

University of Mumbai
Examination 2021

Program: Automobile Engineering
Curriculum Scheme: Rev 2016
Examination: BE Semester VIII

Course Code: AEC801

Course Name: Vehicle Maintenance

Time: 2 hour

Max. Marks: 80

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0106_R16_Auto_VIII_AEC801_QP

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Preventive maintenance contains?
Option A:	Road side work
Option B:	Duplicate parts
Option C:	Decrease vehicle life
Option D:	Skilled worker
2.	A three way catalytic converter
Option A:	Re-circulates exhaust gases
Option B:	Burns fuel vapor gases
Option C:	Reduce N ₂ ,H ₂ O,CO ₂ emission levels
Option D:	Removes CO,HC and NO ₂ from the exhaust gases passing through it
3.	When the brake pedal free play is less than the specified value then the?
Option A:	Brake drags
Option B:	Brake fade
Option C:	Anti lock braking system malfunctions
Option D:	Vapor locking occurs in the brake lines
4.	The main characteristics of maintenance free battery are that?
Option A:	A maintenance free battery require little maintenance during normal use and it is sufficient to add water instead of an electrolyte containing sulphuric acid
Option B:	A maintenance free battery has a relatively short life when compared with standard batteries
Option C:	Since, it is sealed the water in maintenance free battery is not lost through evaporation thus according it is not necessary to top up the cell with water
Option D:	Recharging a maintenance free battery is neither required nor possible
5.	The engine oil viscosity is defined by.....ratings.
Option A:	Automatic transmission fluid (ATF)
Option B:	Society of automotive engineers (SAE)
Option C:	Gross vehicle weight (GVW)
Option D:	American petroleum institute (API)
6.	Cylinder must be honed to minimum ofmm after boring
Option A:	0.03

Option B:	0.04
Option C:	0.05
Option D:	0.06
7.	In what year was On- board diagnostics II (OBD II) system enacted nation wide
Option A:	1973
Option B:	1981
Option C:	1975
Option D:	1986
8.	If the tyre is designated as 175/65 R-14 82 S then the aspect ratio of the tyre is
Option A:	175
Option B:	65
Option C:	14
Option D:	82
9.	The starter system includes
Option A:	A battery , A starter , and an Ignition switch
Option B:	A battery , A distributor , and an Ignition switch
Option C:	A battery , A starter , and a distributor
Option D:	A distributor , A starter , and an Ignition switch
10.	The purpose of thermostat in an engine cooling system is to?
Option A:	Prevent the coolant from boiling
Option B:	Allow the engine to warm up quickly
Option C:	Pressurizes the system to raise the boiling point
Option D:	Indicates the coolant temperature
11.	The main cause for the change in engine oil viscosity is?
Option A:	Humidity
Option B:	Temperature
Option C:	Vibration
Option D:	Contamination
12.	The object of air conditioning a car is to control therein the
Option A:	Temperature & Pressure
Option B:	Pressure & Humidity
Option C:	Humidity & Temperature
Option D:	Pressure & Volume
13.	On-board diagnostic II (O B D II) data are retrieved by connecting a scan tool to the
Option A:	Malfunction indicator lamp (M I L)
Option B:	Data link connector (D L C)
Option C:	Diagnostic trouble code (D T C)
Option D:	Power train control module (P C M)
14.	The purpose of the cylinder head gasket is

Option A:	Prevent the combustion gases from leaking from the joint between the cylinder block and cylinder head
Option B:	Prevent the engine oil from going in to combustion chamber
Option C:	Remove impurities from cylinder head lubricating oil
Option D:	Prevent the leakages of the oil
15.	Refrigerants used in automobile air conditioning system
Option A:	R-12
Option B:	R-134a
Option C:	R-22
Option D:	R-410a
16.	A state that intake valves are cooled while they are open. However B states that exhaust valves are heated while they are open. Who is right?
Option A:	A
Option B:	B
Option C:	Both are right
Option D:	Both are wrong
17.	What is the major difference between BS IV and BS VI
Option A:	BS IV fuels contain 80 ppm sulphur and BS VI fuels contain 60 ppm sulphur
Option B:	BS IV fuels contain 100 ppm sulphur and BS VI fuels contain 90 ppm sulphur
Option C:	BS IV fuels contain 50ppm sulphur and BS VI fuels contain 10 ppm sulphur
Option D:	BS IV fuels contain 150 ppm sulphur and BS VI fuels contain 110 ppm sulphur
18.	The most accurate ignition system of a spark ignition engine is?
Option A:	Magneto system
Option B:	Battery system
Option C:	Magneto and electronic system
Option D:	Electronic control unit system
19.	When replacing the starter which cable do you disconnect first
Option A:	Positive
Option B:	Negative
Option C:	Undefined
Option D:	Both positive & negative
20.	Which of the following will occur to an air conditioning system if the power steering is sharply moved from lock to lock while the engine is running?
Option A:	Pressure in the AC high side will increase
Option B:	Pressure in the AC low side will decrease
Option C:	The compressor will increase the pressure output
Option D:	The compressor clutch may disengage

Q2	Solve any Two out of Three (10 marks each)
A	Explain different components in lower end theory and also explain its servicing.

B	Explain different types of braking system with its trouble shooting and diagnosis.
C	Explain different types of cooling system with its trouble shooting and diagnosis.

Q3	Solve any Four out of Six (05 marks each)
A	Write short note on POWER WINDOW.
B	Write short note on preventive maintenance.
C	Write short note on Temperature control system.
D	Write short note on Jump- start battery.
E	Difference between O.B.D I & O.B.D.II.
F	Write short note on HORN.

University of Mumbai
Examination June 2021

Examinations Commencing from 1st June 2021

Program: **B.E. Automobile**

Curriculum Scheme: Rev2012

Examination: BE Semester VIII

Course Code: AEC801 and Course Name: Autotronics

Time: 2hours

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Specific gravity of an electrolyte in battery or cell is always
Option A:	Less than 1
Option B:	Equal to 1
Option C:	Greater than 1
Option D:	Less than 0.9
2.	If a battery is kept undercharged for long period of time it will become:
Option A:	Cycled
Option B:	Overheated
Option C:	Sulphated
Option D:	charged
3.	Two most common ways to produce hydrogen gas used in fuel cells are____
Option A:	Electrolysis and absorption
Option B:	Steam reforming and electrolysis
Option C:	Electromagnetism and quantum mechanics
Option D:	Thermal conductivity and refraction
4.	The positive plate of Ni-Cad battery is
Option A:	HNO ₃
Option B:	NaOH
Option C:	NiOOH
Option D:	Cd
5.	An alternator consists of:
Option A:	A stator, a rotor, sliprings, brushes, and diodes
Option B:	A stator, an armature, sliprings, brushes, and diodes
Option C:	A stator, a rotor, a commutator, brushes, and diodes
Option D:	A stator, a rotor, a field relay, brushes, and diodes
6.	What part of the AC generator is the rotating the magnetic field?
Option A:	Stator
Option B:	Rotor
Option C:	Brushes
Option D:	Poles

7.	Which of these are part of a starter motor except:
Option A:	An armature
Option B:	A commutator
Option C:	Field coils
Option D:	A regulator
8.	Bendix drive works on the principle of
Option A:	Inertia
Option B:	Magnetism
Option C:	Induction
Option D:	Alternating current
9.	Integrated Starter generator is mounted on
Option A:	Battery
Option B:	Camshaft
Option C:	Crankshaft
Option D:	Flywheel
10.	Which of these is not a torque term associated with starter motor
Option A:	Engine Breakaway Torque
Option B:	Engine Resisting Torque
Option C:	Motor locked Torque
Option D:	Cooling motor Torque
11.	The magnetic field collapses inside the ignition coil because of interruption of current to the__
Option A:	Primary winding
Option B:	Secondary winding
Option C:	Ignition control module
Option D:	Electronic control module
12.	Which one of these becomes the hottest part in spark plug?
Option A:	Metal shell
Option B:	Ground electrode
Option C:	Centre electrode
Option D:	Insulator
13.	What do we call the computer that controls distributorless ignition systems?
Option A:	Master Timing Unit (MTU)
Option B:	Engine Control Unit (ECU)
Option C:	Mesa Controller (MC)

Option D:	Plug Organizer (PO)
14.	What is an EGO sensor?
Option A:	a measure of the self-centeredness of the driver
Option B:	a device for measuring the oxygen concentration in the exhaust of an engine
Option C:	a spark advance mechanism
Option D:	a measure of crankshaft acceleration
15.	An optical crankshaft position sensor
Option A:	senses crankshaft angular position
Option B:	operates by alternately passing or stopping a beam of light from a source to an optical detector
Option C:	operates in a pulsed mode
Option D:	a line of constant magnetic flux
16.	Manifold Absolute pressure(MAP)sensor is located
Option A:	Near combustion chamber
Option B:	Near flywheel
Option C:	In intake manifold
Option D:	At throttle valve butterfly
17.	To know the camshaft position, type of sensor used is _____
Option A:	speed sensor
Option B:	current sensor
Option C:	angle sensor
Option D:	3D magnetic sensor
18.	Why turn signal lights are used?
Option A:	To produce ideal illumination inside the cabin of driver
Option B:	To provide facility of light for other road users
Option C:	To indicate an intended change in the direction by flashing lights on the side towards which the turn will be made
Option D:	to produce ideal road illumination at considerable distance
19.	What type of the device does the fuse is?
Option A:	Regulating device
Option B:	Display device
Option C:	Circuit Protection device
Option D:	Sensing Device
20.	What is an automotive embedded system?
Option A:	Computer system for electronic devices used in automotive.
Option B:	Module Control unit
Option C:	Advanced steering controls
Option D:	Systematic Driver control

Q2.	Solve any Two Questions out of Three 10 marks each
A	Explain the various cables, their sizes, color codes and wiring harness systems used in Automobiles.
B	What is need of 42V electrical system? Explain transition from 12 V to 42V system with its advantages and disadvantages.
C	Explain working of any two Intelligent vehicle systems with neat labeled diagram and also mention their applications.

Q3.	Solve any Two Questions out of Three 10 marks each
A	Explain various ways in which Battery is rated? Also explain various Battery charging methods in detail.
B	What is temperature sensor? Explain its types and functions in automobiles.
C	Differentiate between Alternator and Generator. Describe how rectification from AC-DC is done in Alternator.

University of Mumbai
Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Automobile Engineering**

Curriculum Scheme: Rev2012

Examination: BE Semester VIII

Course Code: AEC802 and Course Name: Vehicle Dynamics

Time: 2 hour

Max. Marks: 80

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Q1. (20 Marks)	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The total road load consists of
Option A:	Only rolling resistance
Option B:	Aerodynamic resistance and rolling resistance
Option C:	Aerodynamic resistance, rolling resistance and gradient resistance
Option D:	Rolling and gradient resistance
2.	Type of shock Absorber used in vehicles
Option A:	Telescopic type shock absorber
Option B:	Leaf spring
Option C:	friction type
Option D:	coil spring
3.	In aerodynamic resistance, the major contributor is
Option A:	Protuburence drag
Option B:	profile drag
Option C:	Skin drag
Option D:	side force
4.	conicity in tyre is
Option A:	manufacturing defect
Option B:	formation of cone during tyre rolling
Option C:	formation of cone during cornering
Option D:	formation of cone during accelerating
5.	Steering oscillations at high speed called as
Option A:	wheel tramp
Option B:	Wheel Shimmy
Option C:	wheel wobble
Option D:	Wheel spin
6.	Basic stability derivatives are _____ in number.
Option A:	6
Option B:	8
Option C:	12
Option D:	3

7.	Jack knifing of articulated vehicles means
Option A:	sliding of trailer wheels
Option B:	Sliding of tractor wheels
Option C:	sliding of tractor and trailer wheels
Option D:	jacking of wheels
8.	Tubeless tyre is preferred because
Option A:	they give soft ride
Option B:	they give hard drive
Option C:	load carrying capacity is more
Option D:	rolling resistance is more
9.	Oversteer means
Option A:	less amount of turning of wheel than required
Option B:	more amount of turning of wheel than required
Option C:	the amount of turning of wheel as required
Option D:	none of the above
10.	Complete the equation, $Y\delta =$
Option A:	CF
Option B:	-CR
Option C:	-CF
Option D:	CR
11.	The vertical force in aerodynamics is called as
Option A:	Drag
Option B:	Lift
Option C:	side force
Option D:	profile drag
12.	The product of pneumatic trail to resultant force generated by tyre is called as
Option A:	Moment
Option B:	Aligning torque
Option C:	cornering force
Option D:	cornering power
13.	Calculate $Y\beta$ if $CF = 40000 \text{ N/rad}$ and $CR = 30000 \text{ N/rad}$
Option A:	10000 N/rad
Option B:	$12 \times 10^8 \text{ N/rad}$
Option C:	70000 N/rad
Option D:	1.33
14.	For tyre to roll on road, the mechanisms important are
Option A:	hysteresis adhesion and velocity
Option B:	adhesion and force
Option C:	hysteresis and velocity
Option D:	Hysteresis and adhesion
15.	Sprung mass of vehicle consists of
Option A:	body and chassis

Option B:	Wheels, body and chassis
Option C:	only transmission elements
Option D:	body, chassis and transmission elements
16.	The steering gear ratio for truck is about
Option A:	15
Option B:	10
Option C:	36
Option D:	18
17.	The geometry that eliminates diving of vehicle during braking is called as
Option A:	Anti pitch geometry
Option B:	Anti dive geometry
Option C:	Anti roll geometry
Option D:	Steering geometry
18.	The unsprung mass of vehicles is kept
Option A:	high
Option B:	medium
Option C:	low
Option D:	Equal to sprung mass
19.	The first mode of tyre resonances is at _____ Hz
Option A:	60 Hz
Option B:	90 Hz
Option C:	110 Hz
Option D:	200 Hz
20.	Calculate $N\delta$, If $CF = 40000$ N/rad and $a = 1.2$ m
Option A:	48000
Option B:	- 48000
Option C:	40000
Option D:	40000

Q2. (20 Marks)	
A	Solve any Two 5 marks each
i.	Explain Roll Centre and roll axis
ii.	Write a note on Anti dive Geometry
iii.	Explain Semiactive Suspension.
B	Solve any One 10 marks each
i.	Derive equation for steady state yawing response to steering Input.
ii.	Derive Equations for Basic stability Derivatives

Q3. (20 Marks)	
A	Solve any Two 5 marks each
i.	Explain wheel shimmy and wobble
ii.	Write a note on tyre vibrations
iii.	Explain four wheel steering.
B	Solve any One 10 marks each
i.	<p>Calculate the Conjugates points for following data-:</p> <p>Total mass – 1000 Kg, Sprung Mass – 850 Kg, Wheel base – 2.2 meter, Front/Rear weight – 65/35, Front Suspension – 21.7 Kn/mt, Rear Suspension – 25 Kn/mt,</p> $\frac{K^2}{L_1 \cdot L_2} = 1.0$
ii.	<p>A lateral force of 300 N acting on the vehicle at its C.G. What would be the steering angle of the front wheel to cancel the effect of lateral force on the vehicle in motion.</p> <p>Mass of vehicle – 2500 Kg, Wheel Base – 3 meter, Distance of C.G. from front axle – 1.75 meters, $C_F = -80000$ N/rad, $C_R = -84000$ N/rad, Speed – 50 Kmph.</p>

University of Mumbai
Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Automobile Engineering**

Curriculum Scheme: Rev2016/

Examination: BE Semester VIII

Course Code: AEC 802 and Course Name: Vehicle Dynamics

Time: 2 hour

Max. Marks: 80

Q1. (20 Marks)	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	What does the 'ply rating' refer to?
Option A:	Aspect ratio
Option B:	Rated strength
Option C:	Recommended inflation pressure
Option D:	The actual number of plies
2.	The steep angles of wind shield leads to
Option A:	increase in drag
Option B:	decrease in drag
Option C:	no change in drag
Option D:	increase or decrease of drag
3.	The main principle behind Guest's theory is
Option A:	both the points will have coupled motions
Option B:	Both the points will have different motions
Option C:	Forces acting at both points will give vibratory motion
Option D:	Forces acting at one point does not affect other point
4.	If one of the conjugate point is at mass center , then other point is at
Option A:	mass center only
Option B:	infinity
Option C:	spring center
Option D:	rear axle
5.	Slip angle produced because of.....
Option A:	Cornering force
Option B:	Turning of vehicle
Option C:	Tyre deformation
Option D:	All of the above
6.	In four wheeled vehicle, the double conjugate points are at
Option A:	drivers cabin
Option B:	front axle
Option C:	front and rear axle
Option D:	Rear axle
7.	The ride rate or combined stiffness of front suspension should be _____ lower than the

	rear suspension
Option A:	0.5
Option B:	0.75
Option C:	0.3
Option D:	0.2
8.	In actual, for vehicle to have better ride keep
Option A:	pitch center in front of front axle and bounce center behind the rear axle
Option B:	pitch center in back of front axle and bounce center behind the rear axle
Option C:	pitch center in front of front axle and bounce center front the rear axle
Option D:	pitch center and bounce center behind the rear axle
9.	The single mass two degrees of freedom system 's two natural frequencies are
Option A:	rolling and pitching
Option B:	pitching and yawing
Option C:	bouncing and rolling
Option D:	pitching and bouncing
10.	Lateral Force produced because of
Option A:	Cornering force
Option B:	Tyre deformation
Option C:	Normal reaction
Option D:	Centrifugal force
11.	A moving system can be represnt as
Option A:	elastic system
Option B:	Dynamic system
Option C:	Elastic and dynamic system
Option D:	kinetic system
12.	The aerodynamic drag is produced when _____ layer will form due to friction
Option A:	seperation
Option B:	laminar
Option C:	boundry
Option D:	Turbulent
13.	the formula, $0.5 * \text{density} * (\text{Velocity}^2)$ is
Option A:	static pressure
Option B:	dynamic pressure
Option C:	internal pressure
Option D:	external pressure
14.	The plies are referred to as
Option A:	Beads
Option B:	Tread
Option C:	Cords
Option D:	Carcass
15.	Toe-in position of tyre is provides in.....
Option A:	Three Wheeler

Option B:	Racing Car
Option C:	Heavy duty vehicles
Option D:	Two wheeler
16.	The main advantage of independent suspension is
Option A:	no camber change
Option B:	High Roll stiffness
Option C:	friction between springs
Option D:	low antidive characteristics
17.	The function of suspension system is
Option A:	To absorb shocks
Option B:	To control speed
Option C:	to have directional control
Option D:	to reduce friction
18.	Road roughness is
Option A:	Excitation source
Option B:	Vehicle Dynamics
Option C:	implicit function
Option D:	Explicit Function
19.	Oxygen sensor is located
Option A:	Before Intake manifold
Option B:	Before Catalytic converter
Option C:	Near Exhaust manifold
Option D:	Inside combustion chamber
20.	Yawing moment means vehicle try to rolls along.....
Option A:	X-axis
Option B:	Y-axis
Option C:	Z-axis
Option D:	Steering Axis

Q2 (20 Marks)	
A	Solve any Two 5 marks each
i.	Write short note on Roll center & Roll axis.
ii.	Write short note on Wheel wobble and wheel shimmy.
iii.	Explain in short Slip angle.
B	Solve any One 10 marks each
i.	Derive an equation to find bouncing and pitching frequencies.
ii.	Calculate the Conjugates points for following data-: Total mass – 1000 Kg, Sprung Mass – 850 Kg, Wheel base – 2.2 meter, Front/Rear weight – 65/35, Front Suspension – 21.7 Kn/mt, Rear Suspension – 25 Kn/mt, $\frac{K^2}{L_1 \cdot L_2} = 1.0$

Q3. (20 Marks)	Solve any Two Questions out of Three 10 marks each
A	Explain interconnected suspension with diagram. Why it is used in automobiles and how it is achieved?
B	What are the tractive properties of tyre and how it affects vehicle performance?
C	A lateral force of 300 N acting on the vehicle at its C.G. What would be the steering angle of the front wheel to cancel the effect of lateral force on the vehicle in motion. Mass of vehicle – 2500 Kg, Wheel Base – 3 meter, Distance of C.G. from front axle – 1.75 meters, $C_F = -80000$ N/rad, $C_R = -84000$ N/rad, Speed – 50 Kmph.

University of Mumbai
Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Automobile Engineering**

Curriculum Scheme: Rev2016

Examination: BE Semester VIII

Course Code: AEC803 and Course Name: Vehicle Safety

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	_____ feature protects the occupants of a vehicle if a crash occurs.
Option A:	Dummies Testing
Option B:	Crash Test
Option C:	Passive safety
Option D:	Active Safety.
2.	Backup (extra) tyre of a vehicle is an example of_____
Option A:	Redundancy
Option B:	Derating
Option C:	Fault Tolerance
Option D:	Fail safe
3.	Multiple brake lights is an example of_____
Option A:	Alternative Design
Option B:	Derating
Option C:	Redundancy
Option D:	Fail safe
4.	A crash test in which Dummies were used to gather human data is called_____
Option A:	Cadaver testing
Option B:	Dummies Testing
Option C:	Cadaver testing
Option D:	Pole testing
5.	Whiplash injury is typically associated with _____
Option A:	Frontal crash
Option B:	Side crash
Option C:	Rear crash
Option D:	Diagonal side crash
6.	The vehicle driver may have difficulty judging his speed and that of other drivers without looking at a speedometer. This error is called as _____
Option A:	Judgmental errors
Option B:	Anthropomorphically induced errors
Option C:	Over steering errors

Option D:	Braking errors
7.	Identify the approach which believes that there is usually more than one cause of an accident or a human error.
Option A:	The multifactoral approach
Option B:	The behavioral approach
Option C:	The situational approach
Option D:	The passive approach
8.	Head Restraint is effective in reducing _____ injury
Option A:	Leg
Option B:	Chest
Option C:	Femur
Option D:	Whiplash
9.	The safest place for infants is in the back seat in an approved _____ infant car seat.
Option A:	Front facing
Option B:	Rear facing
Option C:	Side facing
Option D:	Inclined
10.	Vehicle Momentum is defined as the product of _____
Option A:	mass and force
Option B:	force and velocity
Option C:	mass and velocity
Option D:	mass and acceleration
11.	Autonomous emergency braking (AEB) is a _____ Safety device.
Option A:	Driver
Option B:	Child occupant
Option C:	Passenger
Option D:	Pedestrian
12.	What is the long form of HUD?
Option A:	Here up Display
Option B:	Head up Display
Option C:	Here up Down
Option D:	Horizontal up Display
13.	Quasistatic Seat Test (QST) is used to determine _____ of the seats
Option A:	High retention
Option B:	comfort
Option C:	cushioning
Option D:	loading
14.	Pedestrian Safety can be improved by
Option A:	Air bags
Option B:	Seat belts
Option C:	Rounded vehicle shape

Option D:	Head restraint
15.	What area of a car is designed to deform in a collision?
Option A:	the interior
Option B:	the crumble zone
Option C:	the chassis
Option D:	the door
16.	From following Which system carries camera?
Option A:	Traction control system.
Option B:	Electronic Stability Program.
Option C:	Low tire pressure warning system.
Option D:	Collision avoidance systems.
17.	IRC:2-1968 standard is related to
Option A:	Recommended Practice for the Design and Layout of Cycle Tracks (First Revision)
Option B:	Type Designs for Highway Kilometre Stones (Second Revision)
Option C:	Route Marker Signs for National Highways (First Revision)
Option D:	Standard Letters and Numerals of Different Heights for Use on Highway Signs
18.	IS 13389 : 1992 standard is related to
Option A:	Automotive vehicle - Safety requirements for side door of passenger cars
Option B:	Road vehicles - Collision classification - Terminology (First Revision)
Option C:	Road vehicles - Passenger cars - Moving barrier rear collision test method
Option D:	Automotive vehicles - Procedure for determining the "H" point and the torso angle for 50th percentile adult male in seating positions of motor vehicles
19.	AIS-016 / 2000 standard is related to
Option A:	Performance Requirements for Reversing Lamps for Motor Vehicles
Option B:	Automotive Vehicles – Seats, their Anchorages and Head Restraints for Category M1 – Specifications.
Option C:	Automotive vehicles – Interior Noise – Method of Measurement and Requirements
Option D:	Automotive Vehicles – Safety Belt Anchorages – Specifications
20.	AIS-006 standard is related to
Option A:	Automotive Vehicles – Rear – View Mirrors – Installation Requirements
Option B:	Automotive Vehicles – Starting Grade ability – Method of Measurement and Requirements.
Option C:	Automotive Vehicles – Safety Belt Assemblies – Specifications.
Option D:	Automotive vehicle-Bumper Fitment on M1 Vehicles – Test Methods.

Q2. (20 Marks)	Solve any four	5 marks each
i.	Explain the purpose of Vehicle Safety.	
ii.	What do you understand by universal design?	
iii.	How does the Traction control system help keep vehicles safe>	
iv.	Explain the term Risk communication.	
v.	Discuss any one occupant protection system.	
vi.	Discuss the functioning of Antilock braking System.	

Q3. (20 Marks)	Solve any Two	10 marks each
i.	Explain the significance of rear crash safety.	
ii.	What is Photogrammetry in the context of accident reconstructions?	
iii.	Explain Ultra high Retention seats. And compare with normal seats.	

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Automobile Engineering**

Curriculum Scheme: Rev 2016

Examination: BE Semester VIII

Course Code: AEDLO8043 and Course Name: Product Design & Development

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	In Morphology of design which is the first stage
Option A:	Feasibility study
Option B:	Preliminary Design
Option C:	Detail design
Option D:	Planning for manufacture
2.	Which of these stages is not related to product life cycle
Option A:	Introduction
Option B:	Growth
Option C:	Maturity
Option D:	Prelaunch
3.	Generally the number of stages in product life cycle are
Option A:	10
Option B:	9
Option C:	8
Option D:	4
4.	The first stage in product life cycle is
Option A:	Introduction
Option B:	Growth
Option C:	Maturity
Option D:	Decline
5.	The Taguchi Approach is most closely associated with:
Option A:	Total Quality Management
Option B:	Concurrent engineering
Option C:	Quality function deployment
Option D:	Robust design
6.	The Trade secret stands for
Option A:	A right conferred by government
Option B:	A part of the vigilance by the firm for securing its property information.
Option C:	A license issued by a certifying agency
Option D:	An approval of its product by ISO

7.	Which of the following is not an intellectual property
Option A:	Legally protectable ideas
Option B:	Legally protectable concepts
Option C:	Legally protectable design
Option D:	Legally protectable goods
8.	Which of these is not a method used maximize ease of Assembly
Option A:	Part is inserted from the top of the assembly
Option B:	Part is self-aligning
Option C:	Part is defective
Option D:	Part is secured immediately upon insertion
9.	Which of the following is not included in guidelines for DFA and DFM
Option A:	the mating parts for easy insertion
Option B:	Standardize parts to reduce variety
Option C:	Parts should easily indicate orientation for insertion
Option D:	Defective parts to be included
10.	Which method is used in design for manufacturing
Option A:	Differential
Option B:	Integrated
Option C:	Derivative
Option D:	Substitution
11.	Industrial Design is protected in India by
Option A:	Design Patent
Option B:	Un-registered Design
Option C:	Industrial Design Registration
Option D:	Patent
12.	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
13.	Value analysis does not refer to which of the following value?
Option A:	Functional value
Option B:	Spiritual value
Option C:	Esteem value
Option D:	Exchange value
14.	Concurrent engineering deals with carrying out the following activities at the same time while designing the product:
Option A:	Design and Sales
Option B:	Manufacturing and Sales
Option C:	Design and Re-engineering
Option D:	Design and Manufacturing

15.	Quality Function Deployment (QFD) is largely focused on:
Option A:	To reduce the number of parts in a product
Option B:	Ensuring that the eventual design of a product or service meets customer needs
Option C:	Testing the robustness of a design
Option D:	Reducing costs and preventing unnecessary costs prior to production
16.	Reverse engineering is the process of :
Option A:	Translating executable code back into a higher-level language
Option B:	Using a product as a major part of a new product
Option C:	Analyzing a product to determine its original design
Option D:	Studying the original design of the product
17.	Which design consideration deals with appearance of the Product?
Option A:	Ergonomics
Option B:	Aesthetics
Option C:	System design
Option D:	Creative design
18.	Which physiological factor affects ergonomics?
Option A:	Fatigue
Option B:	Temperature
Option C:	Furniture design
Option D:	Leg Length
19.	The meaning of blue colour is
Option A:	the component is hot
Option B:	the component is cold
Option C:	the component is safe
Option D:	there is possible danger
20.	A temporary monopoly granted by a government to an inventor to exclude others from using an invention is known as
Option A:	Trademark
Option B:	Copyright
Option C:	Ownership
Option D:	Patent

Q.2 (20 Marks Each)	Solve any Two Questions out of Three 10 marks each
A	Explain the significance of product life cycle.
B	Explain the steps in concept generation.
C	Explain the methods of design for manufacturing and assembly with suitable examples.

Q.3 (20 Marks Each)	Solve any Two Questions out of Three 10 marks each
A	Explain value engineering and value analysis.
B	Explain psychological and physiological considerations in automobile product design.
C	With the help of neat sketch explain any one rapid prototyping technique.

University of Mumbai
Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Automobile Engineering**

Curriculum Scheme: Rev2016

Examination: BE Semester VIII

Course Code: AEDLO8044 and Course Name: Transport Management and Motor Industry

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Fill in the blank with proper option: “.....” means a motor vehicle to which a semi-trailer is attached.
Option A:	Joint vehicle
Option B:	Articulated vehicle
Option C:	Split vehicle
Option D:	Floating vehicle
2.	Fill in the blank with proper option: “.....” means in relation to an axle of a vehicle the total weight transmitted by the several wheels attached to that axle to the surface on which the vehicle rests.
Option A:	Dead weight
Option B:	Unladen Weight
Option C:	Axle weight
Option D:	Body weight
3.	What type of vehicle class does Maruti Car belong to?
Option A:	Heavy Commercial Vehicle
Option B:	Medium Goods Vehicle
Option C:	Light Motor Vehicle
Option D:	Motorcycle
4.	If registration number of vehicle is ‘MH04P2732’, what does the letter ‘P’ indicate in this?
Option A:	State to which the vehicle has been registered
Option B:	RTO office where vehicle has been registered
Option C:	Series Code for particular Class of the Vehicle
Option D:	Manufacturing Year
5.	Which form is used for self declaration of physical fitness at the time of applying for Learner’s License?
Option A:	Form 01
Option B:	Form 01-A
Option C:	Form 02
Option D:	Form 03
6.	What is the Form 21?
Option A:	Renewal of Driving License

Option B:	To intimate the loss or destruction of Driving License and application for duplicate
Option C:	Application for Registration of a Motor Vehicle
Option D:	Sale Certificate
7.	Which one of the following is not duration to pay vehicle tax?
Option A:	Annually
Option B:	Half yearly
Option C:	Quarterly
Option D:	after every 05 months
8.	Tax on the movement of goods from one state to another imposed by the state governments is called as
Option A:	Octroi tax
Option B:	Entry tax
Option C:	Professional tax
Option D:	Passenger tax
9.	Ambulance working on no loss no profit basis are exempted of tax
Option A:	1/3 of annual rate
Option B:	100%
Option C:	2/3 of annual rate
Option D:	3/4 of annual rate
10.	What type of insurance is compulsory for all vehicles?
Option A:	Comprehensive insurance
Option B:	Building insurance
Option C:	Zero depreciation comprehensive insurance
Option D:	Third party insurance
11.	What is Solatium Fund?
Option A:	A scheme formed by the Central Government to compensate victims of car theft
Option B:	A scheme formed by the State Government to compensate victims of car theft
Option C:	A scheme formed by the State Government to compensate victims of hit-and-run car accidents.
Option D:	A scheme formed by the Central Government to compensate victims of hit-and-run car accidents.
12.	What type of matters does MACT deal with?
Option A:	Matters related to compensation of motor accidents victims or their next of kin
Option B:	Matters related to Stage Carriage Permit allocation
Option C:	Matters related to theft of the vehicle
Option D:	Matters related to fire insurance
13.	What is the role of Surveyor in case of Motor Vehicle Insurance?
Option A:	To complete the documentation process of registration of new vehicle
Option B:	To complete the documentation process for obtaining the Learner's License
Option C:	To finalize the maximum retail price of new vehicle being sold
Option D:	To assess the extent of loss in case of motor vehicles accident

14.	The place where buses are kept and maintained is called
Option A:	Terminus
Option B:	Bus stand
Option C:	Route
Option D:	Depot
15. is still the major means of Rural transport in India.
Option A:	Bullocks cart
Option B:	Taxi
Option C:	City Bus service
Option D:	Local Trains
16. is the process of selecting path which achieves some predefined purpose in transport network.
Option A:	Transit scheduling
Option B:	Transit routing
Option C:	Category analysis
Option D:	Probit analysis
17.	BRTS is a highly efficient concept designed to meet growing transport demands in cities around the world.
Option A:	Para-transit
Option B:	Public transport
Option C:	Private transport
Option D:	Water transport
18.	How many gauges are there in India railway track?
Option A:	1
Option B:	2
Option C:	3
Option D:	4
19.	Which fuel cannot be transported through pipes?
Option A:	Natural gas
Option B:	Petrol
Option C:	Diesel
Option D:	Coal
20.	Which of the following is not a function of GPS?
Option A:	To help for planning war strategy by measuring the count of weapons available
Option B:	To provide worldwide position, time and velocity information
Option C:	To precisely identify locations on the earth
Option D:	To record or create locations from places on the earth and help you navigate to and from those places

Q2.	Solve any Two Questions out of Three	(10 marks each)
A	Explain traffic signs, signals & controls.	
B	Explain the procedure of taxation on motor vehicle.	
C	What is insurance? What are its types? Explain motor vehicle insurance in detail.	

Q3.	Solve any Two Questions out of Three (10 marks each)
A	Explain theory of fares for basic principles of fare charging.
B	How different factors affect the scheduling of goods transport operation?
C	Explain GPS in detail.

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: IT01028

Curriculum Scheme: Rev2016

Examination: BE Semester VIII

Course Code: 52965 and Course Name: Environmental Management

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Which of the following salts is the main cause of permanent hardness of water?
Option A:	Magnesium sulphate
Option B:	Magnesium bicarbonate
Option C:	Magnesium carbonate
Option D:	Potassium sulphate
2.	Which of the following is incorrect, if we only achieve two out of three pillars of Sustainable Development?
Option A:	Social + Economic Sustainability = Equitable
Option B:	Social + Environmental Sustainability = Bearable
Option C:	Economic + Environmental Sustainability = Viable
Option D:	Political + Environmental Sustainability = Bearable
3.	In a food chain animals constitute the:
Option A:	First trophic level
Option B:	Second trophic level
Option C:	Intermediate trophic level
Option D:	Ultimate trophic level
4.	What are the Primary Goals of Sustainability? i. The end of poverty and hunger ii. Better standards of education and healthcare - particularly as it pertains to water quality and better sanitation iii. To bring about a gradual and sometimes catastrophic transformation of the environment iv. Sustainable economic growth while promoting jobs and stronger economies
Option A:	i,ii,iv
Option B:	i,ii,iii
Option C:	i,iii,iv
Option D:	ii,iii,iv
5.	How many percentage of fissionable U-235 occurring in uranium?
Option A:	0.20%
Option B:	0.70%
Option C:	1.00%

Option D:	1.50%
6.	Which of the following is NOT a problem caused by deforestation?
Option A:	Loss of biodiversity
Option B:	Hurting the economy
Option C:	The harming of many indigenous peoples
Option D:	Creating political and social issues
7.	Biodiversity is important for a variety of reasons i. promotes healthier, maintained ecosystems that provide services to us ii. genetic variety of crops, livestock, and marine organisms iii. There are too many animal species on the world iv. ensures that humans are provided with a healthy, nutrient rich diet
Option A:	i,ii,iv
Option B:	i,ii,iii
Option C:	i,iii,iv
Option D:	ii,iii,iv
8.	The reason of Arc blast is
Option A:	Poor contact within electrical wire splices
Option B:	Radio frequency emissions from high-power transmitters
Option C:	Discharge of high electrical current through open air
Option D:	Failure to lock-out and tag-out electrical breakers
9.	Match the following: Earth Spheres Characteristics a. Hydrosphere 1. It lies above 50 km which coincides with the thermosphere b. Lithosphere 2. Earth's crust and a lower portion of the mantle c. Biosphere 3. Earth's water which exists in both fresh and saline form d. Ionosphere 4. Zone incorporating elements of the hydrosphere, lithosphere and atmosphere
Option A:	a= 1 b=2 c=3 d=4
Option B:	a= 4 b=23 c=2 d=1
Option C:	a= 3 b=2 c=4 d=1
Option D:	a= 1 b=4 c=2 d=3
10.	Plant species with a wide range of genetic distribution evolve into a local population known as
Option A:	Ecotype
Option B:	population
Option C:	Ecosystem
Option D:	Biome
11.	Name the group of species which exploit the abiotic and biotic resources in a similar way?

Option A:	Guild
Option B:	Ecads
Option C:	Biomes
Option D:	Community
12.	The Montreal Protocol, finalized in 1987, is a global agreement to protect
Option A:	Hydrosphere
Option B:	Ionosphere
Option C:	Biosphere
Option D:	Stratospheric ozone layer
13.	Lichens are good bioindicators for
Option A:	Environmental radiation
Option B:	Soil pollution
Option C:	Water and air pollution
Option D:	Evolution
14.	Opportunities for social innovation are greatest when
Option A:	CSR is aligned with a firm's core skills and capabilities.
Option B:	CSR spending of a firm is larger than that of its competitors.
Option C:	CSR is pursued by a firm to improve its reputation.
Option D:	CSR is pursued by a firm to enhance human capital.
15.	Environment Impact assessment(EIA) is done
Option A:	Before the project
Option B:	After the project
Option C:	During the project
Option D:	Any time in life cycle of project
16.	Match the following: Column "A" Column "B" (i) Montreal Protocol (a) 1974 (ii) Air (Prevention and Control of Pollution) Act (b) 1986 (iii) The Environment Protection Act (c) 1987 (iv) The Water (Prevention and Control of Pollution) Act (d) 1981
Option A:	i-a, ii-d, iii-b, iv-c
Option B:	i-c, ii-b, iii-d, iv-a
Option C:	i-c, ii-d, iii-b, iv-a
Option D:	i-c, ii-d, iii-a iv-b
17.	What are the implementation structures of Biodiversity Act - 2002
Option A:	A two tiered structure has been established under the Act at the national and state levels.
Option B:	A three tiered structure has been established under the Act at the national, state and local levels.
Option C:	A four tiered structure has been established under the Act at the national, state, district and local levels.
Option D:	Not structured
18.	Which document provides guidance on auditing management systems?
Option A:	ISO 9000

Option B:	ISO 9001
Option C:	ISO 9002
Option D:	ISO 19011
19.	Within ISO 14001, what do “can” refer to?
Option A:	A requirement
Option B:	A recommendation
Option C:	A permission
Option D:	A possibility or a capability
20.	Which is the most recent pronouncement of the government’s commitment to improving environmental conditions?
Option A:	National Environmental Policy
Option B:	National Water Policy
Option C:	Environment Act
Option D:	Air Policy

Q2 (20 Marks)	
A	Solve any Two 5 marks each
i.	What is meant by disaster? Differentiate between Industrial disaster and Manmade disaster.
ii.	Explain food chain with respect to four major parts. Give examples of food chain
iii.	What are the stages of the EMS lifecycle process?
B	Solve any One 10 marks each
i.	Discuss the consequences of deteriorating air quality on humans, plants and animals.
ii.	What all are components of environment? Define each component.

Q3 (20 Marks)	
A	Solve any Two 5 marks each
i.	Explain Global warming. How does it take place?
ii.	Explain in detail what is Environmental Quality Management?
iii.	Give a brief account of Air (P&CP Act).
B	Solve any One 10 marks each
i.	What is meant by habitat? What are its types? Elaborate on them.
ii.	Classify Ecosystems and explain them in detail.

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: Mechanical Engineering

Curriculum Scheme: Rev 2016

Examination: BE Semester VIII

Course Code: ILO 8021 and Course Name: Project Management

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Projects are unique and temporary, while operations are
Option A:	Specific And Targeted
Option B:	Ongoing and Permanent with a Repetitive Output
Option C:	Unique And Permanent With Non-Repetitive Outputs
Option D:	Ongoing And Temporary
2	From a practical perspective, what is the most important element of a good project communication management approach?
Option A:	Setup a regular and frequent method for communicating with team members and stakeholders and then follow it.
Option B:	Conduct one-on-one meetings (face-to-face or virtual) with project team members every week.
Option C:	Ensure all project communication between team members and stakeholders goes through the Project Leader so that there is no opportunity for misunderstanding.
Option D:	Telephonic conversation, and Emails
3.	The lowest element in the hierarchical breakdown of the WBS is
Option A:	Work package
Option B:	Responsibility matrix
Option C:	Bottoms up budget
Option D:	Deliverable
4.	Use of PMIS is comparatively less in this process group of project management
Option A:	Initiating
Option B:	Executing
Option C:	Monitoring and Controlling
Option D:	Planning
5.	Which of the following represents the estimated value of the work actually accomplished?
Option A:	Earned value (EV)
Option B:	Planned value (PV)
Option C:	Actual cost (AC)
Option D:	Cost variance (CV)
6.	_____ is the discounting rate, which delivers a Net Present Value equal to zero
Option A:	ARR

Option B:	IRR
Option C:	NPV
Option D:	Profitability Index
7.	Project is stopped due to either its successful or unsuccessful conclusion. Auditing, team on new assignment, assets transferred as per policy is known as :
Option A:	Extinction
Option B:	Addition
Option C:	Integration
Option D:	Starvation
8.	The process of partnering is an attempt to mitigate the risk associated with
Option A:	Networking
Option B:	Uncertainty
Option C:	Risks
Option D:	Subcontracting
9	Project Risk = _____* Consequences of Event. None of the above
Option A:	Loss
Option B:	Outcomes of Event
Option C:	Probability of Event
Option D:	Profit
10.	What is the correct sequence of stages in group development
Option A:	Forming, Norming, Performing, Storming, Adjourning
Option B:	Forming, Norming, Storming, Performing , Adjourning
Option C:	Forming, Storming, Norming, Performing , Adjourning
Option D:	Forming, Performing, Norming, Storming , Adjourning
11.	An activity has an optimistic time 11 days, a most likely time of 15 days, and a pessimistic time of 23 days. What is its variance?
Option A:	15.6
Option B:	16.33
Option C:	4
Option D:	2
12.	What are the determinants of project success as per Iron Triangle?
Option A:	Resources, Cost, Performance
Option B:	Knowledge, Time, Resources
Option C:	Cost, Skills, Performance
Option D:	Cost, Performance, Time
13	What is the correct sequence for the following processes of Project Risk Management: 1. Plan Risk Management; 2. Perform Qualitative Risk Analysis; 3. Identify Risks; 4. Perform Quantitative Risk Analysis; 5. Plan Risk Responses;

	6. Control Risks
Option A:	1-2-3-4-5-6
Option B:	1-3-2-4-5-6
Option C:	1-3-4-2-5-6
Option D:	3-1-2-4-5-6
14.	Arrange the following elements of the Project Cycle in the right order: A- Project Appraisal B- Feasibility Analysis C- Negotiation D- Project Selection
Option A:	A-B-C-D
Option B:	B-A-C-D
Option C:	B-A-D-C
Option D:	B-C-A-D
15.	An activity takes 4 days to complete at a normal cost of Rs.500. If it is possible to complete the activity in 2 days with an additional cost of Rs.700, what is the incremental cost of activity.
Option A:	100
Option B:	125
Option C:	1000
Option D:	250
16.	In PERT/CPM, slack time is :
Option A:	Is the amount of time a task may be delayed without changing the overall project completion time
Option B:	Is the latest time an activity can be started without delaying the entire project
Option C:	Is a task or subproject that must be completed
Option D:	Marks the start or completion of a task
17.	The review of the successes and the mistakes is normally held during _____ phase.
Option A:	Initiation
Option B:	Planning
Option C:	Execution
Option D:	Closure
18.	Cost performance index value is less than 1 indicates :
Option A:	Cost under run
Option B:	Cost overrun
Option C:	Cost average
Option D:	Cost Variance
19.	Why does scope creep cause a delay on a project?
Option A:	The project resources are doing the scope creep work and not the originally planned work, causing the originally planned tasks to be delayed.
Option B:	Project work is postponed until the magnitude of scope creep is defined.
Option C:	Scope creep causes task estimates to increase.
Option D:	Scope creep causes cost estimates to increase.

20.	Goldratt's critical chain method is based on																																																							
Option A:	Theory of constraints																																																							
Option B:	Critical path method																																																							
Option C:	Supply of raw material in time																																																							
Option D:	Use of concurrent engineering principle																																																							
Q.2	Solve any Four out of Six . 5 Marks Each																																																							
A	What are the knowledge areas and process groups in Project Management as per PMI?																																																							
B	Explain various project selection models.																																																							
C	What is Goldratt's critical chain method?																																																							
D	<p>Determine the net present value for a project that costs Rs. 2,40,000/- would yield after tax cash flows as follows. Assume cost of capital is 10%</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Year</th> <th>CASH Flow in Rs.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>25,000</td> </tr> <tr> <td>2</td> <td>75,000</td> </tr> <tr> <td>3</td> <td>80,000</td> </tr> <tr> <td>4</td> <td>100,000</td> </tr> </tbody> </table> <p>Comment on feasibility of project based on NPV</p>	Year	CASH Flow in Rs.	1	25,000	2	75,000	3	80,000	4	100,000																																													
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Q.3	Solve any Two Questions out of Three 10 Marks Each																																																							
A	<p>a. A consulting project has an actual cost of Rs. 45000, Scheduled cost Rs. 35000, and value of completed work is Rs. 40000. Find the Schedule and Cost Variance. Also find SPI and CPI.</p> <p>b. What is a contract? Explain different types of contracts.</p>																																																							
B	<p>R & D project has a list of tasks to be performed whose time estimates are given in the as follows.</p> <p style="text-align: center;">Table-1-Time Estimation for R & D Project</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Activity <i>i j</i></th> <th>Activity Time</th> <th>t_o</th> <th>t_m</th> <th>t_p</th> </tr> </thead> <tbody> <tr> <td>1-2</td> <td>A</td> <td>4</td> <td>6</td> <td>8</td> </tr> <tr> <td>1-3</td> <td>B</td> <td>2</td> <td>3</td> <td>10</td> </tr> <tr> <td>1-4</td> <td>C</td> <td>6</td> <td>8</td> <td>16</td> </tr> <tr> <td>2-4</td> <td>D</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>3-4</td> <td>E</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>3-5</td> <td>F</td> <td>6</td> <td>7</td> <td>14</td> </tr> <tr> <td>4-6</td> <td>G</td> <td>3</td> <td>5</td> <td>7</td> </tr> <tr> <td>4-7</td> <td>H</td> <td>4</td> <td>11</td> <td>12</td> </tr> <tr> <td>5-7</td> <td>I</td> <td>2</td> <td>4</td> <td>6</td> </tr> <tr> <td>6-7</td> <td>J</td> <td>2</td> <td>9</td> <td>10</td> </tr> </tbody> </table> <p>a. Draw the project network. b. Find the critical path. c. Find the probability that the project is completed in 19 days. If the probability is less than 20%, find the probability of completing it in 24 days.</p>	Activity <i>i j</i>	Activity Time	t_o	t_m	t_p	1-2	A	4	6	8	1-3	B	2	3	10	1-4	C	6	8	16	2-4	D	1	2	3	3-4	E	6	7	8	3-5	F	6	7	14	4-6	G	3	5	7	4-7	H	4	11	12	5-7	I	2	4	6	6-7	J	2	9	10
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C	<p>Write short notes on.</p> <p>a. Work Breakdown Structure b. Project Procurement Management,</p>																																																							

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