

University of Mumbai

Examinations Summer 2022

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1. features are those that help to prevent vehicle collision.
Option A:	Active safety
Option B:	Passive safety
Option C:	Crash test
Option D:	Dummies Testing
2.	Underinflated tires are an example of
Option A:	Anthropometrically induced errors
Option B:	Over steering errors
Option C:	Judgmental errors
Option D:	Braking errors
3.	_____plays an important role in occupant protection in rear crashes
Option A:	Seat
Option B:	Roof
Option C:	Door panel
Option D:	Steering
4.	When there is a critical safety function that involves a somewhat suspect pathway to successful operation, it may be advisable to consider _____.
Option A:	Redundancy
Option B:	Derating
Option C:	Refiling
Option D:	Unloading the driver
5.	Which one of this belongs to Automotive Industry Standards Committee
Option A:	Automotive Administration of India
Option B:	Automotive Association of India
Option C:	Automotive Research Association of India
Option D:	Automotive Research Administration of India
6.	In crash events, occupants are subjected to
Option A:	Kelvin's Laws
Option B:	Newton's Laws
Option C:	Pascal's Law
Option D:	Darwin's Law
7.	Which of these sensors give input signal to ABS control module
Option A:	Wheel speed sensor
Option B:	Wheel spun sensor
Option C:	Wheel space sensor
Option D:	Wheel time sensor
8.	Which of these refers to positive performance of traffic participants among each other in the event of accidents
Option A:	Compatibility
Option B:	Biomechanics
Option C:	Unloading the driver
Option D:	Fail safe

9.	When the driver makes a sudden turn at a relatively high speed, one or more curved tire marks are typically deposited on the road ways which are called as
Option A:	Yaw marks
Option B:	Side marks
Option C:	Scuff marks
Option D:	Print marks
10.	Which of the following head restraint systems is more effective in rear crash?
Option A:	Rigid
Option B:	Fixed
Option C:	Regular
Option D:	Self-aligning

Q2. (20 Marks)	Solve any Two Questions out of Three	10 marks each
A	Explain in detail accident reconstruction analysis.	
B	Compare and contrast Active and Passive Safety giving examples.	
C	Explain the working mechanism of Ultra high retention seats.	

Q3 (20 Marks)	Solve any Two Questions out of Three	10 marks each
A	Discuss the Tire Pressure Monitoring in detail.	
B	Explain the significance of Automotive Industry Standards (AIS). Also list any 5 AIS.	
C	Explain the phases of reconstruction for vehicular rollover accidents.	

Q4. (20 Marks)	Solve any Two Questions out of Three	10 marks each
A	Explain the concept of biomechanics. Also explain abbreviated injury scale.	
B	Explain the Quasistatic Seat Test (QST). Compare QST with Hydge Sled Test.	
C	Explain the different types of human error.	

University of Mumbai
Examination summer 2022
Program: Automobile Engineering
Curriculum Scheme: R 2016

Examination: BE

Semester: VIII

Course Code: AEDLO8043

and

Course Name: Product Design and Development

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks . 2 Marks each
1.	Taguchi methods may be used in which part of the design process?
Option A:	Prototyping and final design
Option B:	Preliminary design
Option C:	Evaluation and improvement
Option D:	Concept generation
2.	The following aspect of product is concerned with the ease and efficiency of the product performance
Option A:	Functional aspect
Option B:	Operational aspect
Option C:	Durability aspect
Option D:	Aesthetic aspect
3.	DFA focuses on:
Option A:	Reduction and standardization of parts and subassemblies and assemblies
Option B:	Reducing or eliminating expensive, complex or unnecessary features
Option C:	Reducing or eliminating labor
Option D:	Reducing or eliminating inventory
4.	The objective of failure mode and effects analysis is to
Option A:	Anticipate product failures and prevent them from occurring
Option B:	Devise ways of minimizing the impacts of product failures when they occur
Option C:	Describe the interrelationships among product failures
Option D:	Quantify the likelihoods of different product failures
5.	Sales versus Profit plot is:
Option A:	Linear from start and sudden drop at end life
Option B:	Maximum in maturity period
Option C:	Negative in maturity period
Option D:	Always positive in initial phase
6.	Direct needs are -----
Option A:	Basic needs of customers
Option B:	Hidden needs of customers
Option C:	Needs that don't change with time
Option D:	Needs specific to the customer
7.	Land property tax is an example of
Option A:	Variable cost

Option B:	Fixed Cost
Option C:	Total Cost
Option D:	Average total cost
8.	'Performance' and 'aesthetics' in the House of Quality fall under the category of _____
Option A:	Technical descriptors
Option B:	Customer requirements
Option C:	Relationship matrix
Option D:	Poka Yoke
9.	How long is a patent valid in India?
Option A:	30 Years
Option B:	20 Years
Option C:	40 Years
Option D:	60 Years
10.	What is RPN?
Option A:	Risk Potential Number
Option B:	Risk Priority Number
Option C:	Risk Preference number
Option D:	Risk Preventive Number

Q2	Solve any Four out of Six	5 marks each
A	Write note on Innovative Thinking.	
B	Briefly explain Design of Experiment for Robust design.	
C	Describe concept of Product Architecture.	
D	Differentiate between Value Engineering and Value analysis.	
E	Explain Anthropometry.	
F	Write short note on Patent & IP Acts	

Q3	Solve any Two Questions out of Three	10 marks each
A	Describe significance of Industrial design process.	
B	Explain design for environment.	
C	Explain Morphology of Design.	

Q4	Solve any Two Questions out of Three	10 marks each
A	With the help of diagram explain Quality Function Deployment.	
B	Explain Psychological and Physiological considerations.	
C	Describe the role of Rapid Prototyping in modern industries.	

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Which is an example of Triple Constraint?
Option A:	Scope, Human Resource, Time
Option B:	Quality, Scope, Human Resource
Option C:	Cost, Human Resource, Time
Option D:	Scope, Cost, Time
2.	You are responsible for a project with high risks particularly during the early phases - your sponsor has asked for performance reports on a monthly basis. At the end of the first month you report a CPI greater than 1 and also the SPI greater than 1. What would this mean?
Option A:	The project is behind schedule and over budget
Option B:	The project is ahead of schedule and under budget
Option C:	The project is ahead of schedule but over budget
Option D:	The project is behind schedule but under budget
3.	Why does activities on critical path of a CPM network are called critical
Option A:	They represent maximum project completion time
Option B:	They cannot tolerate any delay in completion
Option C:	They consume maximum resources
Option D:	These are most complex activities on project
4.	A risk is known as Positive risk or opportunity if-
Option A:	Impact is negative which you want to lessen its impact
Option B:	Impact is positive which you want to lessen its impact
Option C:	Impact is negative which you may want to actualize
Option D:	Impact is positive which you may want to actualize
5.	The lowest element in the hierarchical breakdown of the WBS is
Option A:	Deliverable
Option B:	Work package
Option C:	Responsibility matrix
Option D:	Bottoms up budget
6.	When many activities are planned to start at the same time in project schedule, the project is likely to be following
Option A:	Concurrent Engineering
Option B:	Research and Development Project
Option C:	Goldratt's Critical Chain
Option D:	laddering approach
7.	The payback period for a project
Option A:	is the internal rate of return that is the discount rate that equates the present values of the two sets of flows.
Option B:	is the discounted cash flow method determines the net present value of all cash flows by discounting them by the required rate of return
Option C:	is the initial fixed investment in the project divided by the estimated annual net cash

	inflows from the project.
Option D:	is also known as the benefit–cost ratio
8.	A project is over budget when
Option A:	CPI > 1
Option B:	SPI > 1
Option C:	CPI and SPI > 1
Option D:	CPI less than 1
9.	Select the correct statement from the following
Option A:	There is always only one critical path in the network
Option B:	A path is called a critical path if it is the longest path in a project network
Option C:	Slack or float of dummy activity is always equal to zero
Option D:	Crashing cost linearly increases with no of days crashed
10.	Project closure when the project is completed as planned is
Option A:	Failed projects
Option B:	Premature closure
Option C:	Abnormal closure
Option D:	Normal closure

Q2	Solve any Two Questions out of Three	10 marks each
A	Explain stages of team development and growth? What are advantages of and barriers to team effectiveness?	
B	Explain Probability and impact matrix. What are the risk response strategies for negative risks (threats) and positive risks(opportunities)?	
C	List and briefly describe the ways projects may be terminated. What are some non-technical reasons for project termination?	
Q3	Solve any Two Questions out of Three	10 marks each
A	Differentiate between the Functional, Pure Project and Matrix organizations.	
B	What is crashing of the project? Explain with a small example the process of crashing	
C	Draw resource loading diagram for the following project. Adjusting the activity floats, and level the resources to the best possible loading. How many men are required to complete this project in 11 days after carrying out resource levelling?	
Q4	Solve any Two Questions out of Three	10 marks each
A	A project in its 26th week has an actual cost of Rs.270,000/-. It was scheduled to have spent Rs.260,000/-. For the work performed the budgeted value is Rs. 272,000/-. What are cost and schedule variances for the project? What is the SPI, CPI and CSI? Comment on the status of the project based on your earned value analysis.	
B	Why negotiations are important in Project Management? Why Win-Win strategy is adopted in project management for negotiations	
C	What does project audit tries to find out? How do project audit recommendations help the project? What are types of project audits based on the depth of audit?	

University of Mumbai
Examinations Summer 2022

Paper Code: 52257
Course Code: AEDLO8044
Time: 2-hour 30 minutes

Program Code: 1T00228
Subject Name: TM&MI
Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Which forms are required for transfer of ownership on death of owner
Option A:	Form no 29 & 30
Option B:	Form no 30 & 31
Option C:	Form no 30 & 32
Option D:	Form no 30 & 34
2.	For Vehicle scheduling how is the total requirements of buses calculated
Option A:	Running time(twice)+Stand time(twice)+maintenance time /Frequency of service
Option B:	Running time (twice)+maintenance time /Frequency of service
Option C:	Stand time(twice)+maintenance time /Frequency of service
Option D:	Running time (twice)+Stand time (twice) /Frequency of service.
3.	“Petroleum class C” means petroleum having
Option A:	having flashpoint below 30 ° C
Option B:	having flashpoint of 33 ° C and above but below 65 ° C
Option C:	having flashpoint of 30 ° C and above but below 90 ° C
Option D:	having flashpoint of 65 ° C and above but below 90 ° C
4.	Which of the following is not a segment of GPS
Option A:	Universe segment
Option B:	Space segment
Option C:	Control segment
Option D:	User segment
5.	Fill in the blank with proper option: Number Plates of Foreign Embassy or foreign diplomats should have
Option A:	White background & black letters
Option B:	Blue background & white letters
Option C:	Yellow background & black letters
Option D:	Yellow background & red letters
6.	Fill in the blank with proper option: “.....” means an omnibus, which is owned by a college, school or other educational institution and used solely for the purpose of transporting students or staff of the educational institution in connection with any of its activities
Option A:	Trainee Bus
Option B:	Educational Institution Bus
Option C:	Luxury Bus
Option D:	Taxi Bus
7.	In _____ method of fare fixation, all successive stages bear a fixed rate of charge.
Option A:	Tapered scale

Option B:	Concessional fare
Option C:	Universal/ Flat fare
Option D:	Straight line scale
8.	Which one of the following is not a duration to pay vehicle tax:
Option A:	Annually
Option B:	Half yearly
Option C:	Quarterly
Option D:	after every 05 months
9.	Which of the following vehicle get partial exemption in the tax?
Option A:	Private Bus
Option B:	Two Wheeler
Option C:	School Bus
Option D:	Private Car
10.	During Crew scheduling no worker is allowed to work for more than _____ in a day.
Option A:	8 hours
Option B:	6 hours
Option C:	4 hours
Option D:	12 hours

Q2 (20 Marks)	Solve any Two Questions out of Three	10 marks each
A	Explain the rules and regulations regarding construction of motor vehicle.	
B	What are requirements and problems on fleet management	
C	Write a detailed note on Management Information System (MIS) in Goods transport operation.	

Q3 (20 Marks)	Solve any Two Questions out of Three	10 marks each
A	What is the need of "Motor Accident Claim Tribunal" and explain its functioning in detail.	
B	Explain the bus and crew Scheduling in passenger transport operations	
C	State the procedure for registration of new vehicle and also for change of registration mark	

Q4. (20 Marks)	Solve any Four out of Six	10 marks each
A	Explain in detail Traffic navigation and Global positioning system.	
B	Explain Storage of petroleum products from refinery to pump outlets & transportation showing details about emergency information panel with neat sketch	
C	Explain the various term included in the surveyors report	

University of Mumbai
Examinations Summer 2022
Program: Automobile
Curriculum Scheme: Rev2016
Examination: BE Semester VII
Course Name: Vehicle Dynamics

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The flow blocking surfaces installed at the perimeter of the radiator, to improve flow through radiator at low vehicle speed is called as Option B: Radiator Option C:
Option A:	Car head
Option B:	Radiator
Option C:	Air blocker
Option D:	Air Dams
2.	The protuberance drag is due to
Option A:	front shield
Option B:	Roof
Option C:	wheel and wheel well
Option D:	Bonnet
3.	When stagnation point kept low on the frontal profile of vehicle, the drag obtained is
Option A:	produces lift
Option B:	no drag obtained
Option C:	Maximum
Option D:	Minimum
4.	For a given Tyre the cornering stiffness is dependent on following two main variables
Option A:	Tyre size and type of Tyre
Option B:	Number of plies and Cord angle
Option C:	Wheel width and tread design
Option D:	Load and inflation pressure
5.	When the slip angle is zero the lateral force generated by tyre is
Option A:	20
Option B:	1
Option C:	0
Option D:	8
6.	Due to application of lateral force acting on vehicle lateral load transfer is called as
Option A:	Roll steer
Option B:	Jounce
Option C:	Body roll
Option D:	Pitch
7.	If pivot point locates above locus points in antidive then
Option A:	front and rear will lift
Option B:	front and rear will under jounce
Option C:	front under jounce and rear will lift
Option D:	front will lift and rear will under jounce

8.	The vibration environment is the main important criteria by which people judge
Option A:	Ride Quality of car
Option B:	Cost of the car
Option C:	efficiency of the car
Option D:	looks of the car
9.	Incorrect steering axis inclination (S.A.I.) causes
Option A:	Tendency to assume toe-out orientation
Option B:	Generation of a braking effect at tight corners
Option C:	Poor recovery of the steering wheel after making a turn
Option D:	The vehicle to pull to the side of lesser inclination
10.	A traction control system in Automobile controls the
Option A:	Vibration on steering wheel
Option B:	Engine power during acceleration
Option C:	Torque that is transmitted by the tyres to the road surface
Option D:	Stopping distance in case of emergency

Q2. (20 Marks Each)	
A	Solve any Two 5 marks each
i.	Write a note on Tyre Magic Formula
ii.	Explain Maurice Olley's criteria for suspension frequency (Design considerations for a good ride)
iii.	Sketch and explain in detail about the "Mechanism of air flow around the vehicle".
B	Solve any One 10 marks each
i.	Find the double conjugate points for following data: Total Mass = 800kg, Sprung Mass = 727kg. Wheel base = 2.286m, Front/Rear weight distribution =63/37 Front suspension rate $k_1 = 21.7$ kN/m and Rear suspension rate $K_2 = 25.0$ kN/m
ii.	Derive equation for Double conjugate Points

Q3. (20 Marks Each)	
A	Solve any Two 5 marks each
i.	Write a note on Ride.
ii.	Write a note on Anti dive Geometry
iii.	Explain Active Suspension
B	Solve any One 10 marks each
i.	Find the geometry that would be necessary to achieve 100% anti squat in rear suspension and the geometry to achieve full anti pitch for the solid axel rear wheel drive vehicle describe below the design weight is 18046.43 N. The front and rear suspension rates are 24KN/m and 30 KN/m. The CG height is 0.632 and wheel base is 2.865.
ii.	Derive equation spring stiffness of interconnected suspension

Q4. (20 Marks Each)	
A	Solve any Two 5 marks each
i.	Explain Air suspension with neat sketch
ii.	Explain steering geometry errors
iii.	Explain how tractive force generated by tyre
B	Solve any One 10 marks each
i.	Locate Roll centre Graphically for <ul style="list-style-type: none"> - Hotchkiss suspension - Four link type suspension - Mcpherson strut suspension - Swing axle type suspension
ii.	Derive equation for pitching and bouncing Frequencies of vehicle

University of Mumbai

Examinations summer 2022

Course Code: AEC801and

Course Name: Vehicle Maintenance

Time: 2 hour 30 minutes

Max.Marks:80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The “W” in SAE 5W-20 means _____ .
Option A:	Weight
Option B:	Winter
Option C:	With
Option D:	Without
2.	The last step in the diagnostic procedure when attempting to solve an HVAC customer problem is _____ .
Option A:	Determine the root cause
Option B:	Verify the repair
Option C:	Recharge the system
Option D:	Perform a visual inspection
3.	To charge an air-conditioning system while it is running, the refrigerant should be added to ____ .
Option A:	the high side
Option B:	the low side
Option C:	both the high and low sides
Option D:	either the high or the low side
4.	R134a is a
Option A:	HFC
Option B:	CFC
Option C:	HFO
Option D:	CFO
5.	Which of the following provides passages for flow of cooling water?
Option A:	Connecting Rod
Option B:	cylinder head
Option C:	crank case
Option D:	piston
6.	An engine overheats at higher rpms and returns to normal temperature at lower rpms. Which of these could be the cause?
Option A:	A stuck-on cooling fan relay
Option B:	A worn water pump belt tensioner
Option C:	A restricted heater core
Option D:	An incorrect coolant concentration
7.	Low cylinder compression can not be caused by _____
Option A:	Worn camshaft bearings

Option B:	Blown head gasket
Option C:	Burned valves
Option D:	Worn Piston Rings
8.	A fuel-injected engine has low fuel pressure at the fuel rail test port. This could be caused by a
Option A:	restricted fuel filter
Option B:	restricted fuel injector.
Option C:	stuck-closed fuel pressure regulator
Option D:	shorted fuel injector
9.	The main function of an exhaust muffler is the
Option A:	Optimization of exhaust efficiency
Option B:	Reduction of exhaust noise
Option C:	Reduction of nitrogen oxide in the exhaust gases
Option D:	Reduction of the exhaust gas volume
10.	The information provided by the oxygen O2 sensor to the feedback control system is about the
Option A:	Air fuel ratio
Option B:	Air temperature
Option C:	Air flow speed
Option D:	Exhaust gas volume

Q2. (20 Marks)	Solve any Four out of Six5 marks each
A	What are the requirements of starting system of an automobile?
B	Explain the different components of final drive and state if any component malfunctions how it will affect the performance of vehicle?
C	What are the sources of differential noise and how it is diagnosed?
D	What is OBD-II and explain in detail.
E	What are the issues with automobile clutch which driver can come across and how they are resolved?
F	What do you mean by suspension system? What are the features of good suspension system?

Q3. (20 Marks)	Solve any Four out of Six5 marks each
A	Explain transaxle diagnosis.
B	What is headrest explain its need in automobile.
C	Describe how to make a performance test of an air conditioner and the meaning of the results.
D	Explain diagnosis of braking system in automobile?
E	Explain working of air-conditioning system in automobile.
F	Explain diagnosis of steering system in automobile.

Q4. (20 Marks)	Solve any Two Questions out of Three 10 marks each
A	Write short not on Exhaust gas re circulation and write a note on EGR trouble diagnosis.
B	What are requirements of starting system and explain its trouble shooting in detail.
C	Describe major service and rebuilding procedures performed on cylinder blocks with neat sketch