University of Mumbai

Examination 2020 under cluster 8 (Lead College: PHCET,Rasayani)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: B.E. Automobile Engineering

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: AEC701 and Course Name: Automotive Design

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	When the thickness of the piston head is 6 mm or less,
Option A:	ribs are required
Option B:	ribs may be required
Option C:	no ribs are required
Option D:	ribs may or may not be required
2.	There are two criteria for design of the piston pin: one is bending failure and the other is
Option A:	bearing consideration
Option B:	Shear consideration
Option C:	Deflection consideration
Option D:	Thermal consideration
3.	The gears having velocity greater than 15 m/s are termed as
Option A:	high speed gears
Option B:	medium speed gears
Option C:	internal gear
Option D:	low velocity gears
4.	the phenomenon when the tip of a tooth undercuts the root on its mating gear is known as
Option A:	law of gearing
Option B:	interference
Option C:	Diametral pitch
Option D:	Circular pitch
5.	The small end as well as big end of the connecting rod is designed by
Option A:	Bending considerations
Option B:	shearing considerations
Option C:	Tearing failure considerations
Option D:	bearing considerations
6.	The side crankshaft has only one crank web and requires only two bearings for

	support whereas the centre crankshaft has
Option A:	two webs and three bearings for support
Option B:	three webs and two bearings for support
Option C:	one web and two bearings for support
Option D:	two bearings and two web for support
7.	A clutch is usually designed to transmit maximum torque which is
Option A:	Equal to the maximum engine torque
Option B:	80% of the maximum engine torque
Option C:	150% of the maximum engine torque
Option D:	70% of the maximum engine torque
8.	If $x=\mu a$ or $x \leq \mu a$, then it is called
Option A:	Back- stop
Option B:	Self- acting
Option C:	Self locking
Option D:	Self energizing
9.	In order to prevent the brake arm from grabbing. The moment of friction force about pivot of brake arm should be
Option A:	less than the moment f effort about the pivot of the brake arm
Option B:	more than the moment of effort about the pivot of brake arm
Option C:	equal to moment of efforts about the pivot of brake arm
Option D:	less than or equal to moment of effort about the pivotof brake arm
10.	The type of valve used in engine is
Option A:	sleeve type
Option B:	rotary type
Option C:	poppet type
Option D:	butterfly type
11.	The force of friction between belt and V grooved pulley is high.
Option A:	Yes, supported by wedge action
Option B:	No
Option C:	There is no wedge action involved
Option D:	No relation
12.	Creep is the slight absolute motion of the belt as it passes over the pulley.
Option A:	Yes
Option B:	No, it is a relative motion
Option C:	It is SHM
Option D:	It is absolute motion
13.	The form factor of a spur gear tooth depends upon
Option A:	circular pitch only
Option B:	pressure angle only
Option C:	number of teeth and circular pitch
Option D:	number of teeth and the system of teeth

14.	Total frictional torque acting on the friction surface in case of design of clutch is given by
Option A:	n.μ.w.R^2
Option B:	n.μ.w.R
Option C:	n.μ.w.
Option D:	μ.w.R
15.	The heat generation in brake depends upon
Option A:	p.v
Option B:	p/v
Option C:	pv/2
Option D:	1/2pv2
16.	The propeller shaft has one or more
Option A:	Spur gears
Option B:	Elbow joints
Option C:	Universal joints
Option D:	Fluid couplings
17.	In a multi plate clutch, T = 150 N-m, n = 4, μ = 0.3 and R = 0.1 m. Find the axial thrust.
Option A:	18
Option B:	1800
Option C:	1250
Option D:	2000
18.	Commonly used materials for IC engine pistons are cast iron, cast steel, and forged steel, cast aluminum alloys. The thermal conductivity of aluminum alloys is approximately ..... that of cast iron.
Option A:	two times
Option B:	three times
Option C:	four times
Option D:	Equal to
19.	Which of the following condition is true for uniform wear theory?
Option A:	p = constant
Option B:	p/r = constant
Option C:	p.r = constant
Option D:	r= constant
20.	To avoid undercutting of cam
Option A:	the least radius of curvature must be greater than pitch circle radius
Option B:	the least radius of curvature must be greater than follower radius
Option C:	the least radius of curvature must be greater than base circle radius
Option D:	the least radius of curvature must be greater than prime circle radius

Q2 **(20 Marks Each)**	**Solve any Four out of Six** **5 marks each**
A	What are the design considerations of clutch
B	Explain self-locking and self-energizing brakes.
C	What is slip and creep of belts?
D	What are the forces acting on connecting rod?
E	Explain valve gear mechanism for horizontal engine?
F	What are the design consideration of piston?

Q3 **(20 Marks Each)**	**Solve any Two Questions out of Three** **10 marks each**
A	A dry single plate clutch is to be designed for an automotive vehicle whose engine is rated to give 100KW at 2400 rpm and maximum torque 500N-m.the outer radius of the friction plate us 25% more than the inner radius. The intensity of pressure between the plate is not to exceed 0.07N/mm^2.the coef.of friction may be assumed equal to 0.3.the helical springs required by this clutch to provide axial force necessary to engage the clutch are eight. If each spring has stiffness equal to 40N/mm, determine the dimensions of the friction plate and initial compression in the spring.
B	Four stroke diesel engine has the following specification: Brake power=5KW Speed=1200rpm Indicated mean effective pressure=0.35N/mm^2 Mechanical efficiency=80% Determine 1) bore and length of cylinder 2) thickness of cylinder head 3)size of the stud for cylinder he head
C	Vehicle of mass 1200kg is moving down the hill at a slope of 1:5 at 72km/h.it is to be stopped in distance of 50m.if the dia.of tyre is 600mm.dettermine average braking torque to be applied to stop the vehicle. If the friction energy is momentarily stored in a 20 kg cast iron brake drum, what is the average temperature rise of the drum?

University of Mumbai

Examination 2020 under cluster 9 (Lead College: FAMT)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **Automobile Engineering**

Curriculum Scheme: **2016**

Examination: BE Semester VII

Course Code: **AEC702** and Course Name: **CAD/CAM/CAE**

Time: 2-hour Max. Marks: 80

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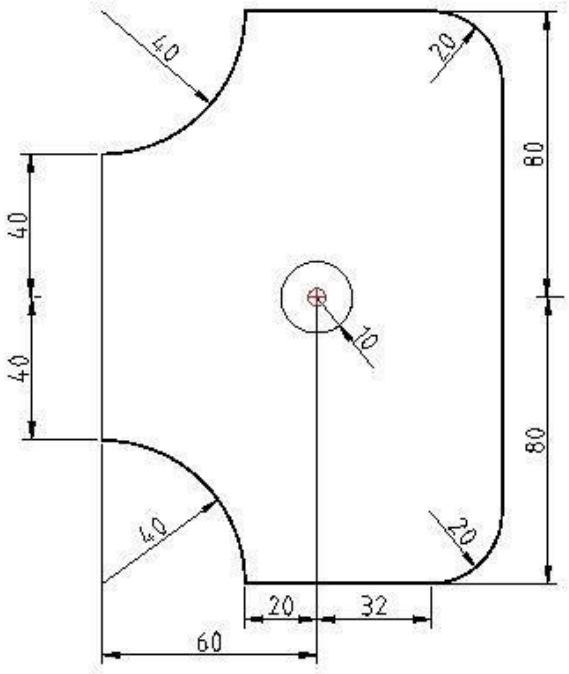
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	The degree of the Bezier curve with n-1 control points is:
Option A:	n+1
Option B:	n-1
Option C:	2n
Option D:	n
2.	Block to move from point A (25,10) to B (40,20) in incremental mode will be
Option A:	N001 G91 G01 X40 Y20 F100;
Option B:	N001 G91 G01 X15 Y10 F100;
Option C:	N001 G90 G01 X40 Y20 F100;
Option D:	N001 G90 G01 X15 Y10 F100;
3.	Which of the following is NOT a miscellaneous function
Option A:	Coolant on/off
Option B:	Canned Cycles
Option C:	Tool change
Option D:	Spindle on/off
4.	Kinematic analysis is simulation of
Option A:	Motion
Option B:	Motion and deformation
Option C:	Deformation
Option D:	Deformation and stress
5.	In a vertical Milling machine, Z zero is generally considered
Option A:	Above the top surface of the work piece
Option B:	At the top surface of the work piece
Option C:	At the bottom face of the work piece
Option D:	Below the bottom face of the work piece
6.	A line is completely outside the window if.....as per Cohen-Sutherland algorithm,
Option A:	The endpoints region code are nonzero values
Option B:	The region codes of line endpoints have a '1' in same bit position.
Option C:	If L bit and R bit are nonzero.
Option D:	The region codes of line endpoints have a '0' in same bit position.
7.	Transformation becomes geometric transformation when _____operations

	are performed on it
Option A:	Physical
Option B:	Mathematical
Option C:	Chemical
Option D:	Mechanical
8.	Convex hull is the one of the properties of _____ Curve.
Option A:	BSpline
Option B:	Bezier
Option C:	Hermite cubic
Option D:	NURBS
9.	Working coordinate system is also known as
Option A:	World coordinate system
Option B:	Global coordinate system
Option C:	Model coordinate system
Option D:	Local coordinate system
10.	Which of the following is the pre-processing stage in RP?
Option A:	Remove support
Option B:	Checking 3D CAD data
Option C:	De-powdering loose material
Option D:	Dip in binder to strengthen the part
11.	Convenient value for "Homogeneous Coordinates" is
Option A:	0
Option B:	2
Option C:	1
Option D:	3
12.	Both 3D Printer (3DP) and Selective Laser Sintering (SLS) method uses powder as the starting material. However, what is the difference between these two methods.
Option A:	3DP uses a binding agent; SLS uses a laser
Option B:	3DP uses a laser; SLS uses a binding agent.
Option C:	3DP uses a filament extruder; SLS uses a binding agent
Option D:	3DP uses a filament extruder; SLS uses a laser
13.	CIM is an example of the implementation of _____ and common _____ in manufacturing.
Option A:	System, Philosophy
Option B:	Information, Technologies
Option C:	Design, Program
Option D:	Quality function, Goal
14.	Following is one of the effects observed on the surface of RP parts.
Option A:	Steering effect
Option B:	Staircase effect
Option C:	Streaming effect
Option D:	Shearing effect

15.	Which one of the following is purely social aspects of CIM?
Option A:	Increase in profit
Option B:	Increase in plant efficiency
Option C:	Increase in unemployment
Option D:	Down sized workforce
16.	CIM deals with one of the below mentioned extra functions as compared to CAD and CAM
Option A:	Manufacturing functions
Option B:	Design functions
Option C:	Business functions
Option D:	Production, Planning and Control
17.	Which one of the following is the most crucial tasks in CIM?
Option A:	Finance management
Option B:	Purchase management
Option C:	Ware housing management
Option D:	Information management
18.	RP technology is best suitable for medical application due to its,
Option A:	Efficiently shape and produce prostheses and implants
Option B:	Ability to efficiently customize and produce prostheses and implants
Option C:	Sufficient flexibility to handle the implants during surgery
Option D:	Ability to produce the prostheses in mass.
19.	The scope and coverage of CIM as compared to CAD CAM is
Option A:	Broader
Option B:	Smaller
Option C:	Narrow
Option D:	Medium
20.	Which of the following process is suitable to avoid sharp corner?
Option A:	LOM
Option B:	SLS
Option C:	3D printing
Option D:	FDM

Q2	**Answer any Four out of Six (5 marks each)**
A	Compare the work coordinate system for Vertical Milling and Horizontal Lathe machine.
B	Explain constructive solid geometry with suitable example.
C	State the importance of CAE.
D	Write short note on Artificial Intelligence in Design and Manufacturing.
E	Write short note on Rapid Tooling.
F	Explain the nature and role of CIM element

Q3	**Solve any Two Questions out of Three (10 marks each)**
A	Write CNC program using G and M codes to contour the component and drill center hole of radius 10mm for the sketch in figure 1. Assume thickness to be 25 mm. Assume suitable data for speed and feed.  *Figure 1*
B	Find the equation of a Bezier curve for control points as P0 (1, 2), P1 (3, 4), P2 (6, -6) and P3 (10, 8). Find the coordinate and draw the curve.
C	A triangle with vertices A (1, 1), B (2 ,1) and C (2, 3) has to be rotated by 30 degree counter clockwise about a point P (3, 2). Determine the composite transformation matrix and find the new co-ordinates of triangle

University of Mumbai

Examination 2020 under cluster 8 (Lead College: PHCET, Rasayani)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **B.E. Automobile**

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: AEC703 and Course Name: Autotronics

Time: 2 hours Max. Marks: 80

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Q1.	**Choose the correct option for following questions.** **All the Questions are compulsory and carry equal marks**
1.	Lead acid battery electrolyte is a mixture of water and
Option A:	Lead peroxide
Option B:	Lead Sulphate
Option C:	Potassium dioxide
Option D:	Sulphuric acid
2.	To determine state of charge for Lead Acid battery we can use___
Option A:	Anemometer
Option B:	Rotameter
Option C:	Hygrometer
Option D:	Hydrometer
3.	What do fuel cells emit?
Option A:	Water
Option B:	Hydrogen
Option C:	Nitrogen
Option D:	Oxygen
4.	The electrolyte used in Alkaline batteries is
Option A:	Only H_2SO_4
Option B:	Dilute H_2SO_4
Option C:	KOH
Option D:	Only water
5.	'Star' and 'Delta' are different types of:
Option A:	rotor winding
Option B:	stator winding
Option C:	field winding
Option D:	regulator winding
6.	Bendix drive works on the principle of
Option A:	Inertia
Option B:	Magnetism
Option C:	Induction
Option D:	Alternating current

7.	Modern Starter motor uses
Option A:	Coolant
Option B:	Solenoids valves
Option C:	Fuel
Option D:	Engine oil
8.	Dynamo is also known as
Option A:	Direct commutator
Option B:	Direct coil generator
Option C:	Direct current generator
Option D:	Direct voltage generator
9.	In inductive pulse generator the rotating member is referred as
Option A:	Reluctor
Option B:	Armature
Option C:	O-wheel
Option D:	Distributor shaft
10.	Ignition timing refers to when the spark plug fires in relation to
Option A:	Camshaft position
Option B:	Crankshaft position
Option C:	Piston position
Option D:	Flywheel position
11.	What is the primary purpose of the ignition coil?
Option A:	To give electricity a pathway
Option B:	To arc the spark
Option C:	To act as a transformer and increase spark voltage
Option D:	To supply ample current
12.	A mass air flow sensor measures
Option A:	the density of atmospheric air
Option B:	the composition of air
Option C:	the rate at which air is flowing into an engine measured in terms of its mass
Option D:	the flow of exhaust out of the engine
13.	A thermistor is
Option A:	a semiconductor temperature sensor
Option B:	a device for regulating engine temperature
Option C:	a temperature control system for the passenger
Option D:	a new type of transistor
14.	when a strain gauge is stretched,_____
Option A:	its temperature will increase
Option B:	its resistance will increase
Option C:	its temperature will decrease
Option D:	its resistance decreases
15.	When filament inside bulb emits visible light?

Option A:	When electric current passes through it & it becomes cool
Option B:	When electric current passes through it & it becomes hot
Option C:	When it becomes hot because of burning of fuel inside the engine
Option D:	When it undergoes a cycle of getting hot & cool
16.	What should be the color of tail light?
Option A:	White
Option B:	Amber
Option C:	Blue
Option D:	Red
17.	What should be the shape of the reflector used in the headlight?
Option A:	Flat
Option B:	Circular
Option C:	Cubic
Option D:	Parabolic
18.	Adaptive cruise control (ACC) is also known as
Option A:	Intelligent car control
Option B:	Intelligent automotive control
Option C:	Intelligent cruise control
Option D:	Intermediate cruise control
19.	_____has been developed as a supplement to ABS.
Option A:	Electronic traction control
Option B:	Motorized controlled suspension
Option C:	Electric power Suspension
Option D:	Adaptive cruise control
20.	What are the sensors used in ABS?
Option A:	MAP Sensor
Option B:	Wheel speed sensor
Option C:	Throttle sensor
Option D:	Crank shaft position sensor

Q2 (20 Marks)	**Solve any Two out of Three** **10 marks each**
A	What is the need of 42volt technology? Explain transmission from 12 volt to 42 volt system with its applications and limitations.
B	Explain Principle, Construction and Working of generator. How it is different from alternator?
C	Describe in detail CDI and Distributorless Ignition system with neat sketch.

Q3 (20 Marks)	**Solve any Two out of Three** **10 marks each**
A	Explain the various cables, their size, color codes and wiring harness systems used in automotive vehicles.
B	Explain Motorized actuator and Stepper motor with neat sketch.
C	What is “Telematics” technology? Discuss its advantages, disadvantages and

	applications.

University of Mumbai

Examination 2020 under cluster 9 (Lead College: FAMT)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: BE – Automobile ENGINEERING

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: AEDLO7034 and Course Name: COMPUTATIONAL FLUID DYNAMICS

Time: 2 hour Max. Marks: 80

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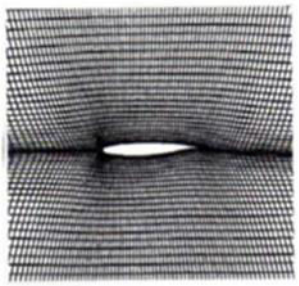
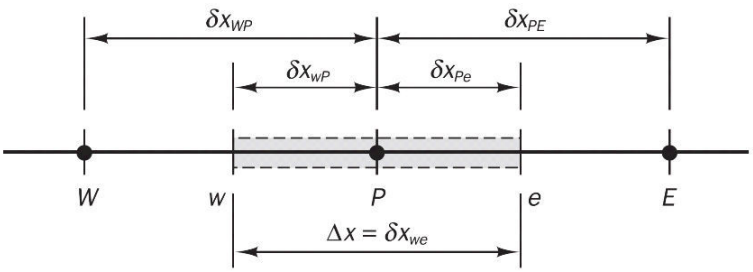
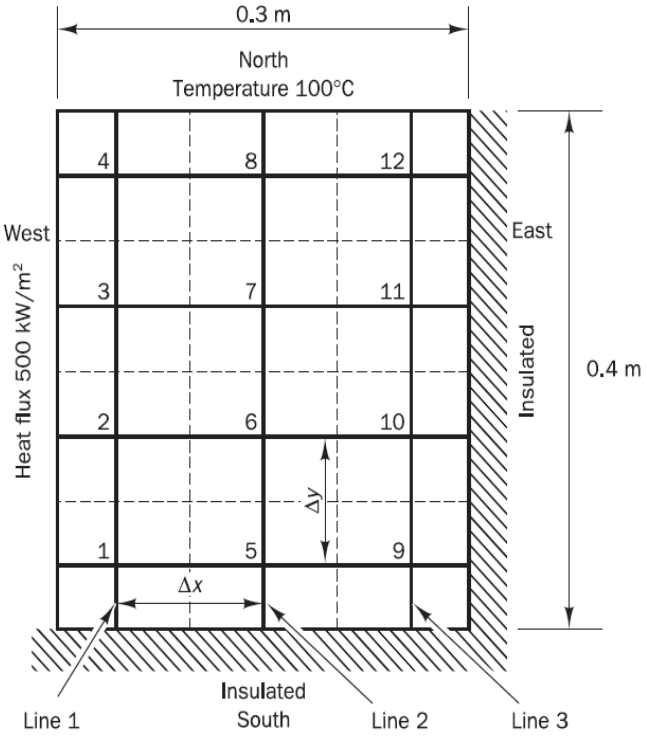
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	How many additional terms are present in the x-momentum equation of Reynolds-Averaged Navier-Stokes equations?
Option A:	Zero
Option B:	Six
Option C:	Three
Option D:	Two
2.	Identify the type of Grid 
Option A:	C type
Option B:	H type
Option C:	O type
Option D:	X type
3.	Which of the following represent the rate of change of a variable due to diffusion within the control volume?
Option A:	grad ($\rho\Phi V$)
Option B:	$\partial(\rho\Phi)/\partial t$
Option C:	div (Γgrad Φ)
Option D:	grad (Γdiv Φ)
4.	The main difference between the SIMPLE and the SIMPLER algorithms is that in the latter
Option A:	No velocity-correction equation is used
Option B:	No relaxation factor is required
Option C:	Pressure is directly calculated
Option D:	No pressure-correction equation is used
5.	The j^{th} unknown variable using TDMA is given by $\Phi_j=A_j\Phi_{j+1}+C_j$. (where j=1 to n are the nodes excluding boundaries). In which order A_j and C_j are computed?

Option A:	Backwards
Option B:	Forward
Option C:	Simultaneously
Option D:	Alternately
6.	Which of the following is not true?
Option A:	There will still be a need of theoretical and experimental investigations in fluid flow problems in future
Option B:	Numerical results complement results from theoretical and experimental analyses
Option C:	Not all fluid flow problems can be solved using CFD even if very powerful computing resources are made available
Option D:	CFD has a potential to replace the theoretical and experimental approaches compl etely
7.	The viscous stress on an elemental control volume in a Newtonian fluid flow in the y direction and on a plane perpendicular to the x direction is
Option A:	$\tau_{yx} = 2\mu\left(\frac{\partial v}{\partial y}\right) + \lambda(\nabla . V)$
Option B:	$\tau_{xy} = \mu\left(\frac{\partial u}{\partial y} + \frac{\partial v}{\partial x}\right)$
Option C:	$\tau_{xy} = 2\mu\left(\frac{\partial u}{\partial y} + \frac{\partial v}{\partial x}\right)$
Option D:	$\tau_{yx} = \mu\left(\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y}\right)$
8.	In one-dimensional steady-state diffusion problem, which of the following is true?
Option A:	The diffusive flux of Φ leaving the east face is the same as the diffusive flux of Φ entering the west face
Option B:	The diffusive flux of Φ leaving the east face plus the diffusive flux of Φ entering the west face is equal to the generation of Φ
Option C:	The diffusive flux of Φ leaving the east face minus the diffusive flux of Φ entering the west face is equal to the generation of Φ
Option D:	The diffusive flux of Φ leaving the east face is the same in magnitude and opposite in direction as the diffusive flux of Φ entering the west face
9.	For the control volume around node 'P' as shown in the figure, the diffusion coefficient Γ at the east face with linear approximation is 
Option A:	$\Gamma_w = (\Gamma_P + \Gamma_W) / 2$
Option B:	$\Gamma_w = (\Gamma_P - \Gamma_W) / 2$

Option C:	$\Gamma_e = (\Gamma_E + \Gamma_P) / 2$
Option D:	$\Gamma_e = (\Gamma_E - \Gamma_P) / 2$
10.	Thomas algorithm is a _____
Option A:	Linear equations solver
Option B:	Quadratic equations solver
Option C:	Discretization method
Option D:	Linear least square system
11.	If in a one dimensional diffusion problem $S_u = S_p = 0$ in a discretized equation $a_P\Phi_P=a_W\Phi_W+a_E\Phi_E+S_u$ at node, it implies that
Option A:	S_u and S_p are zero everywhere
Option B:	The discretized equation is for a node close to the left boundary
Option C:	The discretized equation is for a node close to the right boundary
Option D:	The discretized equation is for an internal node, which is neither close to the left nor to the right boundary
12.	In a control volume adjacent to the boundary, the flux crossing the boundary is _____ in the discretized equation.
Option A:	set to some arbitrary constant
Option B:	set to zero
Option C:	introduced as a source term
Option D:	introduced as a convective flux
13.	The substantial derivative $\frac{Du}{Dt}$ is
Option A:	$\frac{\partial \rho}{\partial x} + u\left(\frac{\partial \rho}{\partial x}\right) + v\left(\frac{\partial \rho}{\partial x}\right) + w\left(\frac{\partial \rho}{\partial x}\right)$
Option B:	$\frac{\partial u}{\partial t} + u\left(\frac{\partial u}{\partial x}\right) + v\left(\frac{\partial v}{\partial y}\right) + w\left(\frac{\partial w}{\partial z}\right)$
Option C:	$\frac{\partial u}{\partial t} + u\left(\frac{\partial u}{\partial x}\right) + v\left(\frac{\partial u}{\partial y}\right) + w\left(\frac{\partial u}{\partial z}\right)$
Option D:	$\frac{\partial u}{\partial t} + u\left(\frac{\partial \rho}{\partial x}\right) + v\left(\frac{\partial \rho}{\partial y}\right) + w\left(\frac{\partial \rho}{\partial z}\right)$
14.	In vorticity transport equation for a two dimensional flow, the advection of the vorticity is given by the term:
Option A:	$u(\partial\omega_x/\partial x)+ w(\partial\omega_z/\partial z)$
Option B:	$v(\partial\omega_y/\partial y)+ w(\partial\omega_z/\partial z)$
Option C:	$u(\partial\omega_z/\partial x)+ v(\partial\omega_z/\partial y)$
Option D:	$u(\partial\omega_z/\partial y)+ v(\partial\omega_z/\partial x)$
15.	Which feature of the coefficient matrix is a desirable for boundedness.
Option A:	Non-diagonal dominance
Option B:	Singularity
Option C:	Sparsity
Option D:	Diagonal dominance

16.	Explicit scheme can be stable for a one dimensional diffusion problem if:
Option A:	$\Delta t < \rho C[(\Delta x)^2/2k]$
Option B:	$\Delta t < \rho C[2k/(\Delta x)^2]$
Option C:	$\Delta t < \rho C[(\Delta x)^2/k]$
Option D:	$\Delta t < \rho C[2k/(\Delta x)]$
17.	If turbulence is considered as the mechanism to dissipate energy, which of the following terms is particularly important in the Navier-Stokes equations?
Option A:	Diffusion term
Option B:	Convection term
Option C:	Rate of change term
Option D:	Source term
18.	How many initial conditions and boundary conditions are needed for solving following equation. $\frac{d\emptyset}{dt} + u\frac{\partial\emptyset}{\partial x} + v\frac{\partial\emptyset}{\partial x} + w\frac{\partial\emptyset}{\partial x} = \alpha\left(\frac{\partial^2\emptyset}{\partial x^2} + \frac{\partial^2\emptyset}{\partial y^2} + \frac{\partial^2\emptyset}{\partial z^2}\right) + \frac{q'''}{\rho C_p}$
Option A:	One initial condition and three boundary conditions
Option B:	One initial condition and six boundary conditions
Option C:	three initial condition and three boundary conditions
Option D:	Three initial condition and six boundary conditions
19.	 For the two dimensional source free heat conducti on problem shown in the figure, the discretized eq uation is given by $a_P T_P = a_W T_W + a_E T_E + a_S T_S + a_N T_N + S_u$. Following is true for the coefficients of node-1:
Option A:	a_S, S_u and S_p are zero.
Option B:	a_E, a_N and S_p are zero
Option C:	a_E, a_S and S_p are zero
Option D:	a_W, a_S and S_p are zero

20.	One of the drawbacks of the non-conservative schemes is that they are likely to produce _____
Option A:	large round off errors
Option B:	false diffusion
Option C:	large discretization errors
Option D:	artificial sources or sinks

Q.2	**Solve Any Two (10 Marks each)**
A	Derive the continuity equation in three dimensional Cartesian co-ordinates and also write the final result in the vector (conservative) form.
B	Write a short note on characteristics of turbulent flows and RANS equations. What are Reynolds stresses?
C	Explain steps involved in the SIMPLE algorithm. What is the difference between the algorithm used in SIMPLE and SIMPLER?

Q.3	**Solve Any Two (10 Marks each)**
A	Consider a large plate of thickness t = 5 cm with an internal heat generation of 500 kW/m^3 and thermal conductivity of 0.5 W/mK. The east and west faces of the plate are maintained at 150 deg. C and 300 deg. C respectively. Assume that the dimensions in the directions perpendicular to the thickness are large enough such that the temperature gradients due to conduction are significant in the direction of thickness only. a) Write the (one dimensional) governing equation for the above phenomena b) Divide the thickness into five equal parts and obtain the discretized equation for each node. c) Arrange the equations in the form of a tri-diagonal Matrix.
B	What is TDMA? Solve following system of linear algebraic equations using TDMA: $75\phi_1 = 25\phi_2 + 8500$ $50\phi_2 = 25\phi_1 + 25\phi_3 + 1000$ $50\phi_3 = 25\phi_2 + 25\phi_4 + 1000$ $50\phi_4 = 25\phi_3 + 25\phi_5 + 1000$ $75\phi_5 = 25\phi_4 + 16000$
C	A property ϕ is transported by means of convection and diffusion in a one dimensional domain. The governing equation to be used is $d/dx (\rho u \phi) = d/dx (\Gamma d\phi/dx)$. The boundary conditions are at x = 0, ϕ = 1 and at x = L, ϕ = 0. Assume that the property is transported from x= 0 to x = L. Using five equally spaced nodes and an upwind differencing scheme, frame the distribution of ϕ as a function of x for u = 2.5 m/s, L = 0.5 m, ρ = 1.0 kg/m^3, Γ = 0.1 kg/m-s. Obtain the discretized equations for the nodes and arrange them in the tri-diagonal Matrix form. Justify use of upwind differencing scheme in this case.

University of Mumbai

Examination 2020 under cluster 8 (Lead College: PHCET, Rasayani)Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Automobile Engineering**

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: AEDLO7031and Course Name: Automotive NVH

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	What is normal audible range?
Option A:	51 Hz to 16000Hz
Option B:	15 Hz to 16000Hz
Option C:	25 Hz to 61000Hz
Option D:	52 Hz to 61000Hz
2.	The normal ear is most sensitive at frequencies between
Option A:	300Hz to 600Hz
Option B:	30Hz to 60 Hz
Option C:	30000hz to 60000Hz
Option D:	3000Hz to 6000Hz
3.	Which type of instruments do not require separate power source for measuring vibratory response of a vibratory system?
Option A:	Active instruments
Option B:	Passive instruments
Option C:	Electric instruments
Option D:	Mechanical instruments
4.	A sound sources radiate a measurable amount of energy is called as
Option A:	Sound power
Option B:	Power sound
Option C:	Power booster
Option D:	Power grid
5.	Which of following is correct regarding the Isolation factor
Option A:	Hz is unit of Isolation factor
Option B:	Joule is unit of Isolation factor
Option C:	Newton is unit of Isolation factor
Option D:	Dimensionless quantity
6.	Which of the following is a type of transmitted force to the foundation?
Option A:	Undamping force
Option B:	Damping force
Option C:	Tensile force

Option D:	Torsional force
7.	An isolator may be considering as _____if it transmits whatever force is applied to it.
Option A:	Effective
Option B:	Massless
Option C:	Resonant
Option D:	Rigid
8.	Which of the following method can be used to reduce excitation level of the source?
Option A:	Lubrication of joints
Option B:	Cutting of the joints
Option C:	Balancing of joints
Option D:	Increasing no of joints
9.	In the equation $\frac{\partial \tau}{\partial t} = Vs$ div q ; q is called as
Option A:	Instantaneous particle velocity
Option B:	Instantaneous particle acceleration
Option C:	Instantaneous particle moment
Option D:	Instantaneous particle position
10.	The vibration level is defined by
Option A:	$La = 100 \log[(\frac{aref}{a})^{2}]$
Option B:	$La = \log[(\frac{a}{aref})^{3}]$
Option C:	$La = 10 \log[(\frac{a}{aref})^{2}]$
Option D:	$La = \log[(\frac{a}{aref})]$
11.	The speed of sound in air is given by equation
Option A:	$c = 49.03 \times (460 + tF)^{1/2}$
Option B:	$c = 39.03 \times (460 + tF)^{1/3}$
Option C:	$c = 39.03 \times (460 + tF)^{1/3}$
Option D:	$c = 49.03 \times (46 + tF)^{1/2}$
12.	Natural frequency of a mount can be calculated as
Option A:	$fn = 4.13 \times \sqrt{\frac{2i}{SD}}$
Option B:	$fn = 3.13 \times \sqrt{\frac{1}{SD}}$
Option C:	$fn = 3.13 \times \sqrt{SD}$
Option D:	$fn = 4.13 \times \sqrt{SD}$
13.	What is the reason of wheel wobbling?
Option A:	Improper tyre pressure
Option B:	King pin worn out

Option C:	Drop in pressure
Option D:	Wrong hose size
14.	_____Affects the distribution of the weight around wheelcircumference.
Option A:	Static balance
Option B:	Dynamic balance
Option C:	Overall balance
Option D:	Horizontal balance
15.	Which among these is the noise freeclutch?
Option A:	Coneclutch
Option B:	Single plate with coil spring
Option C:	Multiplate clutch
Option D:	Fluid flywheel
16.	When a body is subjected to transverse vibrations, the stress induced in a body will be
Option A:	Shear stress
Option B:	Bending stress
Option C:	Tensile stress
Option D:	Compressive stress
17.	The critical speed of a shaft with a disc supported in between is equal to the natural frequency of the system in
Option A:	Transverse vibrations
Option B:	Torsional vibrations
Option C:	Longitudinal vibrations
Option D:	None of the above
18.	In vibration isolation system, if $\omega/\omega n < 2$, then for all values of damping factor, the transmissibility will be
Option A:	Less than unity
Option B:	Equal to unity
Option C:	Greater than unity
Option D:	Zero
19.	The first critical speed of an automobile running on a sinusoidal road is calculated by
Option A:	Resonance
Option B:	Approximation
Option C:	Superposition
Option D:	Rayleigh quotient
20.	Speed of sound in air
Option A:	Increases with temperature
Option B:	Decrease with temperature
Option C:	Remain same
Option D:	Can’t calculate

Q2.	**Solve any Four out of Six5 marks each**
A	*Sketch and explain Piezoelectric accelerometer*
B	*Compare Static balancing and Dynamic balancing*
C	*Illustrate and explain single-channel active noise control system using feed forward control system.*
D	*What are the backpressure considerations for designing of Exhaust muffler*?
E	*Why Vehicle noise, vibrationand harshness performance is an important validation criterion for vehicle design?*
F	*Explain with sketch Centrifugal pendulum.*

Q3.	**Solve any Four out of Six5 marks each**
A	*What are the objectives and significance of Automotive NVH?*
B	*What is the importance of the balance between isolation and absorption?*
C	*Write a note on radial force variation.*
D	*How the acoustic isolation capability of the vehicle's panels and windows affects the NVH performance?*
E	*Sketch and explain velocity transducer.*
F	*Explain the term tyre run-out*

University of Mumbai

Examination 2020 under cluster 8 (Lead College: PHCET, Rasayani)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: BE Automobile Engineering

Curriculum Scheme: Revised 2016

Examination: BE Semester VII

Course Code: AEDLO7032 and Course Name: Automotive Embedded Systems

Time: 2-hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	PCI stands for _____ bus.
Option A:	Peripheral Complex Internet
Option B:	Peripheral Component Interconnect
Option C:	Processor Cable Interconnect
Option D:	Processor Complex Interconnect
2.	In _____memory, the data can be erased and reprogrammed by using ultraviolet (UV) light.
Option A:	PROM
Option B:	EPROM
Option C:	EEPROM
Option D:	Flash Memory
3.	_____ port is used for serial data transmission.
Option A:	Serial
Option B:	Parallel
Option C:	Timer
Option D:	ALU
4.	The _____ is the heart of embedded system.
Option A:	input-output devices
Option B:	Processor
Option C:	Memory
Option D:	ALU
5.	Which of the following is an example of parallel communication protocol?
Option A:	CAN
Option B:	I2C
Option C:	USB
Option D:	ISA
6.	MC9S12XD family is not available in _____ pin package option.
Option A:	144-pin
Option B:	112-pin
Option C:	80-pin

Option D:	60-pin
7.	In MC9S12XD family for which mode of operation the processor program is executed from internal memory?
Option A:	Normal Expanded Mode
Option B:	Normal Single-Chip Mode
Option C:	Low Power Mode
Option D:	Freeze mode
8.	In MC9S12XD family, which mode is entered when the CPU executes the WAI instruction?
Option A:	Pseudo Stop Mode
Option B:	Full Stop Mode
Option C:	Freeze mode
Option D:	System Wait Mode
9.	Which pin is used to transmit data out of SPI module when it is configured as a master and receive data when it is configured as slave?
Option A:	MOSI pin
Option B:	MISO pin
Option C:	Slave Select pin
Option D:	Serial Clock pin
10.	Which are the two lines used in the I2C?
Option A:	SCL and status line
Option B:	SDA and SPDR
Option C:	SDA and SCL
Option D:	SPDR and SCL
11.	SCI module has _____ external pins.
Option A:	1
Option B:	2
Option C:	3
Option D:	4
12.	In PWM each of the _____ channels have a programmable period and duty cycle as well as dedicated counter.
Option A:	2
Option B:	4
Option C:	6
Option D:	8
13.	IDE stands for _____
Option A:	Integrated Development Environment
Option B:	Intel Digital Environment
Option C:	Intelligent Device Enable
Option D:	Inter Device Editor
14.	IDE Tool-Editor is used to _____
Option A:	find and replace text

Option B:	create and modify source code
Option C:	resolve errors
Option D:	convert source code into an executable file
15.	Which IDE Tool is used to convert source code into an executable file?
Option A:	Project Manager
Option B:	Search Engine
Option C:	Build System
Option D:	Editor
16.	A steer by wire system aims to eliminate the physical connection between the steering wheel and the wheels of a car by using electrically controlled _____ to change the direction of the wheels
Option A:	Motors
Option B:	Transformers
Option C:	Alternator
Option D:	Stator
17.	An electronic device that switches head lights of an automobile to low beam mode automatically when the sharp lights off an oncoming vehicle falls on its windscreen is called as _____
Option A:	Auto dipper
Option B:	Auto raiser
Option C:	Auto changer
Option D:	Auto turner
18.	X by wire is technology where electronic system replaces
Option A:	transmission system components
Option B:	electrical system
Option C:	hydraulic components
Option D:	Battery
19.	The baud rate of Flex Ray is _____
Option A:	3 Mbit/s
Option B:	1 Mbit/s
Option C:	2 Mbit/s
Option D:	10 Mbit/s
20.	In CAN bus, _____ frame is used to request data from a node.
Option A:	overload
Option B:	data
Option C:	remote
Option D:	error

Q2 **(20 Marks)**	**Solve any Two Questions out of Three** **10 marks each**
A	Write a short note on Flex Ray protocol.
B	Draw and explain functional block diagram of MC9S12XD.
C	Explain power window with focus on embedded technology.

Q3. **(20 Marks)**	**Solve any Two Questions out of Three** **10 marks each**
A	Explain Steer by wire and Suspension by wire with suitable example each.
B	Explain any two Serial communication protocols in brief.
C	Explain in brief the external signals of SPI module.

University of Mumbai

Examination 2020 under cluster ALL (Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7016 and Course Name: Cyber Security and Laws

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which of the following are wireless attacks?
Option A:	MAC Spoofing , Phishing
Option B:	Eavesdropping,, MAC Spoofing
Option C:	Phishing, Repudiation
Option D:	Eavesdropping , Non- Repudiation
2.	This attack can be deployed by infusing a malicious code in a website's comment section.
Option A:	Cross Site Request Forgery (XSRF)
Option B:	SQL injection
Option C:	HTML Scripting
Option D:	Cross Site Scripting (XSS)
3.	The Objective of Firewalls is to protect?
Option A:	Data Driven Attacks
Option B:	Unauthorized Access
Option C:	Confidentiality
Option D:	Integrity
4.	The user activities are sniff and forward this information as a background process to the attackers
Option A:	Adware
Option B:	Malware
Option C:	Spyware
Option D:	Warms
5.	It is a class of computer threat?
Option A:	Stalking
Option B:	Phishing

Option C:	DOS attacks
Option D:	Soliciting
6.	Someone posing as IT tech requests information about your computer configuration. What kind of attack is this?
Option A:	Whaling
Option B:	Social Engineering
Option C:	Insider Threat
Option D:	Phishing
7.	The Primary objective of worm is to Spread the infection from….
Option A:	computer to computer
Option B:	File to file on a computer
Option C:	Website to website
Option D:	Router to routers
8.	It is usually targeted by nature where the emails are exclusively designed to target any exact user.
Option A:	Algo-based phishing
Option B:	Vishing
Option C:	Domain Phishing
Option D:	Spear phishing
9.	In this attack, someone is repeatedly harassed to individuals or organizations using any electronics means.
Option A:	Identity theft
Option B:	Phishing
Option C:	Cyber stalking
Option D:	Bullying
10.	It is a kind of attempts by individuals to get confidential or sensitive information from a individuals to falsifying their identity?
Option A:	Identity theft scam
Option B:	Phishing scams
Option C:	Spyware scams
Option D:	Trojan horse Scam

11.	It cannot be exploited by assigning or by licensing the rights to others.
Option A:	Designs
Option B:	Patents
Option C:	Copy rights
Option D:	Trademark
12.	Which of following would not gain copyright protection?
Option A:	A DVD
Option B:	An unrecorded speech
Option C:	Written lyrics of a song
Option D:	A hand knitted jumper
13.	Which one of the following statements is true?
Option A:	The definition of an invention is set out in the Patents Act 1977.
Option B:	Copyright must be registered in order to gain protection.
Option C:	A patent must be registered in order to gain protection.
Option D:	The owner of a patent cannot sell it but can prevent others using his invention.
14.	Which one of the following is outside the scope of IT Act 2000
Option A:	Electronic message
Option B:	Electronic Evidence
Option C:	Power of Attorney with digital signature
Option D:	Electronic gift
15.	Which Act casts responsibility on body corporate to protect sensitive personal information and provide punishment for offences by companies.
Option A:	IT Act 2000
Option B:	Indian Evidence Act 1872
Option C:	Indian penal code
Option D:	IT (Amendment)Act 2008
16.	What is the proposed punishment for Cyber Terrorism in IT Act?
Option A:	10 year imprisonment
Option B:	Life Imprisonment

Option C:	5 year imprisonment
Option D:	1 Lac rupees penalty
17.	Which of the following NERC Standard provide cyber-security framework for identification and protection of critical cyber assets to support the reliable operation of BES
Option A:	CIP-001
Option B:	CIP-002
Option C:	CIP-002 through CIP-009
Option D:	CIP-003
18.	Standard CIP-002 is used for
Option A:	Critical cyber asset identification
Option B:	Electronic Security Perimeter
Option C:	Physical Security of Critical cyber assets
Option D:	Sabotage reporting
19.	Which of the following are part of key provisions of Sarbanes-Oxley Act ?
Option A:	Physical Security of Critical cyber assets
Option B:	Bulk Electric System (BES)
Option C:	Critical assets
Option D:	Corporate Responsibility for financial reports
20.	ISO 27000 was originally published in ____ as the BS 7799 by the British Standards Institute (BSI)
Option A:	1995
Option B:	1998
Option C:	2000
Option D:	2012

Q2 **(20 Marks)**	
A	**Solve any Two** **5 marks each**
i.	Explain Active and Passive Attacks with example
ii.	Explain how Appeal can be made under the IT Act 2000
iii.	Explain Key IT Requirement of GLBA/GLB
B	**Solve any One** **10 marks each**
i.	How Criminal Plan the Attack? Explain various steps

ii.	Explain E-Contracts. Discuss E-Contracts Act 1872.

Q3. **(20 Marks)**	
A	**Solve any Two** **5 marks each**
i.	Explain Bluetooth Hacking with various tools
ii.	Explain Vishing, Phishing and Smishing in Cyber Security
iii.	Explain Key IT Requirement of FISMA
B	**Solve any One** **10 marks each**
i.	Explain how Intellectual Property Laws protect the rights of the owner of the Intellectual Property
ii.	Explain Key features of Indian Information Technology Act 2000.

University of Mumbai

Examination 2020 under cluster ALL (Lead College:)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7018 and Course Name: EAM

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Energy that is available in market for definite price is known as
Option A:	Renewable energy
Option B:	Commercial energy
Option C:	Non-commercial energy
Option D:	Traditional energy
2.	As per the report "BP Statistical Review of World Energy-2014", for how many years the coal reserve in India available for energy production?
Option A:	500
Option B:	300
Option C:	100
Option D:	200
3.	Which source of energy dominates the energy production mix in India?
Option A:	Natural gas
Option B:	Coal
Option C:	Oil
Option D:	Nuclear
4.	Assisting and implementing ENCON recommendation measures and monitoring the performance are done in
Option A:	Pre Audit phase
Option B:	Audit phase
Option C:	Post Audit phase
Option D:	Pre and Audit phase
5.	The height of a column in a pump is called as
Option A:	Horizontal head
Option B:	Static head
Option C:	Multi head
Option D:	Vertical head
6.	What covers study of Variations occurring in energy costs, availability and reliability of supply of energy, energy mix, identify energy conservation technologies, retrofit for energy conservation equipment.
Option A:	Performance assessment

Option B:	Energy Audit
Option C:	Energy reliability
Option D:	Energy planning
7.	Which type of audit offers the most accurate estimate of energy savings and cost?
Option A:	Preliminary Audit
Option B:	Detailed Audit
Option C:	Overall Audit
Option D:	Secondary Audit
8.	Obtaining site drawings like building layout, steam, air distribution, electricity distribution are performed in which phase of audit?
Option A:	Post Audit phase
Option B:	Pre Audit phase
Option C:	Audit phase
Option D:	In between Pre and Post Audit phase
9.	Power factor can be improved by connecting which among these?
Option A:	Semiconductor device
Option B:	Resistors
Option C:	Inductor
Option D:	Static capacitors
10.	Fixed charge and Variable charge are dependent on what factor for HT consumer?
Option A:	Average load ,Energy consumption
Option B:	Energy consumption, Maximum Demand
Option C:	Maximum demand, Energy Consumption
Option D:	Maximum demand ,Peak load demand
11.	Energy savings potential of variable torque applications compared to constant torque application is:
Option A:	Higher
Option B:	Equal
Option C:	Lower
Option D:	Does not depend on Torque
12.	Electronic soft starters are used for motors to:
Option A:	improve the loading
Option B:	provide smooth start and stop
Option C:	achieve variable speed
Option D:	provide jerk during starting
13.	For large space lighting we prefer
Option A:	Time based control
Option B:	day light based controllers
Option C:	Localized Switching
Option D:	Photo sensors
14.	Formation of bubbles in an impeller is called
Option A:	Cavitation

Option B:	Defects
Option C:	Friction
Option D:	Heat burn
15.	If no instrument other than tachometer is available, what method you would suggest for measuring the motor load?
Option A:	Slip method
Option B:	Input power measurement method
Option C:	Line current measurement method
Option D:	Terminal voltage method
16.	In lighting performance assessment ILER stands for
Option A:	International Lighting Energy Regulation
Option B:	Indian Lighting Efficiency Regulation
Option C:	Installed Load Efficacy Ratio
Option D:	Interior Lighting Energy Ratio
17.	To have lighting performance assessment satisfactory to good, ILER value must be
Option A:	0.75 and above
Option B:	0.5 and less
Option C:	between 0.25 to 0.5
Option D:	below 0.25
18.	Which LEED rating system requires durability?
Option A:	LEED for Schools
Option B:	LEED for Commercial Interiors
Option C:	LEED for Homes
Option D:	LEED for Existing Buildings: Operation and Maintenance
19.	Photovoltaic cell converts solar energy into
Option A:	Heat energy
Option B:	Electric energy
Option C:	Mechanical energy
Option D:	Chemical energy
20.	Which insulation material is used for high temperatures
Option A:	Magnesia
Option B:	Polyurethane
Option C:	Expanded Polystyrene
Option D:	Calcium Silicate

Q2	
A	**Solve any Two** **5 marks each**
i.	Explain any FIVE special features of green building.
ii.	Explain advantages of power factor improvement.
iii.	A pump is filling water in to a rectangular overhead tank of 5 m x 4 m with a height of 8 m. The inlet pipe to the tank is located at height of 20 m above ground. Pump suction : 3 m below pump level Overhead tank overflow line : 7.5 m from the bottom of the tank Power drawn by motor : 5.5 kW Motor efficiency η : 92% Time taken by the pump to fill the overhead tank up to overflow level : 180 minutes. Find the pump efficiency.
B	**Solve any One** **10 marks each**
i.	What is the need of energy audit and explain types of energy audit.
ii.	Describe General fuel economy measures in furnaces

Q3	
A	**Solve any Two** **5 marks each**
i.	Explain Benchmarking and its types.
ii.	A 7.5 kW, 415 V, 15 A, 970 RPM, 3 phase rated induction motor with full load efficiency of 86 % draws 7.5 A and 3.23 kW of input power. Find the percentage loading of the motor.
iii.	Explain what is thermal insulations and its benefits.
B	**Solve any One** **10 marks each**
i.	Describe energy saving opportunities in water pumps.
ii.	Explain energy conservation opportunities in lighting controls.

University of Mumbai

Examination 2020 under cluster ALL(Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7011 and Course Name: Product Life Cycle Management

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	_____ is not a phase under product life cycle management
Option A:	Introduction
Option B:	Growth
Option C:	Maturity
Option D:	Rotation
2.	In _____ phase extensive advertisement is needed for product promotion
Option A:	Introduction
Option B:	Growth
Option C:	Maturity
Option D:	Decline
3.	In _____ phase profit level reaches to its maximum peak
Option A:	Introduction
Option B:	Growth
Option C:	Maturity
Option D:	Decline
4.	In_____ phase product sales reaches to minimum and profit is also lowest
Option A:	Introduction
Option B:	Growth
Option C:	Maturity
Option D:	Decline
5.	_____ is not a benefit of PLM
Option A:	Product life cycle analysis
Option B:	Profit maximization
Option C:	Decision making
Option D:	Large investment
6.	In _____ design model approach simultaneous and interlinked design activities are carried out
Option A:	Integrated
Option B:	Individual
Option C:	Isolated
Option D:	Dual

7.	_____ engineering is also called as simultaneous engineering.
Option A:	Concurrent
Option B:	Combine
Option C:	Linear
Option D:	Parallel
8.	_____ emphasizes the multidisciplinary approach in the product development process
Option A:	Concurrent engineering
Option B:	Dual engineering
Option C:	Rotational Engineering
Option D:	Realistic engineering
9.	_____ is not a step under new product development.
Option A:	Idea generation
Option B:	Concept development
Option C:	Idea screening
Option D:	Sensitivity analysis
10.	In ____ product is customized according to the customer wishes and product prepared as per specific requirement of customer.
Option A:	Product configuration
Option B:	Product rotation
Option C:	Product division
Option D:	Product linearization
11.	PDM stands for ____
Option A:	Product Data Management
Option B:	Product Development Management
Option C:	Product Dispatch Management
Option D:	Product Distinct Manament
12.	_____ is not the benefit of PDM
Option A:	It centralizes and control data
Option B:	It removes unnecessary data
Option C:	It improves data management
Option D:	It increases cost and time
13.	_____ is not the feature of PDM
Option A:	It facilitates better use of resources
Option B:	Engineering changes can be controlled easily
Option C:	Lead time gets reduced
Option D:	Consumes more time and resources
14.	_____ is not the component of virtual product development
Option A:	Virtual product design
Option B:	Virtual simulation
Option C:	Digital manufacturing
Option D:	Supply chain management

15.	DMU stands for _____
Option A:	Digital Mock up Unit
Option B:	Digital Manufacturing Unit
Option C:	Digital Maintenance Unit
Option D:	Differential Manufacturing Unit
16.	_____ is a realistic rendering technique of creating an image by tracing the path of light
Option A:	Ray tracing
Option B:	Ray casting
Option C:	Radiosity
Option D:	Radiography
17.	DFE stands for ____
Option A:	Design for excellence
Option B:	Design for efficiency
Option C:	Design for environment
Option D:	Design for economy
18.	DFE focuses on _____ factor
Option A:	Economy
Option B:	Energy
Option C:	Efficiency
Option D:	Environment
19.	LCA stands for _____
Option A:	Life Cycle Assessment
Option B:	Life Cycle Analysis
Option C:	Life Cycle Assembly
Option D:	Life Cycle Achievement
20.	LCCA stands for
Option A:	Life Cycle Class Achievement
Option B:	Life Cycle Creative Assessment
Option C:	Life Cycle Combine Assessment
Option D:	Life Cycle Cost Analysis

Q2 **(20 Marks)**	**Solve any Four out of Six 5 marks each**
A	*Explain product data management in detail.*
B	*Explain virtual product development tools in detail.*
C	*Explain the concept of sustainable development.*
D	Explain virtual manufacturing in detail.
E	*Explain product data management along with its advantages.*
F	*Explain the framework of life cycle assessment.*

Q3. **(20 Marks)**	**Solve any Two Questions out of Three 10 marks each**
A	*Explain life cycle phases in detail.*

B	*Explain product life cycle strategies in brief.*
C	*Explain various product development tools in detail.*

University of Mumbai

Examination 2020 under cluster ALL(Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7019 and Course Name: Development Engineering

Time: 2 hour Max. Marks: 80

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0701_R16_ALL_VII_ILO7019_QP1

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which of the following was the first committee on Panchayati raj in India
Option A:	Balwant Rai Mehta
Option B:	Ashok Mehta
Option C:	L.M.Singhvi
Option D:	S. Mohinder Singh
2.	When is National Panchayati Day celebrated
Option A:	23rd December
Option B:	1st June
Option C:	24th April
Option D:	15th September
3.	73rd amendment gave practical shape to which article of the constitution
Option A:	Article 14
Option B:	Article 32
Option C:	Article 40
Option D:	Article 51
4.	The multi-dimensional poverty index is a measure developed by the
Option A:	UNCTAD
Option B:	World Bank
Option C:	International Monetary Fund IMF
Option D:	Oxford poverty and human development initiative , OPHDI , and the UNDP
5.	Which of the following system is established on the basis of direct election
Option A:	Gram Panchayat
Option B:	Block Committee
Option C:	Zila Parishad
Option D:	District
6.	Engagement of local people in development project refers to
Option A:	Economic development
Option B:	Socila development
Option C:	Participatory development
Option D:	Sustainable development

7.	Panchayats are constituted for
Option A:	four years
Option B:	five years
Option C:	six years
Option D:	three years
8.	Bread labour means
Option A:	To earn one's livelihood by engaging in manual labour
Option B:	Hard physical labour
Option C:	Labour for making bread
Option D:	Engaging in agriculture
9.	The Human Development Index ranks the countries based on their performance in the key areas of (1) health, (2) sex-ratio, (3)education (4) access to resources
Option A:	1,2,3
Option B:	2,3,4
Option C:	1,3,4
Option D:	1,2,4
10.	Which one of the following is not a correct statement ?
Option A:	Growth is quantitative and value neutral
Option B:	Development means a qualitative change which is always value positive
Option C:	Positive growth and development refer to changes over a period of time
Option D:	Both growth and development refer to changes over a period of time.
11.	Which of the following elements must always be in the mind of the engineer while performing his duties vis-à-vis Ethics (1)public safety, (2) economy, (3) health, (4) welfare
Option A:	1,2,3
Option B:	1,2,3,4
Option C:	1,4
Option D:	1,3,4
12.	According to Gandhi, ' Enjoy the wealth by renouncing it'is the essence of
Option A:	Trusteeship
Option B:	Sarvodaya
Option C:	Swaraj
Option D:	Ramarajya
13.	The term that refers to principles, values, beliefs that define right or wrong behaviour is
Option A:	Customer satisfaction
Option B:	Innovation
Option C:	Ethics
Option D:	Empowerment
14.	In which five year plan the Panchayat Raj System was introduced in India for the first time
Option A:	First

Option B:	Second
Option C:	Fifth
Option D:	Sixth
15.	Which of the following is an appropriate general principle with regard to engineering ethics
Option A:	The engineer shall regard his duty to the public welfare as paramount to all other obligations
Option B:	The engineer shall regard his duty to the objectives of the company as paramount to all other obligations
Option C:	The engineer shall regard his duty to the Profession of engineering as paramount to all other obligations
Option D:	The engineer shall regard his duty to his excellence as paramount to all other obligations
16.	Those individuals who raise ethical concerns to others inside or outside the organisation are called
Option A:	Entrepreneur
Option B:	Whistle blower
Option C:	Social entrepreneur
Option D:	Social impact management
17.	Which of the following is not a key intervention to improve governance
Option A:	Facilitating independent and inclusive journalism
Option B:	Capacity building of government officials
Option C:	Advocacy for policy design and implementation
Option D:	Employment for all
18.	Which of the following is not in the 11^{th} schedule of subjects
Option A:	Fisheries industry
Option B:	Safe drinking water
Option C:	Markets and fairs
Option D:	Large irrigation projects
19.	The following is not a stated objective of Self Help Groups
Option A:	Provide employment to the members
Option B:	Create awareness about rights
Option C:	Foster a sense of community
Option D:	Entrepreneurship development
20.	Those individuals who raise ethical concerns to others inside or outside the organisation are called
Option A:	Entrepreneur
Option B:	Whistle blower
Option C:	Social entrepreneur
Option D:	Social impact management

Q2	Solve any Four out of Six 5 marks each
A	Explain the provisions of the 74th amendment
B	What is the scope of information and communication technology in rural India
C	Define ethics and ethical dilemma
D	What are the important components of Green Revolution
E	What are the various steps taken for inclusion of women and the members of the reserved category in decision making
F	Why was there a need to set up rural co-operatives

Q3	Solve any Four out of Six 5 marks each
A	Briefly discuss the various rural development schemes in India
B	What is the importance of ethical conduct in business
C	Human Development Index is a barometer of a nation's progress- Comment on this while giving specific examples to prove your point
D	What are self help groups (SHG)? Explain their significance in rural development
E	Discuss any 2 initiatives of the Government of India towards urban development
F	What are the functions of Panchayat Samiti

University of Mumbai
Examination 2020 under cluster ALL (Lead College: VCET)

Program: **ALL_Institute Level Optional Course 1**
Curriculum Scheme: Rev2016
Examination: BE Semester VII
Course Code: ILO 701**7**
Course Name: Disaster Management and Mitigation Measures
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 is NOT occurred as a consequence of earthquake
Option A:	Tsunami
Option B:	Fire
Option C:	Damage to building
Option D:	Drought
2.	Which of the following is NOT the natural cause of flood .
Option A:	River bank erosion
Option B:	Poor natural drainage
Option C:	Heavy rain
Option D:	Deforestation
3.	Terrorism is a _____type of disaster
Option A:	Man made
Option B:	Natural
Option C:	Both natural and man made
Option D:	Neither natural nor man made
4.	World Health Organization (WHO) was established in
Option A:	1950
Option B:	1948
Option C:	1947
Option D:	1960
5.	Who heads NDMA, the apex body for Disaster management
Option A:	Home Minister
Option B:	Finance Minister
Option C:	Prime Minister
Option D:	Home Secretary
6.	Which of the following is a disaster mitigation strategy?
Option A:	Constructing cyclone shelters

Option B:	Giving loans from banks
Option C:	Providing cheap electricity
Option D:	Providing school uniforms to children
7.	Which of the following organization is the apex authority of disaster management in India?
Option A:	NDA
Option B:	NDMA
Option C:	CDMA
Option D:	INDR
8.	If the deficiency of a particular year's rainfall more than 50 % of normal it is termed as
Option A:	Onset of Drought
Option B:	Moderate Drought
Option C:	Severe Drought
Option D:	Simple Drought
9.	Magnitude of earthquake indicates amount of _____.
Option A:	vibrations per second
Option B:	vibrations per minute
Option C:	Oscillations
Option D:	energy released
10.	By which Act, N.I.D.M got the statutory organization status?
Option A:	National Disaster Policy Act 1999
Option B:	NDMP 2019
Option C:	Disaster Management Act 2005.
Option D:	National DM Policy 2009
11.	Amateur Radio is also known as?
Option A:	Ham radio
Option B:	Home radio
Option C:	Pocket radio
Option D:	Silent radio
12.	What are the three phases of disaster management planning?
Option A:	Preparation, Response and Recovery
Option B:	Preparation, Planning and Perception
Option C:	Evacuating, Rebuilding and Re-branding
Option D:	Planning, Evacuating and Recovery
13.	Cyclones, Heat wave , Climate change are part of _____disaster.
Option A:	The Geological Disaster
Option B:	The Hydrological Disasters
Option C:	The Meteorological Disasters
Option D:	The Chemical Disaster

14.	The Indian Tsunami Early Warning Centre (ITEWC) established at Indian National Centre for Ocean Information Sciences is located in
Option A:	Chennai
Option B:	Kochi
Option C:	Goa
Option D:	Hyderabad
15.	In _____ in 2013 cloudburst created the flash flood situation to cause heavy damage to lives and property.
Option A:	Uttarakhand
Option B:	Chennai
Option C:	Kashmir
Option D:	Karnataka
16.	When was the updated & revised National Disaster Management Plan was prepared?
Option A:	2016
Option B:	2019
Option C:	2018
Option D:	2017
17.	Which of the following is the best thing to do during heavy lightning?
Option A:	lie on the ground in an open place
Option B:	Go into a water body
Option C:	Stay indoors, away from metallic doors and windows
Option D:	Stand under a tall tree
18.	The given three actions are arranged for which step i) The planning ii) The training and iii) The supply
Option A:	The prevention step
Option B:	Recovery step
Option C:	The preparation step
Option D:	The recovery step
19.	The Vision of _____ is “To build a safer and disaster resilient India by a holistic proactive technology driven and sustainable development strategy that involves all stake holders and fasters a culture of Prevention, preparedness and Mitigation.
Option A:	N.D.R.F
Option B:	N.D.M.A
Option C:	S.D.R.F
Option D:	N.I.D.M
20.	S.D.R.F Stands for
Option A:	State Disaster Response Fund
Option B:	State Disaster Relief Fund
Option C:	State Dedicated Relief Fund
Option D:	State Dynamic Response Fund

Q2	Solve any Four out of Six 5 marks each
A	State and describe the measures to prevent the global warming.
B	Define "Nuclear Disaster "and describe the effects of Nuclear disasters in India
C	What are the long term and short-term effects of disaster?
D	What are the main phases of Disaster Management?
E	Describe the importance and the methods to create public awareness in Disaster management?
F	Explain the role of Government Agencies in Relief fund raising for Disaster management.

Q3.	Solve any Two Questions out of Three 10 marks each
A	Write detail note on occurrence, causes and measurement of earthquake. List out some of the major earthquakes occurred in India
B	Explain the role of NGO's in post disaster scenario and during rehabilitation.
C	State Do's and Don'ts in case of various disasters.

University of Mumbai

Examination 2020 under cluster ALL(Lead College: VCET)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **ALL_Institute Level Optional Course 1**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7012 and Course Name: Reliability Engineering

Time: 2 hour Max. Marks: 80

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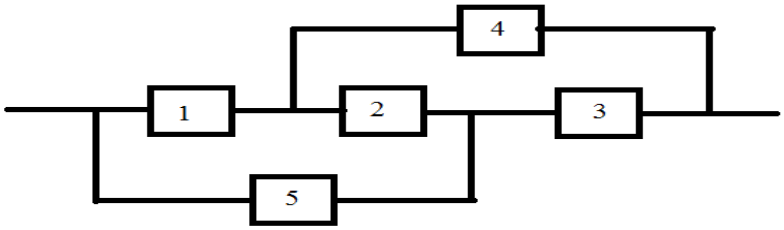
Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The Bathtub curve indicates failure probability, Which stage is NOT normally associated with the bathtub curve?_____
Option A:	Pulling the plug where production is halted due to unacceptable level of failures
Option B:	Infant-mortality where failures occur early
Option C:	Wear-out where failure increases due to age
Option D:	Normal-life where few failures occur
2.	Three components each with a reliability of 0.9 are placed in series. What is the reliability of the system ?
Option A:	0.729
Option B:	0.125
Option C:	0.00258
Option D:	0.989
3.	. If A is a perfect subset of B and P(a) < P(b), then P(B - A) is equal to _____
Option A:	P(a) / P(b)
Option B:	P(a) P(b)
Option C:	P(a) + P(b)
Option D:	P(b) - P(a)
4.	In order to maintain maintainability in the system, repair time must _____
Option A:	be increased
Option B:	be reduced
Option C:	kept constant
Option D:	keeps on changing
5.	What refers to wear out failure_____.
Option A:	Depends upon the subject
Option B:	Depends upon type of the experiment
Option C:	Increasing failure rate
Option D:	Decreasing failure rate
6.	Find median and mode of the messages received on 9 consecutive days 15,11,9, 5,18,4,15,13,17.
Option A:	13,6
Option B:	13,18

Option C:	18,15
Option D:	15, 16
7.	The reliability of a device comprised of various parts functioning in series is the :
Option A:	Product of the reliabilities
Option B:	Sum of the probabilities of the unreliabilities
Option C:	Product of the unreliabilities
Option D:	Sum of the reliabilities
8.	Which among the following exhibits inversely proportional relationship with the reliability?
Option A:	Production cost
Option B:	Maintenance and repair cost
Option C:	Design and development cost
Option D:	Availability
9.	If 'm' is the mean of a Poisson Distribution, then variance is given by _____
Option A:	m^2
Option B:	$m^{1/2}$
Option C:	m
Option D:	$\frac{m}{2}$
10.	Which of the following is not considered a reliability design method_____.
Option A:	Parts selection
Option B:	Choice of technology
Option C:	Accessibility
Option D:	Derating
11.	Markov analysis is a technique that deals with the probabilities of future occurrences by_____.
Option A:	Using Bayes' theorem
Option B:	Analyzing presently known probabilities
Option C:	Time series forecasting
Option D:	The maximal flow technique
12.	Skewness of Normal distribution is _____
Option A:	Negative
Option B:	Positive
Option C:	0
Option D:	Undefined
13.	The design function which assigns probability of failures between components or subsystems is called:
Option A:	Significance
Option B:	Prediction
Option C:	Qualification
Option D:	Apportionment
14.	What is MTTR

Option A:	Mean Time To Restore
Option B:	Mean Time To Repair
Option C:	Mean Time To Recovery
Option D:	Mean Time to Restoration
15.	The inherent availability can be calculated for repairable system as:
Option A:	$A_I = \frac{MTBF}{MTTF + MTTR}$
Option B:	$A_I = \frac{MTTF}{MTTF + MTTR}$
Option C:	$A_I = \frac{MTTF}{MTBF + MTTR}$
Option D:	$A_I = \frac{MTTR}{MTTF + MTTR}$
16.	Three companies A, B and C supply 25%, 35% and 40% of the notebooks to a school. Past experience shows that 5%, 4% and 2% of the notebooks produced by these companies are defective. If a notebook was found to be defective, what is the probability that the notebook was supplied by A?
Option A:	44⁄69
Option B:	25⁄69
Option C:	13⁄24
Option D:	11⁄24
17.	What would happen, if an equipment possesses reliability and maintainability to the maximum extent in accordance to MTTR?
Option A:	Failure rate is higher & downtime is longer
Option B:	Failure rate is lower & downtime is longer
Option C:	Failure rate is higher & downtime is shorter
Option D:	Failure rate is lower & downtime is shorter
18.	All fault-tolerant techniques rely on
Option A:	Integrity
Option B:	Dependability
Option C:	Redundancy
Option D:	Reliability
19.	What is the Major Key parameter of maintainability?
Option A:	Accessibility
Option B:	Vulnerability
Option C:	RCS
Option D:	Survival
20.	Which of the following is the biggest impact of availability
Option A:	mean time
Option B:	median time
Option C:	downtime
Option D:	maximum time of repair

Q2	**Solve any Four out of Six** **5 marks each**
A	Tests performed on a self-diagnostic module for a complex electronic system resulted in correct diagnostics of a known fault 98% of time with only a 1% false reading when it was known there were no faults present. The Probability of a failure (fault) occurring over the test period is 0.005. How reliable is the self-diagnostic module?
B	Consider the system below. Do the following a) Assume that all componentsare identical and independent, and have a reliability R(t). Find the expression for the system reliability. b) Assume the components have exponentially distributed failure times with parameter λ. Develop an expression for the failure rate of the system $\lambda_s(t)$. 
C	Explain measures of Availability.
D	Obtain reliability of Parallel system containing of n components, when the reliability of each component is known. Assume that the units are non-repairable.
E	Explain the Failure Mode Effects analysis
F	Explain Reliability Block Diagram with example

Q3	**Solve any Two out of Three** **10 marks each**
A	ExplainBath Tub Curve, Hazard rate, failure density and Failure Rate with help of suitable example
B	It is known that 5% of the book bound at a certain bindery have defective bindings. Find the probability that 2 of 100 books bound by this bindery will defective binding using the Poisson approximation to the binomial distribution.
C	Explain Reliability Improvement methods with suitable example

University of Mumbai

Examination 2020 under cluster 8 (Lead College: PHCET, Rasayani)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: Automobile Engineering

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: AEDLOC7033 and Course Name: AAA

Time: 2-hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
Q1.	In aerodynamics the friction free flow is also called _____
Option A:	non-viscous flow
Option B:	viscous flow
Option C:	laminar flow
Option D:	turbulent flow
Q2.	What is the material of the radiator cooling tube?
Option A:	Rubber
Option B:	Plastic
Option C:	Brass
Option D:	Copper
Q3.	The term used to define and measure the air resistance acting against a moving car is…
Option A:	lemniscate of Bernoulli
Option B:	coefficient of drag
Option C:	frictional eigenvalue
Option D:	frictional eigen vector
Q4.	Imagine a moving car. The area directly in front of the car is an area of…
Option A:	lower air pressure
Option B:	higher air pressure
Option C:	a perfect vacuum
Option D:	vacuum
Q5.	Wind tunnel test in Various tools were used throughout the duration of the project, its not a part of that
Option A:	MATLAB
Option B:	ANSYS
Option C:	SOLIDWORKS.
Option D:	ANDROID
Q6.	Supersonic wind tunnel tests are applicable for a range according to the fluid flow of speed

Option A:	(M<0.8),
Option B:	(0.8<M<1.2)
Option C:	(1.2<M<5.0)
Option D:	(M>5.0)
Q7.	Which type of wind tunnel tests are more suitable for high-speed vehicle design?
Option A:	Subsonic
Option B:	Transonic
Option C:	Supersonic
Option D:	Hypersonic
Q8.	Which value are considered of drag coefficient, while calculating the aerodynamic force for SPHERE shape of body?
Option A:	1.17
Option B:	0.47
Option C:	0.42
Option D:	0.5
Q9.	If the air flows across the front edge of the hood without separation, separation may occur at the cowl, while further downstream the flow will re-attach somewhere on the windshield. This phenomenon has been investigated by
Option A:	Wolf Heinrich Hucho
Option B:	Scribor-Rylski
Option C:	Benjamin Franklin
Option D:	Caro-Kann
Q10.	Front end modifications are worked to improve
Option A:	the weight of vehicle
Option B:	viscous layer
Option C:	the height of bonnet
Option D:	Vortex formation
Q11.	The Full rear end is most commonly called
Option A:	boat back
Option B:	squareback
Option C:	fastback
Option D:	notchback
Q12.	Usually, bluff bodies induce flow separation at positions where the velocity at the edge of the boundary layer is _____ than the free stream velocity
Option A:	lesser
Option B:	mediate
Option C:	high
Option D:	sometimes lesser and sometimes higher
Q13.	The drag (CD) of a body of revolution is approximately
Option A:	1.2

Option B:	0.9
Option C:	0.45
Option D:	0.05
Q14.	The drag of a body of revolution consists mainly on
Option A:	frictional drag
Option B:	profile drag
Option C:	interference drag
Option D:	induced drag
Q15.	The flat plate in a parallel air flow would be exerted by pure
Option A:	frictional drag
Option B:	profile drag
Option C:	interference drag
Option D:	induced drag
Q16.	The viscosity of the air is significant only within the narrow zone adjacent to the wall, called the _____
Option A:	Viscous layer
Option B:	Boundary layer
Option C:	Non-viscous layer
Option D:	Stoke's Layer
Q17.	Which design consideration deals with appearance of the product?
Option A:	Ergonomics
Option B:	Aesthetics
Option C:	System design
Option D:	Creative design
Q18.	In design process, which step is followed after defining the problem?
Option A:	Analysis
Option B:	Synthesis
Option C:	Optimization
Option D:	Evaluation
Q19.	What is meant by Aesthetics?
Option A:	Interaction between man machine working environment
Option B:	Appearance of the product
Option C:	System design
Option D:	Creative design
Q20.	As per Aesthetic consideration color may not be _____
Option A:	Bright
Option B:	Multiple
Option C:	Dull
Option D:	Vibrant

Q2.	Solve any Four out of Six 5 marks each
A	Discuss wind tunnel versus simulation of aerodynamic testing.
B	Draw and explain forces and moments acting on vehicle and their characteristics
C	Draw and explain types of rear ends of passenger cars.
D	Explain design and construction of wind tunnel
E	Explain drag force and types.
F	Explain drag reduction technologies for attached Flows.

Q3.	Solve any Four out of Six 5 marks each
A	Write a short note on Road testing.
B	What is boat tailing draw and explain with example
C	What are the aesthetic aspects of design?
D	Explain briefly what is a front splitter and rear splitter.
E	Write a short note on Bluff bodies.
F	Write a short note on CFD