

**UNIVERSITY OF PUNE**  
**[4364]-831**  
**B. E. ( Automobile Engineering )**  
**Automotive Refrigeration and Air**  
**Conditioning**  
**(2008 Pattern)**

**Total No. of Questions : 12**  
**[Time : 3 Hours]**

**[Total No. of Printed Pages :7]**  
**[Max. Marks : 100]**

***Instructions :***

- (1) Answers to the two sections should be written in separate answer-books.*
- (2) Answer any 3 question from section-I and 3 question from section-II*
- (3) Neat diagram must be drawn wherever necessary.*
- (4) Figures to the right indicate full marks.*
- (5) Use of non-programmable calculator is allowed.*
- (6) Assume suitable data, if necessary.*

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**SECTION-I**

**Q1.**

- a) In vapour compression refrigeration cycle what is subcooling and superheating? Explain with the help of diagram its effect on C.O.P. [4]
- b) Explain simple vapour compression refrigeration system. Give the cycle analysis. [6]
- c) A vapour compression refrigerator uses R12 as a refrigerant operates between the pressures 2.5 bar and 9 bar. The compression is isentropic and there is no undercooling. [8]  
The vapour is in dry saturated condition at the beginning of the compression. Estimate the theoretical COP. If the actual COP is 0.65 of the theoretical value, calculate the net cooling produced per hour. The refrigerant flow is 5 kg/min. properties of refrigerant are

Pressure (bar)	Saturation temperature (OC)	Enthalpy (kJ/kg)		Entropy of saturated vapour, (kJ/kg)
		Liquid	Vapour	
9.0	36	70.55	201.8	0.6836
2.5	-7	29.62	184.5	0.7001

Take  $C_p$  for superheated vapour at 9 bar as 0.64 kJ/kgK.

OR

Q2.

- a) In a refrigerator working on Bell Coleman cycle, air is drawn in to compressor from the cold chamber at pressure of 1 Bar and temperature of  $-5^\circ\text{C}$ . After isentropic compression to 5 bar, air is cooled at constant pressure to temperature of  $15^\circ\text{C}$ . After polytropic expansion  $PV^{1.22}=C$  expanded to 1 bar to the chamber.

Calculate: a) C.O.P.      b) TR

Take mass flow rate = 20 kg/min [10]

- b) Explain Carnot cycle with P-h and T-S diagram. Derive an expression for its COP. [8]

Q3.

- a) Define Refrigerant and give its classification. [6]  
 b) What are properties of an ideal refrigerant? [4]  
 c) Write down various components of air conditioning system. [6]

OR

Q4.

- a) Explain environmental concerns/Legislation for automotive A/C systems. [4]  
 b) Explain various types of Evaporators. [6]  
 c) Write note on Refrigerant charge capacity determination [6]

Q5.

- a) Define Air Conditioning. Draw and explain comfort chart. [4]
- b) What are the different air distribution modes? [6]
- c) Explain any one Automatic Temperature control device [6]

OR

Q6.

- a) Write a note on Vehicle operation modes & Cool-down performance. [4]
- b) What are various components of air distribution system. [6]
- c) What are various ducts? Which is mostly use in A/C system? Why? [6]

SECTION-II

Q7.

- a) Define psychrometry. Define [6]
  - 1) DBT
  - 2) WBT
  - 3) DPT
  - 4) Sp humidity
- b) Show the following processes on skeleton psychrometric chart [6]
  - 1) Adiabatic mixing of two streams.
  - 2) Sensible heating
  - 3) Cooling and dehumidification.
- c) Dry air at 25° C DBT and 15°C WBT at 1.01325 bar pressure is used for air conditioning process Find [6]
  - 1) Relative humidity
  - 2) Humidity ration
  - 3) DPT
  - 4) Specific enthalpy

OR

Q8.

- a) 800 m<sup>3</sup>/min air at 30°C DBP and 10°C DPT ,is to be mixed adiabatically with 300m<sup>3</sup>/min of air at 30°C DBT and 50% Rh. For mixed air find [8]
- 1) Sp. Humidity
  - 2) DBT
  - 3) WBT
  - 4) Density and
  - 5) Specific enthalpy
- b) Write short note on Bypass factor of coil [5]
- c) Explain sensible Heat Factor. [5]

Q9.

- a) Explain air conditioning load on engine performance [6]
- b) A conference room for seating 100persons is to be maintained at 22°C DBT and 60% relative humidity. The outdoor conditions are 40°C DBT and 27°C WBT. The various load in the room are as follows.  
Sensible and latent heat loads per person, 80W and 50W respectively; lights and fans, 15000 W; sensible heat gain through glass, wall etc 15000W. The air infiltration is 20M<sup>3</sup>/min and fresh air supply is 100 m<sup>3</sup>/min. Two third of recirculated room air and one third of fresh air is mixed before entering the cooling coil. The bypass factor of cooling coil is 0.1.  
Determine ADP, the grand total heat load and ERSHF [10]

OR

Q10.

- a) Explain various factors which forms load on automobile Air Conditioner. [6]
- b) The following data relates to the office air conditioning system having maximum seating capacity of 25 occupants. [10]
- Outside design conditions = 34°C DBT, 28°C WBT  
Inside design conditionings = 24°C DBT, 50% RH  
Solar heat gain = 9120W  
Latent heat gain per occupant = 105W  
Sensible heat gain per occupant = 90W

Lightening load = 2300W

Sensible heat load from other sources= 11630W

Infiltration load= 14m<sup>3</sup>/min

Assume 40% fresh sir & 60% of recirculated air is passing through evaporator coil and bypass factor of 0.15, find DPT of the coil and capacity of the plant.

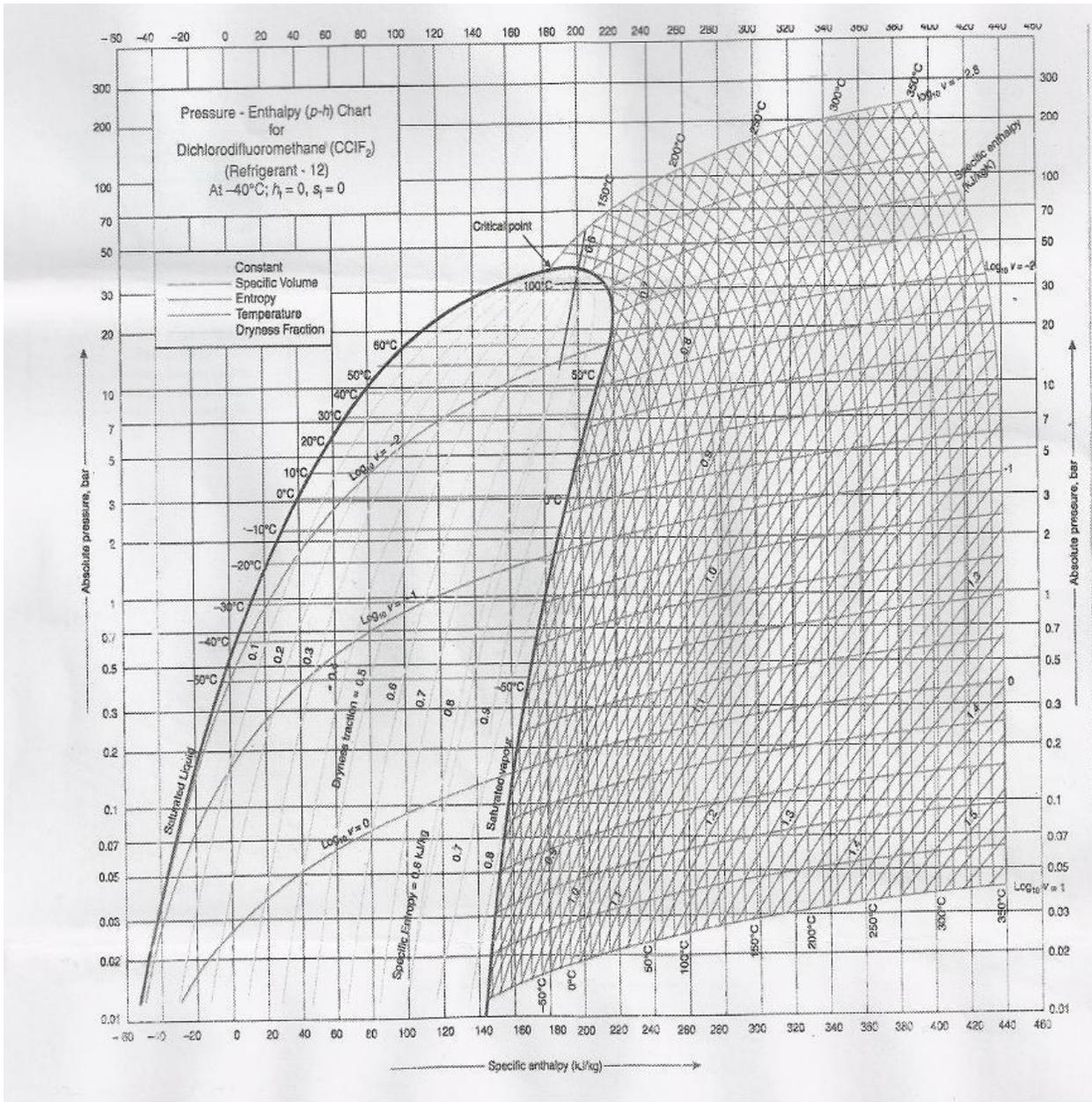
Q11.

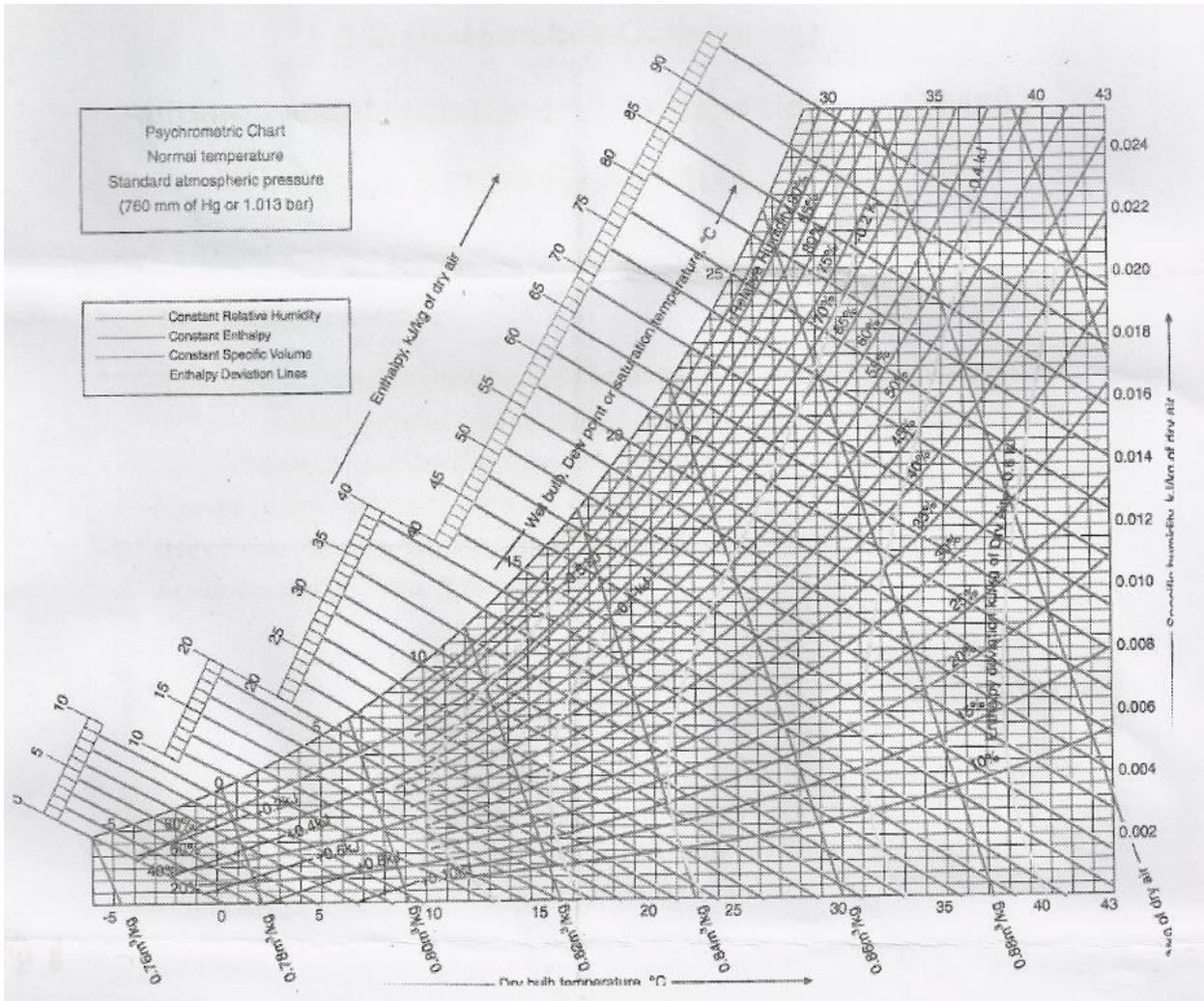
- a) Write a note on refrigerant recovery, recycle and recharging. [8]
- b) What is the application of slight glass. Draw diagrams for appearance and the meaning. [8]

OR

Q12.

- a) What are the significance of leak detection, explain how to detect it. [8]
- b) Write a note on compressor service. [8]





**UNIVERSITY OF PUNE**  
**[4364]-837**  
**B. E. Automobile Exam, 2013**  
**Automotive NVH**  
**(2008 Course)**

**Total No. of Questions : 6**  
**[Time : 3 Hours]**

**[Total No. of Printed Pages :3]**  
**[Max. Marks : 100]**

**SECTION-I**

Q1.

- a) Discuss the sources of vibration and noise in Automobile [8]
- b) Explain the physiological effect of noise and vibration. [8]

Q2.

- a) Show that the ratio of two successive amplitudes of oscillations is constant in damped vibratory system. [8]
- b) What is meaning of principle mode of vibration? Derive an expression for frequency equation in case of two degree of freedom, undamped free vibration. [10]

OR

Q2.

- a) Write a note on co-ordinate coupling [6]
- b) Explain generalized coordinates [6]
- c) Write a note on vibration of multi degree of freedom system. [6]

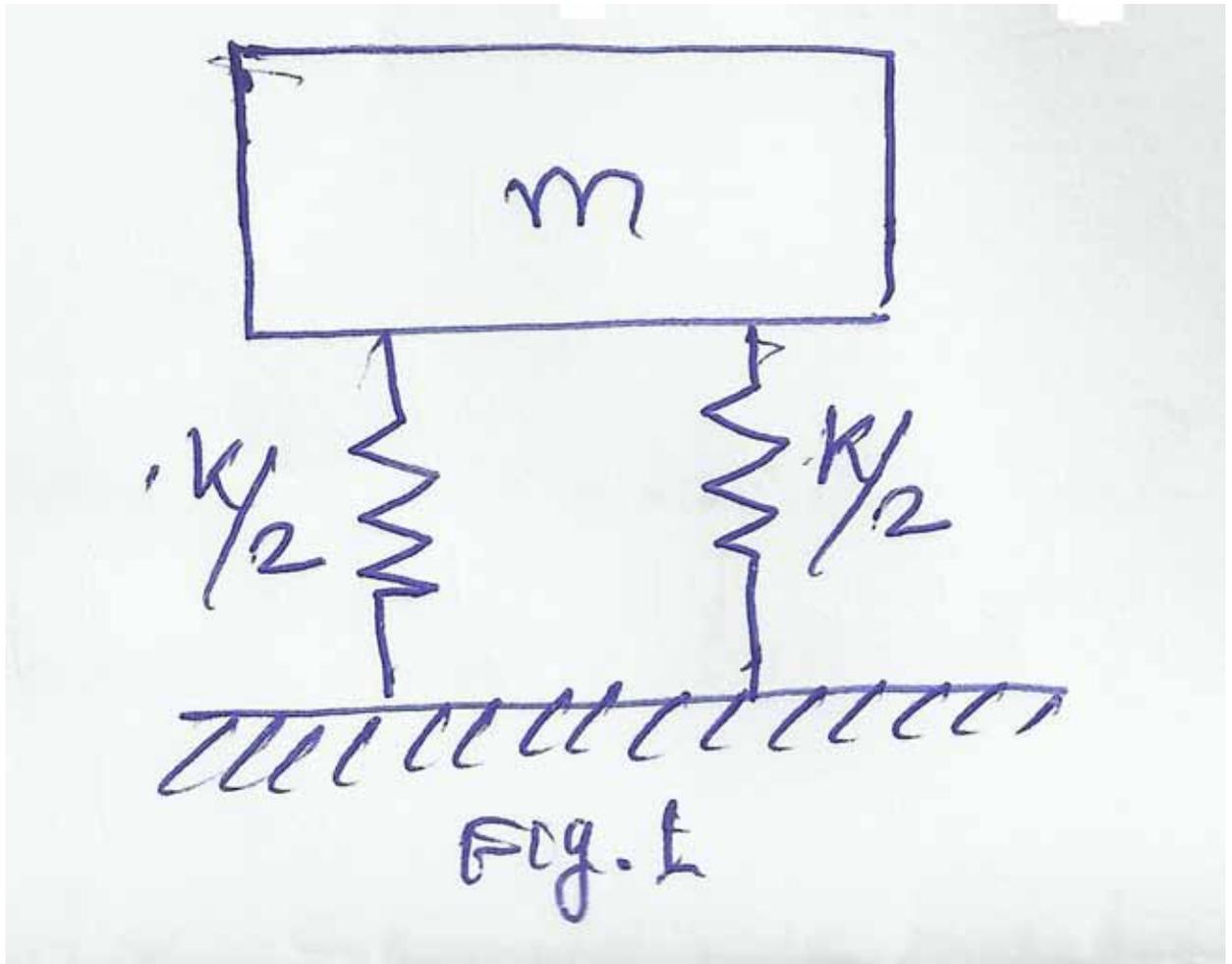
Q3.

- a) Write a note on [16]
  - 1) Vibration Isolation
  - 2) Tuned absorbers
  - 3) Damping treatment
  - 4) Dry friction damping

OR

Q3.

- a) Explain the coulomb Damping in detail. [8]
- b) Derive the equation of transmissibility ratio for Isolation using spring as shown in fig.1 [8]



## SECTION-II

Q4.

- a) What is the difference between structure borne sound and air borne sound [6]
- b) Define and explain [6]
  - 1) Acoustic intensity
  - 2) Sound power
  - 3) Sound intensity
- c) Explain the weighting Networks [6]

OR

Q4.

- a) Derive the relation for sound pressure intensity and power level. [10]
- b) Write a note on (any two)
  - 1) Octane bond Analysis
  - 2) Summation of pure tones
  - 3) Spherical wave propagation [8]

Q5.

- a) Describe ISO standard for noise level measurement of vehicle in stationary position. [8]
- b) Write note on Frequency measuring instruments [8]

OR

Q5.

- a) Explain with a neat sketch the construction and working of condenser microphone
- b) Describe ISO standard for noise level measurement of vehicle in running condition. [8]

Q6.

- a) List different methods of noise control and explain them in detail [6]
- b) Write note on [10]
  - 1) Isolation
  - 2) Damping
  - 3) Balancing

OR

Q6.

- a) Explain methods of control of noise of [9]
  - 1) Engine Noise
  - 2) Aerodynamic Noise
  - 3) Tyre Noise
- b) How we apply noise control method [7]
  - 1) At Source
  - 2) Along the path
  - 3) At Receiver

**UNIVERSITY OF PUNE**  
**[4364]-832**  
**B. E. (Semester - I) Examination –2013**  
**B. E. (Automobile Engineering)**  
**Machine and Vehicle Dynamics (416489)**  
**(Course 2008)**

**[Total No. of Questions:]**  
**[Time : 3 Hours]**

**[Total No. Printed Pages: 5]**  
**[Max. Marks : 100]**

***Instructions :***

- 1) Answer **any three** questions from each I and three questions from section II
- 2) Answers to two sections must be written in separate answer books.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Black figures to the right indicate full marks.
- 5) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
- 6) Assume suitable data, if necessary.

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**SECTION - I**

Q.1 a) A three cylinder Radial engine driven by common crank has the cylinders [9]  
Speed at 120<sup>0</sup>. The stroke is 125mm, length of connecting rod 225mm and the  
mass of reciprocating parts per cylinder 2kg. calculate the Primary and Secondary  
forces at crank shaft speed of 1200 rpm.

b) Explain the effect of Partial balancing of reciprocating parts of two cylinder [7]  
locomotive.

**OR**

Q.2 a) Four masses A,B,C, & D are completely balanced masses C and D make [12]  
angles of 90<sup>0</sup> and 195<sup>0</sup> respectively with that of mass B in the counter  
clockwise direction. The rotating masses have the following properties

$$m_b = 25 \text{ kg} \quad \zeta_a = 150 \text{ mm}$$

$$m_c = 40 \text{ kg} \quad \zeta_b = 200 \text{ mm}$$

$$m_d = 35 \text{ kg} \quad \zeta_c = 100 \text{ mm}$$

$$\zeta_d = 180 \text{ mm}$$

Plane B and C are 250mm apart. Determine the i) mass A and its angular position with that of mass B ii) Position of all the planes relative to plane of mass A.

b) What is static and dynamic balancing? [4]

Q.3 a) The measurement on mechanical vibrating system show that it has a mass of 8kg on that spring can be combined to give an equivalent spring stiffness of 5.4 N/mm. If the vibrating system has a dash pot attached which has damping coefficient of 40 Ns/m. Determine. [10]

i) Critical damping coefficient

ii) Damping factor

iii) logarithmic decrement

iv) Ratio of two Consecutive amplitude.

b) Define the terms [4]

i) Degree of freedom

ii) Phase angle

iii) Time Period

iv) Resonance

c) Explain Frequency Response Curve. [4]

**OR**

Q.4 a) Show that the ratio of two Successive amplitude of oscillations is Constant [8] in damped Vibratory system.

b) Derive an expression to find out natural Frequency of free, undamped, single [6]

degree of freedom system.

c) Explain the coulomb damping [4]

Q.5 a) A vibratory body of mass 150kg supplied as spring of total stiffness 1050 KN/m has a rotating unbalance force of 525N at a speed of 3000 rpm if the damping factor is 0.3. Determine [10]

i) The amplitude caused by unbalance

ii) Phase angle

iii) Transmissibility

iv) Actual Force transmitted

b) Write note on vibration Isolation [6]

Q.6 a) A mass of 90kg is suspended on spring having stiffness of 18000 N/m and is acted upon by harmonic force of 35N at the resonance. The damping is considered to be Viscous and is having damping coefficient of 90 N sec/m Determine [10]

i) Undamped Natural frequency

ii) Amplitude of force vibration

iii) Phase angle between force and displacement

b) Write Note on force and motion transmissibility. [6]

## SECTION- II

Q.7a) Derive an expression for axle load of vehicle when it is stationary and standing on level ground. [8]

b) Elaborate vehicle fixed coordinate system and Earth fixed co-ordinate system and Earth fixed co-ordinate system with the help of sketches. [8]

**OR**

Q.8 a) Write mathematical expression for tractive force available for motor vehicle [8]  
in following case

- i) Solid rear axle with non-locking differential
- ii) Solid rear axle with locking differential
- iii) solid front drive axle with non- locking differential
- iv) Independent front axle

b) Explain the concept of effective mass and mass factor used in evaluation of [4]  
acceleration performance of vehicle.

c) Explain the different Aerodynamic moments acting on vehicle. [4]

Q.9 a) Determine the front and rear suspension side rates for a car given that the tire [6]  
spring rate is 211N/mm. The front suspension rate is 25N/mm and the rear  
is 17.6N/mm. Also estimate the natural Frequency of the two suspensions  
when the front tiers each carry a load of 435kg and rear tires each carry  
a load of 332kg.

b) Describe the concept of Oscillation center for bounce and pitch motion [6]  
of vehicle.

c) Draw the typical quarter car model used for vehicle ride analysis [4]

**OR**

Q.10 a) List four vehicle ride vibration excitation Sources and elaborate any [6]  
two in brief.

b) Write note on Active and Semi active Suspension [6]

c) Explain PSD (Power spectral Density) function as representation of road [4]  
roughness.

Q.11 a) Explain yaw velocity response / gain and draw characteristic curves for [8]

for neutral steer, under steer, and over steer.

b) Explain in brief any one test used for determination of handling characteristics of vehicle. [6]

c) Draw neat sketch of Ackerman steering geometry [4]

**OR**

Q.12 a) Derive an expression for steer angle of front wheel during high speed cornering [10]

b) Explain Acceleration gain [8]

i) lateral Acceleration gain

ii) yaw velocity

iii) critical speed

iv) characteristic speed

**UNIVERSITY OF PUNE**

**[4364]-833**

**B. E. (AUTOMOBILE ENGINEERING) Examination 2013**

**AUTOMOBILE SYSTEM DESIGN (416490)**

**(2008 Course)**

**[Total No. of Questions:12]**

**[Total No. of Printed pages :5]**

**[Time : 3 Hours]**

**[Max. Marks : 100]**

**Instructions :**

- (1) *Solve Any 3 questions from each section.*
- (2) *Answers to the two Sections should be written in separate answer-books*
- (3) *Neat diagram must be drawn wherever necessary.*
- (4) *Figures to the right indicate full marks.*
- (5) *Assume suitable data, if necessary.*
- (6) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

**SECTION I**

Q.1a) Design a tensile bar for minimum cost of the following materials. [14]

Assume a factor of safety of 2.

Material	Mass Density (kg/m <sup>3</sup> )	Yield strength (MPa)	Material cost Rs/N
Steel	3000	16	130
Aluminium alloy	3000	32	50
Magnesium alloy	2100	32	20

Area of bar should be at least 85mm<sup>2</sup> , length of bar is 200mm and a

constant tensile load on bar is of 5000N.

b) What do you understand by optimum and adequate design? [4]

**OR**

Q.2a) A cantilever beam of length 200 mm and rectangular cross section is to function in a device as a spring member. The width of the beam is five times its depth. It is subjected to vertical force which varies from + 500N to -500N at its free end. The maximum deflection at the free end is limited to 1mm. The factor of safety is 2. Design the beam for minimum material cost, out of the following materials. [18]

material	mass density (kg/m <sup>3</sup> )	material cost (Rs/kg weight)	Endurance limit (n/mm <sup>2</sup> )	modulus of elasticity (n/mm <sup>2</sup> )
m1	7800	20	130	207×10 <sup>3</sup>
m2	2800	70	50	72×10 <sup>3</sup>
m3	4500	800	260	114×10 <sup>3</sup>

Q.3a) What are the design requirements of a clutch? [4]

b) A single dry plate clutch is to be designed to transmit 7.5 kW at 900 RPM. Find- [12]

- i) Diameter of the shaft ii) mean radius and face width of the friction lining assuming the ratio of the mean radius to the face width as 4.  
iii) outer and inner radii of the clutch plate iv) Axial force required to engage the clutch

**OR**

Q.4 a) Why multi-plate clutch is preferred in two- wheelers? [4]

b) A multi-plate clutch is to transmit 3-6 kW power at 750 RPM It has [12]  
to transmit 10% more than the rated torque. The inner radius of contact  
is 40mm and outer radius is 70 mm The clutch operates in oil with an  
expected coefficient of friction 0.1 The average allowable pressure is 3.5  
mpa for maximum torque. Find the number of discs required and the  
axial force.

Q.5a) What are the advantages of increasing the number of gear ratio [4]  
Steps in automobile gearbox?

b) A four speed gearbox is to be constructed for providing the ratio's [12]  
of 1, 1.46, 2.28 and 3.93 to 1 as nearly as possible. The diametral pitch  
of each gear is 3.25 mm and the smallest pinion is to have at least 15  
teeth. Determine the suitable number of the different gears.

**OR**

Q.6a) Explain the selection of beating in gearboxes. [6]

b) The gear ratio's of a 3 speed gearbox are 3.5, 2.1 and 1 and the [10]  
constant ratio of differential is 6. Calculate the speed of car in each  
gear if the engine RPM is 3000 and the rear wheel diameter is 600mm.

**SECTION II**

Q.7a) What should be the characteristics of a propeller shaft? [3]

b) Why is a tubular section propeller shaft normally used? [3]

c) An automobile engine develops 28kW at 1500 RPM and its bottom [10]

gear ratio is 3.06 if a propeller shaft of 40mm meter of mild steel tube to be used, assuming a safe shear stress of  $55 \times 10^3$  kPa for the ms.

**OR**

- Q.8a) What is the purpose of rear axle final drive? [3]
- b) what are the merits of cross-type joint? [3]
- c) Explain the general design procedure of front axle [10]
- Q.9a) How does the expanding mechanism of shoes affect the total braking torque? [4]
- b) Why is disc brake preferred for front wheels and the drum brake for rear wheels? [4]
- c) In a hydraulic single line braking system force on foot-pedal is 100N, [8] pedal leverage ratio is 4, cross sectional area of master cylinder is  $4 \text{ cm}^2$  cross sectional area of front pistons  $20 \text{ cm}^2$ , cross sectional area of rear piston  $5 \text{ cm}^2$  and distance moved by effort is 1 cm calculate-
- i) Front to rear brake ratio ii) percentage of front and rear braking  
iii) Total force ratio iv) Distance moved by output v) cylinder movement ratio vi) Total movement ratio

**OR**

- Q.10a) What are the components of hydraulic braking system? [6]
- Explain their functions.
- b) What is the braking efficiency? Explain. [4]
- c) The coefficient of friction between the brake linings and brake drum [6] is 0.43 The brake drum diameter is 18cm and the total load between brake

linings and drum is 3850N. Determine braking torque and the heat generated per minute.

Q.11a) Find the thickness of semi- elliptical leaf spring having 1m span[14] carrying a load 5400N The permissible stress for the spring is 490 mPa Also calculate the width if i) leaves are unstressed initially ii) leaves are stressed initially. Take  $y= 75\text{mm}$ ,  $i_f=2$ ,  $i_g=6$ ,  $E=2.1 \times 10^5 \text{ mPa}$

b) What is nipping in leaf springs? [4]

**OR**

Q.12a) Explain the components of steering system. [12]

b) What are the characteristics of over –steer? [3]

c) What are the causes of stiff steering? [3]

[Total No. of Questions: 12]

[Total No. of Printed Pages: 3]

UNIVERSITY OF PUNE

[4364]-839

B. E. (Automobile) Examination - 2013

(Vehicle Safety)(416492B)(Elective-II)(2008 Course)

[Time: 3 Hours]

[Max. Marks: 100]

**Instructions:**

- 1 Answer three questions from section I and three questions from section II.
- 2 Assume suitable data, if necessary.

**SECTION -I**

- Q.1 A What are the characteristics of vehicle structure. 6  
B Explain the role of safety system in Automobile 10

**OR**

- Q.2 A Explain the importance of Ergonomics in Automobile safety 8  
B Explain with figure any one safety system used in latest vehicle 8
- Q.3 A Explain the optimization technique of vehicle structures for Crashworthiness. 10  
B Explain different types of impact due to crash. 8

**OR**

- Q.4 A What are requirement of crash testing? 6  
B Explain the photographic image analysis of impact test 6  
C Explain about movable barrier tests 6

- Q.5 A Explain about human impact and tolerances with respect to vehicle ergonomics 8
- B How to determine injury thresholds? 8

**OR**

- Q.6 A Explain different types of Dummies and their importance 10
- B Write short note on: 6
- i. Location of controls
  - ii. servicity Index

**SECTION II**

- Q.7 A Explain active safety and passive safety 10
- B Explain the working of airbags and bumpers with respect to safety 8

**OR**

- Q.8 A Explain the latest trends in traffic system for improved road safety 10
- B Explain the need of safety glasses 8
- Q.9 A Explain recent trends in Automobile lightning 8
- B Explain different types of Automobile lamps. 8

**OR**

- Q.1 Write short note on: 16
- 0
- i. Direction Indicator
  - ii. Number plate lamp
  - iii. Stop lamp
  - iv. Reflective Indication position lamp

- Q.11 A List the AIS regulations as per CMVR of 1989 Act. 10
- B Comment on fuel economy with respect to safety regulations. 6

**OR**

Q.12

Write a short note:

16

- i. Safety Regulation of 2002 Act
- ii. General Requirements on Body structure

[Total No. of Questions: 12]

[Total No. of Printed Pages: 2]

**UNIVERSITY OF PUNE**

[4364]-842

**B. E. (AUTO) Examination - 2013**

**ALTERNATIVE FUELS AND EMISSION CONTROL (2008 Course)**

[Time: 3 Hours]

[Max. Marks: 100]

**Instructions:**

- 1 Answer any three questions from Section I and any three questions from Section II
- 2 Answers to the two sections should be written in separate answer-books.
- 3 Neat diagrams must be drawn wherever necessary.
- 4 Black figures to the right indicate full marks.
- 5 Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
- 6 Assume suitable data, if necessary.

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**SECTION - I**

- |     |   |   |    |
|-----|---|---|----|
| Q.1 | A | How are SI and CI engine fuels rated?                 | 10 |
|     | B | Explain the reason for looking for alternative fuels. | 6  |

OR

- |     |   |  |   |
|-----|---|--|---|
| Q.1 | A | Discuss the important qualities of an SI and CI engine fuel. | 8 |
|     | B | Write the general chemical formula of following fuels        | 8 |
|     |   | 1) Paraffin  |   |
|     |   | 2) Olefin  |   |
|     |   | 3) Naphthene   |   |
|     |   | 4) Aromatic  |   |
- Also state their molecular arrangement and mention whether they are saturated or unsaturated

- |      |   |   |   |
|------|---|---|---|
| Q. 2 | A | Compare the properties CNG,LPG and PETROL                           | 6 |
|      | B | Can alcohol be used for CI engine? Explain                          | 6 |
|      | C | What are properties, Advantages and disadvantages of hydrogen fuel. | 6 |

OR

- |      |   |   |    |
|------|---|---|----|
| Q. 2 | A | Explain with neat sketch the biodiesel production process | 8  |
|      | B | Write note on (any two)                                   | 10 |
|      |   | i) Ethanol  |    |
|      |   | ii) Storage of hydrogen fuel                              |    |
|      |   | iii) Biogas   |    |

Q. 3	A	What are different synthetic fuels used in vehicle? Explain any three considering following aspect: i) Properties ii) Advantages and disadvantages iii) Handling and safety aspect iv) Engine modification or effect on engine performance	16
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**SECTION II**

Q. 4	A	What are different sources of pollutant in homogenous SI engine? Explain in brief.	5
	B	How the A/F ratios affect the CO, HC and NOx emission in SI engine? Explain with sketch.	5
	C	Write note on positive crank case ventilation.	7
OR			
Q. 4	A	Explain the effect of SI engine design and operating variables on emission	8
	B	Explain working of evaporative control system for PFI engine with neat sketch	9
Q. 5	A	Explain with neat sketch constructional and operational features of NDIR analyzer for measurement of CO and HC concentration.	9
	B	Describe the sources and causes of soot and particular emission	8
OR			
Q. 5	A	Explain with sketch the operating principle of chemiluminescence analyzer (CLA)	8
	B	List and explain the two methods to improve cold performance of catalytic converter	9
Q. 6	A	List the negative effect of HC and CO emission on human health and what is treatment to CO intoxication person.	8
	B	Describe the history of emission norm	8
OR			
Q. 6	A	Write note on i) Indian emission norms ii) European emission standard for light duty vehicle iii) Effect of NOx emission on human as well as on environment	16

[Total No. of Questions: 12]

[Total No. of Printed Pages: 3]

**UNIVERSITY OF PUNE**

**[4364]-843**

**B. E. (Automobile Engineering) Examination - 2013**

**VEHICLE PERFORMANCE AND TESTING**

**(416495) (2008 Course)**

**[Time: 3 Hours]**

**[Max. Marks: 100]**

**Instructions:**

- 1 *Answers to the two sections should be written in separate answer-books.*
- 2 *Black figures to the right indicate full marks.*
- 3 *Your answer will be valued as a whole*
- 4 *Neat diagrams must be drawn wherever necessary.*
- 5 *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
- 6 *Assume suitable data, if necessary.*
- 7 *Answer three questions from Section I and three questions from Section II*

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**SECTION - I**

- Q.1      A) Explain various vehicle performance parameters in detail? [8]  
            B) Write a note on [8]  
                a) Suspension System  
                b) Steering System

OR

- Q.1      A) Explain with neat sketch the construction working of catalytic [8]  
            convertor.  
            B) Explain the procedure to find out vehicle propulsive power. [8]  
                Which parameters consume major stake engine power?

- Q. 2      A) Write a note on Epicyclic transmission? List down characteristic [8]  
            of automotive clutches?  
            B) Write test procedure for gear box testing [8]

OR

- Q. 2      A) How the automotive clutches are tested? Write the performance [8]  
            parameters of automotive clutch.  
            B) Explain with sketch the performance characteristics of torque [8]  
                converter



[Total No. of Questions: 10]

[Total No. of Printed Pages: 3]

**UNIVERSITY OF PUNE**

**[4364]-848**

**B. E. (Automobile Engineering) Examination - 2013  
TRANSPORT MANAGEMENT & MOTOR INDUSTRY  
(2008 Course)**

**[Time: 3 Hours]**

**[Max. Marks: 100]**

**Instructions:**

- 1 Answer three question from each section
- 2 Answer any three questions from Section I and any three questions from Section II
- 3 Illustrate your answers with neat sketches wherever necessary.
- 4 Black figures to the right indicate full marks.
- 5 Neat diagrams must be drawn wherever necessary.
- 6 Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
- 7 Assume suitable data, if necessary.

**SECTION - I**

- Q.1 Answer the following: 16
- a State the duties and responsibilities of Drivers of State Transport Organization.
  - b Define the terms
    - i) Good vehicle
    - ii) Public place
    - iii) Transport vehicle
    - iv) Fare
  - c State particulars that have to be collected for the purpose of preparing a accident report.
  - d Sketch the following traffic symbols:
    - i) Stop
    - ii) Right hand drive
    - iii) One way symbol
    - iv) First aid post
- Q.2 Attempt the following; 16
- a Define the following terms as per Motor Vehicle Act 1988:
    - i) Motor Vehicle or Vehicle
    - ii) Contract carriage

- iii) Private Service Vehicle
    - iv) State Transport Undertakings
  - b Write offences related to licenses and corresponding penalty.
  - c Why road tax is levied on vehicle? Who are exempted from Tax Payments and Why?
  - d Differentiate between Assurance and Insurance.
  
- Q. 3 Attempt the following: 16
  - a Explain types of motor vehicle insurance
  - b Describe the procedure for obtaining permanent driving license.
  - c Which factors are considered while buying a used vehicle?
  - d What are the functions of Surveyor and Loss Assesor ?
  
- Q. 4 Attempt the following: 16
  - a Draw a organization structure at Deport Level of Bus Transportation and explain the functions of Deport Manager.
  - b Explain the recent Motor vehicle act.
  
- Q. 5 Write short notes 18
  - a State Transport authority
  - b List the mandatory, cautionary and informative signs with neat sketch and examples
  - c Tax exemption of motor vehicle
  
- SECTION II**
  
- Q. 6 Attempt the following: 16
  - a State four functions of an Automobile engineer in running Transport Organization.
  - b State the purpose and functions of ARAI.
  - c Differentiate between state transports (MSRTC) and Private Bus Services.
  - d State the advantages and disadvantages of LPG.
  
- Q. 7 Attempt the following: 16
  - a What is the basic element of transport system?
  - b Explain KAIZEN operation and research
  - c State which records are essential in transport organization?
  - d What is the role of an Automobile Engineer in running a transport organization?
  
- Q. 8 Attempt the following: 16
  - a Differentiate between MSRTC & BEST
  - b What are advance traffic control systems?
  - c What are the rules for import, transport and storage of petroleum?

d What are the emission standards prescribed under the M.V. Rules to control pollutions?

Q. 9 Attempt the following: 16

a Explain the stages in History and Development of Motor Industry in India.

b State the functions of P.C.R.A and V.R.D.E and their importance for Motor Industry.

Q. 10 Attempt the following: 18

a Explain various research organizations.

b Differentiate between state transports (MSRTC) and Private Bus Services.

c Explain EURO Norms to Automobile Industry.