss the various costs involved in product costing.

06

c) Explain what is human engineering and ergonomics?

06

Q3] a) What are product specifications and how they are established?

08

b) What are the various ways to collect customer need information and how it is useful?

06

c) Write a note on Prototyping.

06

Q4] a) Discuss the impact of DFM decisions on overall costs, product quality and other factors.

08

b) Explain the role of design considering environmental issues?

06

c) Write a note on Robust design.

06

Q5] a) Explain value engineering and analysis with any suitable case study.

10

b) Explain the product development process in detail.

10

Q6] a) Explain the two stage concept selection methodology.

10

b) What is FMEA and what is the need & benefits of FMEA?

10

AUTO

Sub: Tmmi

(3 Hours)

Total Marks: - 80



- N.B: (1) Question no 1 is compulsory.
 (2) Attempt any three out of remaining five questions.
 (3) Figures to the right indicate full marks.
 (4) Illustrate your answers with sketches wherever necessary.

- Q.1 a Write note on following:- 20
 i. Different motor vehicle registration mark system in India
 ii. One time tax
 iii. Comprehensive insurance
 iv. Basic Factors in bus scheduling
- Q.2 a Write note on:- 10
 i. STA and RTA
 ii. Solatium fund scheme
 b What is the role of MIS in passenger transport operation? 10
- Q.3 a What are the objectives of taxation & write note on tax exemption. 10
 b Draw the typical depot layout and explain its administrative structure. 10
- Q.4 a What are the rules and regulation regarding transport and storage of petroleum products 10
 b What is the procedure to obtain permanent driving licence & explain any five traffic sign 10
- Q.5 a What are the duties of conductor and drivers of state transport undertaking 10
 b What are the various elements of transport system and explain its importance. 10
- Q.6 a Write note on following :- 20
 i. Global positioning system
 ii. Factors to be considered while developing new traffic
 iii. Accident claim procedure
 iv. Linkages between transport, live hood assets and structural conditions.

B.E (Sem VII) Automobile Engg. Nov-Dec-15

CBCS Sub:- CBE

23/11/15

QP Code : 5872

AUTO

CBE

23/11/15

REVISED COURSE

TIME: 3HRS

Total marks: 80



N.B. (1). Question no. 1 is compulsory

(2). Attempt any three questions out of remaining five questions.

(3). Draw neat sketches to justify your answer.

1. (a) Explain the following with load path :- (15)
(i) Closed integral structures (ii) Open Structures
(iii) Flat punt structures.
(b) Stepwise explain the overall design criteria for vehicle comparison of same class (10)
2. (a) What is preliminary design? Explain weight distribution of a passenger car. (10)
(b) With neat sketches Explain the following layout: - (10)
(i) Normal Control
(ii) Forward Control
(iii) Semi forward Control
(iv) Underfloor engine
3. (a) what are the different material used in construction of the following:- (10)
(i) Passenger car (ii) luxury bus
(b) Explain latest trend in manufacturing of automobiles. (10)
4. (a) Explain the different loads to which the Chassis frame is subjected. (10)
(b) Explain the design requirement of driver's and passenger's seats. (10)
5. (a) Explain the effect of aerodynamics forces acting on the vehicles. (10)
(b) Draw and explain different car body style. (10)
6. Write Short notes :- (20)
(a) Master model (c) Spot welding
(b) Ergonomics (d) Body Painting

AUTO

Note:

1. Question No.1 is compulsory.
2. Solve any 3 from remaining 5 questions.
3. Total No. of questions to be attempted are Four
4. Assume suitable data, if necessary.

Q1

- a) Explain the concept of homogenous coordinate system and its significance. Marks 5
- b) Explain the difference in adaptive and feedback control & in what circumstances the Adaptive Control is preferred? 5
- c) What are the major steps to solve the problem using FEM? Whether it gives exact answers? Why it has become popular? 5
- d) Explain Drive-part-check (DPC) surface syntax in APT programming by considering a suitable example. 5

Q2

- a) Write a Manual part program for finishing the following forged component as shown in Fig. 1. Illustrate the meaning of each code used in the program and the tool movement by showing the tool path. 08
Take spindle speed as 1000 rpm and feed rate 0.5 mm/rev. Use the diametral format for programming.

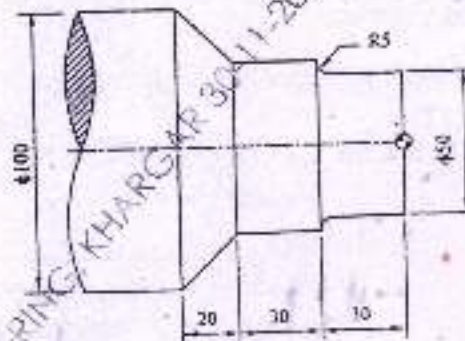


Fig. 1

- c) Write the program for the above component (fig.1) assuming the raw billet size of dia. 100 mm and length 150 mm, using the canned cycle for rough turning followed by finished turning, keeping the finishing allowance as 0.5 mm and 0.3 mm along Z and X axis respectively. 06
- d) Find the Transformation that rotates the object points through 30 degrees about point (1, 2). To what does the point (2, 3) maps? 06

TURN OVER



QP Code : 5895

2

Q3

- a) List the different types of hidden line/surface (HLR/HSR) removal algorithms explain any one in detail. 10
- b) Explain Selective Laser Sintering (SLS) and how is it different from 3D printing? 10

Q4

- a) Explain the elements of computer integrated manufacturing and their functioning. 08
- b) What do you mean by parametric & nonparametric expression of curves? What are the advantages of parametric curves? Express the equation of Line & circle in the parametric form. 08
- c) What are the different types of errors which may get introduced while converting the CAD solid model into RPT compatible format? 04

Q5

- a) Find the Transformation matrix which aligns a given vector $V = aI + bJ + cK$ in three dimensional space with positive Z axis. 10
- b) Explain- 10
- i) P & H refinement methods of CAE
- ii) Compare Bezier and B spline blending functions.

Q6 Explain any four of the following (any four)

- a) Automated guided Vehicle 5
- b) Rapid Tooling 5
- c) AI in Design 5
- d) Applications of RPT 5
- e) Role of CAD/CAM in CIM. 5

- N.B: (1) Question no 1 is compulsory.
 (2) Attempt any three out of remaining five questions.
 (3) Figures to the right indicate full marks.
 (4) Illustrate your answers with sketches wherever necessary.



- Q.1 Solve any four from following six 20
- What is the need of transfer of ownership of vehicle? 05
 - What is the importance of one time tax and why it is laid on vehicle? 05
 - What is third party insurance and explain it in brief. 05
 - Chalk out the difference between state transport and private bus service. 05
 - What is the need of emergency information panel on vehicles carrying inflammable goods? 05
 - Why GPS is considered as one of the important techniques in vehicular operation? 05
- Q.2 a Explain the adopted procedure for change in registration mark of vehicle? 10
 b Write a short note about tax exemption in case of some motor vehicle. 10
- Q.3 a Explain the duties of drivers in case of accident. 10
 b Define transport stating its classification and its economic significance 10
- Q.4 a Make detailed note of rules regarding storage and transport of petroleum products. 10
 b Explain the term traffic navigation also explain different techniques involved in it. 10
- Q.5 a Explain the procedure adopted for securing permanent driving license. 10
 b Explain the procedure in detail for claiming the compensation for accident vehicle. 10
- Q.6 Solve any four from following six 20
- Explain the use of MIS in goods transport operation 05
 - How to calculate cost of transport? 05
 - What is claim tribunal? 05
 - Under what circumstances motor vehicle tax is refundable and why? 05
 - What are documents needed to register newly purchased commercial vehicle? 05
 - Explain vehicle scheduling? 05

AUTO

Sub: AD

(3 Hours)

QP Code : 31343

[Total Marks : 80]

Note:

- Question No. 1 is compulsory.
- Attempt any Three questions from remaining.
- Use of Design Data Hand book is permitted.
- Assume suitable data if required.



1. Attempt any Four of the following

5 X 4 = 20

(a) What are the desirable properties of cylinder materials? Name the materials used for engine cylinder.

(b) Why is heat dissipation necessary in clutches? What are drawbacks of asbestos friction materials?

(c) List the important factors upon which the capacity of a brake depends.

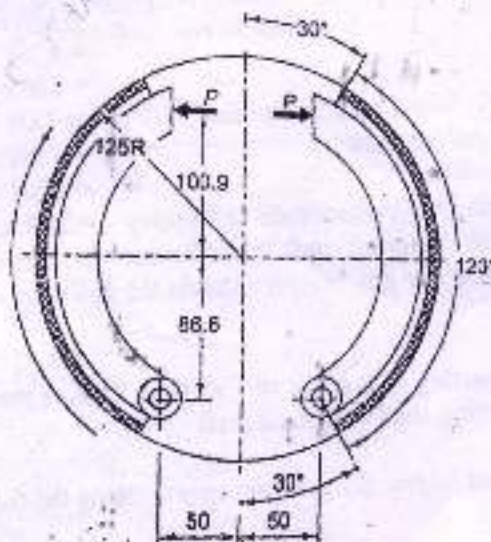
(d) Prepare a list of materials, specifying their characteristic used in automotive brake lining and clutch lining.

(e) Design a helical compression spring for a maximum load of 1000 N for a deflection of 25 mm using the value of spring index as 5. Maximum permissible shear stress for spring wire is 420 N/mm^2 and modulus of rigidity $= 84 \text{ k N/mm}^2$.

2. (a) An automotive internal expanding double shoe brake is shown in fig. The face width of the friction lining is 40 mm and the maximum intensity of normal pressure is limited to 1 N/mm^2 . The coefficient of friction is 0.32. The angle θ_1 can be assumed to be zero. Calculate:

10

- the actuating force P ; and
- the torque absorbing capacity of the brake





(b) A semi elliptic spring used for automobile suspension, consists of two extra full length leaves and eight graduated length leaves, including the master leaf. The centre to centre distance between the two eyes is 1 m. The leaves are made of steel 55Si2Mn90 having $\sigma_{yt} = 1500 \text{ N/mm}^2$ and $E = 2.07 \times 10^5 \text{ N/mm}^2$. The maximum spring load is 30 kN and the factor of safety is 2. The leaves are pre stressed so as to equalize stresses in all leaves under maximum load. Determine the dimensions of the cross section of the leaves and the deflection at the end of the spring.

3. (a) Explain Design considerations of cylinder.

05

(b) The following data is given for four stroke diesel engine:

15

Cylinder bore	= 100 mm
Stroke	= 125 mm
Brake mean effective pressure	= 0.65 MPa
Speed	= 2000 rpm
Fuel consumption	= 0.25 kg/BP/h
Maximum gas pressure	= 5 MPa
Higher calorific value of fuel	42000 kJ/kg

Assume that 5 % of the total heat developed in the cylinder is transmitted by the piston. The piston is made of grey cast iron and the permissible tensile strength is 37.5 N/mm^2 . Assume $k = 46.6 \text{ W/m}^2\text{C}$ and the temperature difference between the centre and edge of the piston head is 220°C . Calculate:

- The thickness of the piston head by strength consideration
- Which criterion decides the thickness of the piston head?
- State whether the ribs are required. If so, calculate the numbers and thickness of piston ribs

4. (a) Explain the design consideration of connecting rod.

05

(b) Design a centre crankshaft for single cylinder vertical engine using the following data:

15

Cylinder bore	= 125 mm
Stroke	= 150 mm
(L/r) ratio	= 4.5
Speed	= 2000 rpm
Weight of flywheel cum belt pulley	= 1 kN
Maximum gas pressure	= 3 MPa
Total belt pull	= 2 kN
Width of hub for flywheel cum belt pulley	= 200 mm

The torque on the crankshaft is maximum when the crank turns through 22° from TDC and at this position the gas pressure inside the cylinder is 2.5 MPa. The belts are in horizontal direction.

5. (a) Why are connecting rods made of I sections? Name the materials used for connecting rod and crankshaft

05

(b) Design an exhaust valve for a diesel engine using the following data:

15

Cylinder bore	= 250 mm
Stroke	= 300 mm
Speed	= 600 rpm

Mean velocity of gas through port	= 50 m/s
Maximum gas pressure	= 4 MPa
Seat angle of valve	= 45°
Allowable bending stress for valve	= 50 MPa

Calculate:

- i) Diameter of the valve port
- ii) Diameter of the valve head
- iii) Thickness of the valve head
- iv) Diameter of the valve stem
- v) Maximum lift of the valve

6. (a) Design a helical compression spring of circular cross section wire to carry safely an axial compressive load of 6 kN at a maximum stress of 800 MN/mm². The spring stiffness should be 25 kN/m and other proportions as follows:

Spring index = 6 to 8

Ratio of length to mean diameter of coil = 1.7 to 2.3

Determine:

- i) Mean diameter of coil
- ii) Diameter of wire
- iii) Length of coil when closed
- iv) Length of coil before application of load



10

(b) Gear ratios for a small passenger car are as follows:

- | | |
|----------------------|------------|
| 1 st gear | = 4.2 : 1 |
| 2 nd gear | = 2.56 : 1 |
| 3 rd gear | = 1.52 : 1 |
| Top gear | = 1 : 1 |

The module of the gear may be assumed as 3.25 mm. The smallest pinion in the gear train must have atleast 15 teeth, speed of the engine shaft = 1.52 x speed of lay shaft. Assuming straight teeth and one single lay shaft in the gear box. Calculate:

10

- i) Centre distance between shaft and lay shaft
- ii) Number of teeth in each gear wheel
- iii) Actual gear ratios on the basis of results

Mean velocity of gas through port	= 50 m/s
Maximum gas pressure	= 4 MPa
Seat angle of valve	= 45°
Allowable bending stress for valve	= 50 MPa
Calculate:	

- i) Diameter of the valve port
- ii) Diameter of the valve head
- iii) Thickness of the valve head
- iv) Diameter of the valve stem
- v) Maximum lift of the valve



6. (a) Design a helical compression spring of circular cross section wire to carry safely an axial compressive load of 6 kN at a maximum stress of 800 MN/mm². The spring stiffness should be 25 kN/m and other proportions as follows:

Spring index = 6 to 8

Ratio of length to mean diameter of coil = 1.7 to 2.3

10

Determine:

- i) Mean diameter of coil
- ii) Diameter of wire
- iii) Length of coil when closed
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(b) Gear ratios for a small passenger car are as follows:

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| 1 st gear | = 4.2 : 1 |
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| Top gear | = 1 : 1 |

The module of the gear may be assumed as 3.25 mm. The smallest pinion in the gear train must have atleast 15 teeth, speed of the engine shaft = 1.52 x speed of lay shaft. Assuming straight teeth and one single lay shaft in the gear box. Calculate:

10

- i) Centre distance between shaft and lay shaft
- ii) Number of teeth in each gear wheel
- iii) Actual gear ratios on the basis of results

Be sem-VII CBE

13/05/2016

AUTO

Sub-CBE

QP Code : 31265

(3 Hours)

[Total Marks : 80

- 1) Question no 1 is compulsory
- 2) Attempt any Three out of remaining Five questions.
- 3) Justify your answer with neat sketches.

- Q1) 20M
- a) What is ergonomic? What are various ergonomic considerations in design of driver's and passenger's seat.
 - b) Explain with neat diagram vehicle weight distribution of a passenger car.

- Q2) 20M
- a) Write on "Bus coach Building" and "Bus layout".
 - b) Explain the following with load path :-
 - 1) Bending and Torsion loading
 - 2) Closed Integral structures
 - (3) Open Structures
 - (4) Flat structures

- Q3) Write on: 20M
- a) Aerodynamic forces on a vehicle.
 - b) Safety considerations in a Vehicle Design.
 - c) Driver's seat requirement for a heavy duty truck.
 - d) Factors responsible for vibration and discomfort on a long journey tour on a luxury car.

- Q4) Write on: 20M
- a) Visibility and Auto Industry
 - b) Materials used in a Auto Industry.

- Q5) 20M
- a) Write on "Latest trend in Automobile Design".
 - b) Write on "Chassis components and their functions".

- Q6) Write short notes: (any four) 20M
- a) Thin walled Structures
 - b) Steering column
 - c) Pitching and Bouncing
 - d) Crash Analysis
 - e) Body mountings

XXX

AUTO

Sub - CAD/CAM
(CBGS)(R-2012)

(3 hours)

[Total marks: 80]

N.B.: 1) Q. No. 1 is compulsory.

2) Attempt any three questions out of remaining five questions.

3) Assume suitable data if required.

Q1 a) Explain wire frame modeling, surface modeling and solid modeling. 10

b) Write a manual part program for finishing a forged component as shown in 10

Fig. 1. Assume the spindle speed and feed for machining as 500 rpm and 0.3 mm/rev respectively.

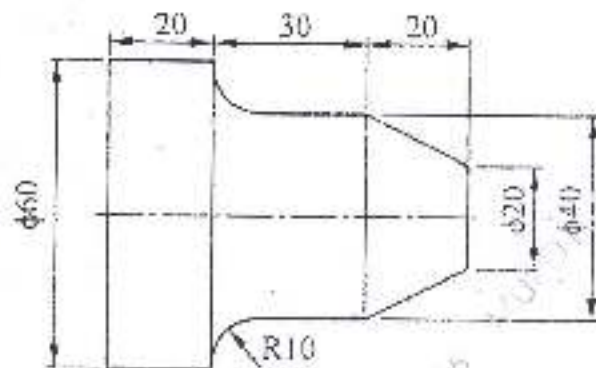


Fig. 1

Q2 a) A Hermite cubic spline is defined by points (1, 1) and (6, 5), having tangent vectors as (0, 4) and (4, 0) respectively. Find the co-ordinates of parametric mid-point and slope at the same point. 10

b) Explain AS/RS and their types. 10

Q3 a) Find the transformed co-ordinates of a triangle A (50, 20), B (110, 20) and C (80, 60), if it is reflected about: i) X-axis and ii) Line $y = x$. 10

b) Explain the nature and role of CIM elements. 10

Q4 a) Find the transformation matrix which aligns vector K along positive z-axis with vector $V = aI + bJ + cK$. 10

b) Explain the major steps involved in rapid prototyping. List the various rapid prototyping technologies and explain Stereo-lithography in detail. 10

[P.T.O.]

- Q5 a) Write a complete APT part program to machine the outline of the geometry and drill a hole as shown in Fig. 2. The component is 5 mm thick. The end mill used is 10 mm in diameter and suitable drill. Assume suitable speed and feed for machining. 12

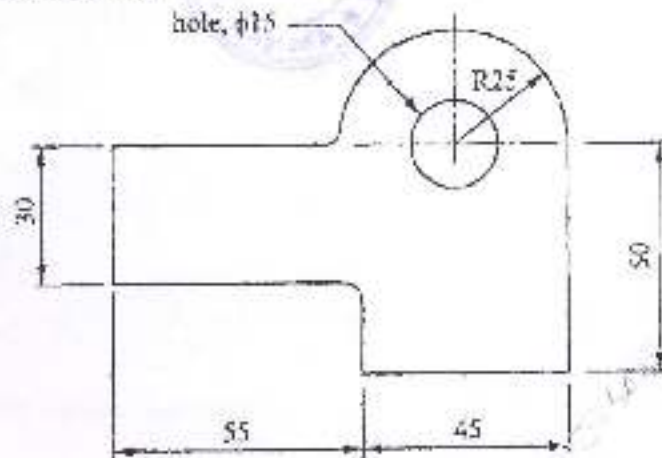


Fig. 2

- b) Find the general transformation matrix N for window to viewport mapping. 8

- Q6 Write short notes on; 20
- Knowledge based Engineering
 - Computer Aided Engineering
 - CIM Hardware and Software
 - Rapid Prototyping Applications

Sub :- PDAD

(3 Hours)

[Total Marks : 80]

- Note :** (1) Question number 1 is compulsory
(2) Attempt any three out of remaining five questions
(3) Assume suitable data if necessary
(4) Figures to right indicate full marks



1. Solve any four: 20
- (a) What is Taguchi's loss function? Explain its importance in product design.
 - (b) Write a short note on Reverse Engineering
 - (c) What is Industrial product design? Explain in brief.
 - (d) How Design of Experiment (DOE) helps in Robust Design of new product or process development.
 - (e) Explain modular architecture of product with its advantages.
 - (f) What are intellectual property rights relevant to product design and development? Explain in brief.
2. (a) What is QFD? Explain the importance of quality house in Product Design with the help of Example. 10
- (b) What are the different factors and general rules considered for Design for Manufacturing (DFM) in case of welding? Explain. 10
3. (a) Explain Failure Mode Effect Analysis with suitable case study. 10
- (b) What are various physiological and psychological considerations in ergonomics? Explain. 10
4. (a) Define value of a product. Explain various steps involved in value analysis with an example of your choice. 10
- (b) Explain simple Man Machine Interaction in Ergonomics with help of Block Diagram. 10
- (c) Write a short note on anthropometry. 10
5. (a) Explain 7 phases of Morphology of design with an example. 10
- (b) Explain concurrent engineering approach for design and development of product. 10
6. (a) Explain the following: 20
- (i) Design for Environment. ::
 - (ii) Rapid prototyping
 - (iii) Product life cycle management
 - (iv) Design for Assembly.

AUTO



Q.P. Code : 813901

(3 Hours)

[Total Marks : 80

- B. :** (1) Question No.1 is **compulsory**.
 (2) Attempt any **three** out of the remaining **five** questions
 (3) **Figures** to the right indicate **full** marks.
 (4) Illustrate your answers with sketches wherever necessary.

Attempt any **four** from following

20

- (a) Explain the different colour codes along with sizing of letters and numbers which are used for displaying the registration mark on number plate of motor vehicle.
 - (b) Is it possible to get refund of tax paid for a motor vehicle, if so how?
 - (c) Write short note on claims tribunal.
 - (d) Point out the difference between state transport and private bus service.
 - (e) Explain the relation between structural condition and transport.
 - (f) Explain the term traffic navigation.
-
- (a) Indicate any five road offences along with number of each section of motor vehicle act under which the offender will be prosecuted stating the penalties for the same in detail. 10
 - (b) Why the tax exemption will be given to certain class of vehicles stating in detail how much exemption is given. 10
-
- (a) What are the duties surveyor and loss assessor in case of claim compensation process in case of accident? 10
 - (b) The cost of transport is divided in to "Fixed Cost" and "Variable Cost". How these cost play an important role in fixing the freight charges. 10
-
- (a) State in detail the usefulness of "Global Positioning System" in managing the vehicular traffic operation. 10
 - (b) What are the basic documents in transport operation? Explain it in detail. 10
-
- (a) What are the rules and regulations framed for construction of motor vehicle? 10
 - (b) State and explain any five duties of driver in case of accident. 5
 - (c) What are the advantages of computers in bus transport organization? 5

TURN OVER



Q.P. Code : 813901

2

6. Attempt any **four** from following 20
- (a) Explain the linkage between live hood asset and transport. 5
 - (b) Give the detailed classification of fare collection system and explain any one. 5
 - (c) What do you mean by fitness certificate & its validity in case of transport vehicle? 5
 - (d) What is one time tax & explain in brief along with amount of "One Time Tax" applicable for different class of vehicle. 5
 - (e) Point out the difference between "Comprehensive" and "Third Party Insurance". 5
 - (f) Write down the minimum qualifications which person should acquire to become surveyor and loss assessor. 5
-

BE/VU/AUTO/SCM/CBSGS 21/12/2016

REV.

Copy

Sub - SCM

Q. P. Code : 793801

(3 Hours)

[Marks : 80]

- Note : 1) Question number ONE is compulsory. Answer any THREE from remaining FIVE.
2) All questions carry equal marks.
3) Answer to each new question should be started on a fresh page.
4) Figure in brackets on the right hand side indicate full marks.
5) Assume suitable data if necessary.

1. (a) Explain different decision phases of SCM. 05
(b) Explain macro perspectives of SCM. 05
(c) Explain bullwhip effect. 05
(d) What do you mean by Tailored Transportation? 05
2. (a) Explain Design procedure for Supply Chain Network (SCN) with neat sketch. 10
(b) Draw a block diagram showing Process of Supply Chain Management 10
3. (a) Explain with a block diagram Vendor development and evaluation process in SCM. 10
(b) Explain in SCM the procedure for achieving Strategic Fit. 10
4. (a) The case deals with the restructuring initiatives Dabur took in the early 2005s. 12
In order to cater to a wider audience, Dabur decided to reposition itself as an FMCG company with a herbal plank, moving away from its earlier image of an Ayurvedic medicine manufacturer. In order to convey a new vibrancy, the company has adopted new product offerings and new packaging. Dabur's promotional campaigns include leading Bollywood actors and sportstars. Dabur moved away from an umbrella branding strategy and went in for individual branding. It pruned products which were not aligned with its brand architecture. It also took concerted steps towards geographical expansion to international markets, and within India, focused on regions like southern India, which it had earlier neglected. The company's revenues in 2010-11 reveal that the changes undertaken by the company have started showing results.

Attempt following Questions with Discussion:

1. Analyze the reasons that impelled Dabur to refine its Ayurvedic image to that of a herbal FMCG company?

TURN OVER



2. What were the action plans Dabur undertook as part of its restructuring?
How did they help close the chinks in its marketing armour?
3. Dabur targeted sales of Rs.800 billion by 2017. Comment on the growth strategies to be adopted by Dabur.
- (b) Explain with block diagram supply chain IT framework 08
5. (a) Explain with sketch Competitive and supply chain strategies. 10
(b) Explain with block diagram Customer Relationship Management (CRM). 10
6. Write Short notes on **ANY TWO** of the following: 20
 - a) Green supply chain.
 - b) Purchasing policies.
 - c) Risk management in IT.

AD/BE AUTO/VII/CBG-5/8/12/16

Sub :- AD

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(03 Hours)

[Marks : 80]

- Note: 1. Question No. 1 is compulsory.
2. Attempt any **Three** questions from remaining.
3. Use of Design Data Hand book is permitted.
4. Assume suitable data if required.



1. Attempt any Four of the following

- Explain Design considerations of cylinder. What are dry and wet Cylinder liners?
- Why are connecting rods made of 1 sections? Name the materials used for connecting rod.
- Name the materials used for crankshaft. What are the design considerations of crankshaft?
- Prepare a list of brake lining and clutch lining materials used in automotive. Specify their characteristics.
- What is internal expanding shoe brake? What are the advantages and disadvantages?

2. (a) Design of a cast iron piston for a single acting four stroke engine for the following data: 15

Cylinder bore = 90 mm;
Stroke = 130 mm;
Maximum gas pressure = 5 N/mm²
Indicated mean effective pressure = 0.8 N/mm²
Mechanical efficiency = 85%
Fuel consumption = 0.20 kg per brake power per hour;
Higher calorific value of fuel = 42 × 10³ kJ/kg;
Speed = 2000 r.p.m.
Any other data required for the design may be assumed.

(b) Explain Design considerations of piston. Why piston is made light weight? 05

3. (a) The bore of a cylinder of the four stroke diesel engine is 120 mm. The maximum gas pressure inside the cylinder is limited to 4 MPa. The cylinder head is made of cast iron and allowable tensile stress is 40 N/mm². Determine the thickness of cylinder head. The studs which are made of steel, have allowable stress as is 50 N/mm². Calculate (i) number of studs, (ii) nominal diameter of studs, and (iii) pitch of studs. Draw the neat diagram for each component. 10

[TURN OVER]



(b) Design a connecting rod for a high speed diesel engine using the following data:

Cylinder bore	= 110 mm
Stroke	= 120 mm
Length of connecting rod	= 300 mm
Speed	= 2500 rpm
Mass of reciprocating parts	= 1.5 kg
Maximum gas pressure	= 3.625 MPa
Factor of safety against buckling	= 5

4. (a) Explain the Whipping Stress of connecting rod.

(b) Design a centre crankshaft for single cylinder vertical engine using the following data:

Cylinder bore	= 120 mm
Stroke	= 140 mm
(L/r) ratio	= 4.5
Speed	= 2000 rpm
Weight of flywheel cum belt pulley	= 1 kN
Maximum gas pressure	= 3 MPa
Total belt pull	= 2 kN
Width of hub for flywheel cum belt pulley	= 200 mm
The torque on the crankshaft is maximum when the crank turns through 22° from TDC and at this position the gas pressure inside the cylinder is 2.5 MPa. The belts are in horizontal direction.	

5. (a) What is the difference between Centre and Overhung crankshafts? Name the materials used for crankshaft.

(b) Design the valve gear mechanism for the exhaust valve of a petrol engine using the following data:

Cylinder bore	= 200 mm
Stroke	= 300 mm
Speed	= 500 rpm
Effective length of each arm	= 165 mm
Angle between two arms	= 160°
Maximum gas pressure	= 3.5 MPa
Seat angle of valve	= 45°
Mass of valve	= 0.5 kg
Back pressure when the exhaust valve opens	= 0.4 MPa
Maximum suction pressure	= 0.03 MPa

The valve opens 33° before TDC and closes 1° after BDC the valve is to open and close with constant acceleration and deceleration for each half of the lift.