

**University of Mumbai**  
**Examination 2021 under cluster:8(Lead College: PHCET,Rasayani)**  
**Examinations Commencing from 15<sup>th</sup> JUNE 2021 to 30<sup>th</sup> JUNE 2021**

Program: Automobile Engineering

Curriculum Scheme: R2012

Examination: BESemesterVII

Course Code: AEC703and Course Name: Automotive Design

Time: 2 hourMax. Marks: 80

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<b>Q1.</b>	<b>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks</b>
1.	The rocker arm of valve mechanism is used to
Option A:	change the direction of force
Option B:	increase the speed of valve opening and closing
Option C:	reduce the efforts
Option D:	multiplication of efforts
2.	Ribs are used in piston to
Option A:	Strengthen the piston against gas pressure
Option B:	Strengthen the piston against vibrations
Option C:	Strengthen the piston tensile stress
Option D:	Cool the piston
3.	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
4.	counterweights are attached to crankshaft for
Option A:	to reduce fuel consumption
Option B:	Getting more torque
Option C:	getting more power
Option D:	balancing rotating masses
5.	If connecting rod is designed to be resistant to buckling then
Option A:	$I_{xx} = 4 I_{yy}$
Option B:	$I_{xx} = 2 I_{yy}$
Option C:	$I_{xx} = I_{yy}$
Option D:	$4 I_{xx} = I_{yy}$
6.	In high speed engines, the ratio of length of connecting rod to the crank radius
Option A:	4
Option B:	2
Option C:	3
Option D:	7

7.	When clearance between piston and cylinder is insufficient then
Option A:	Excessive noise occurs
Option B:	Piston slap occurs
Option C:	Piston seizure will occur
Option D:	Piston vibrates
8.	In Al alloy piston the clearance is ----- of CI piston
Option A:	Double
Option B:	Half
Option C:	$\frac{3}{4}$ th
Option D:	Same as that
9.	Maximum torque of Propeller shaft can be calculated by
Option A:	( Maximum torque of engine)*( first gear ratio)*( back axle ratio)
Option B:	( Minimum torque of engine)*( first gear ratio)*( back axle ratio)
Option C:	( Maximum torque of engine)*( second gear ratio)*( back axle ratio)
Option D:	( Maximum torque of engine)*( first gear ratio)
10.	When the ratio of L/D is up to -----, then piston cup is required
Option A:	2.5
Option B:	1.5
Option C:	0.5
Option D:	0.75
11.	The following is not a Friction clutch
Option A:	Fluid clutch
Option B:	Centrifugal clutch
Option C:	Cone clutch
Option D:	Disc clutch
12.	Connecting Rod is designed by considering it as
Option A:	Truss member
Option B:	Long column
Option C:	Short column
Option D:	beam
13.	The propeller shaft is designed for
Option A:	Torsional shear stresses and for whirling speed
Option B:	Only for direct shear stresses
Option C:	For whirling speed only
Option D:	Direct shear stresses and compressive stresses
14.	IN analysis of internal expanding shoe brake, coefficient of friction is considered as
Option A:	negligible
Option B:	constant
Option C:	Varying as per intensity of pressure
Option D:	Half of the intensity of pressure

15.	It is more safe to use ----- theory to design clutch
Option A:	Uniform pressure
Option B:	Uniform wear
Option C:	Uniform torque transmission
Option D:	Uniform friction
16.	Centrifugal clutch used in heavy mobile equipment because of
Option A:	More load carrying capacity
Option B:	It will provide time delay for smooth engagement
Option C:	Less friction
Option D:	Constant friction
17.	In hoists and elevators, the brake absorbs
Option A:	Kinetic energy
Option B:	Heat energy
Option C:	Impact energy
Option D:	Potential energy
18.	In automobiles type of spring used is
Option A:	Helical torsion spring
Option B:	Helical extension spring
Option C:	Open coil spring
Option D:	Helical compression spring
19.	The value of spring index is taken as
Option A:	15
Option B:	10
Option C:	8
Option D:	2
20.	The main disadvantage of band brake is
Option A:	More maintenance
Option B:	Poor heat dissipation
Option C:	More wear
Option D:	Less reliable

<b>Q2</b> <b>(20 Marks)</b>	<b>Solve any Four out of Six</b>	<b>5 marks each</b>
A	What are the design considerations of Brake?	
B	Explain importance of pressure angle in cam design	
C	Explain full floating and semi-floating type piston pin?	
D	What are the design considerations of Crankshaft?	
E	Explain materials used for piston	
F	Write a note on whirling speed of shaft	

<b>Q3.</b> <b>(20 Marks)</b>	<b>Solve any Two Questions out of Three 10 marks each</b>
A	An automobile engine develops 38 HP at 1500 rpm and its bottom gear ratio is 3.06. If propeller shaft's outside diameter is 4 cm, find out its inside diameter. The safe stress for the material is 562.5 kgf/cm <sup>2</sup> .
B	A plate clutch is consisting of one pair of contacting surfaces. The inner and outer diameters of disc are 100 and 200 mm. The coefficient of friction is 0.2. The permissible intensity of pressure is 1 N/mm <sup>2</sup> . Assuming uniform wear theory calculate power transmitting capacity at 750 rpm.
C	The following is the data for piston pin design of 4 stroke diesel engine : D= 100 mm maximum gas pressure = 5 MPa, bearing pressure of small end of connecting rod = 25 Mpa. Allowable bending stress for pin = 140 MPa Length of piston pin = 1.4 times outside diameter of piston pin. Calculate Outside diameter and inside diameter of pin. Also check it for bending stresses.

**University of Mumbai**  
**Examination 2021 under cluster 8 (Lead College: PHCET, Rasayani)**

Examinations Commencing from 15<sup>th</sup> JUNE 2021 to 30<sup>th</sup> JUNE 2021

Program: **Automobile Engineering**

Curriculum Scheme: Rev2012

Examination: BE Semester VII

Course Code: AEC701 Course Name: Chassis and Body Engineering

Time: 2 hour

Max. Marks: 80

<b>Q1.</b>	<b>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks 2 Mark each</b>
1.	Integrally mounted parts and their mountings on chassis are called
Option A:	Dead weight
Option B:	C.G.
Option C:	Static load
Option D:	Chassis components
2.	Which of the following load is not supported by an automobile frame?
Option A:	Weight of the body, passengers and cargo loads
Option B:	Torque from engine and transmission
Option C:	Sudden impacts from collisions
Option D:	Nuclear Radiation
3.	Classification of different type of vehicle structure is based on
Option A:	Shear forces at the edges of panels
Option B:	Forces acting at front axle
Option C:	Forces acting at rear axle
Option D:	Forces acting on components of Engine
4.	Side loads on the vehicle arise due to
Option A:	Bump
Option B:	Pot hole
Option C:	Cornering
Option D:	Symmetric load
5.	Which value is considered of drag coefficient, while calculating the aerodynamic force for HALF-SPHERE shape of body?
Option A:	0.42
Option B:	0.45
Option C:	1.17
Option D:	0.50
6.	Front visibility of driver is not influenced by
Option A:	A pillar
Option B:	Position of B pillar
Option C:	Angle of front windshield
Option D:	Seating position of driver

7.	Drag which is produced due to lift is called?
Option A:	Induced drag
Option B:	Parasite drag
Option C:	Weight
Option D:	Thrust drag
8.	What Are Air Dams?
Option A:	Spoilers at the front of the vehicle
Option B:	Spoilers at the rear of the vehicle
Option C:	Spoilers at the sides of the vehicle
Option D:	Spoilers at the top of the vehicle
9.	The angular oscillation of the vehicle about lateral(horizontal) axis is called
Option A:	Rolling
Option B:	Pitching
Option C:	Yawing
Option D:	None of above
10.	As applied to specification of commercial heavy vehicle the abbreviation G.V.W is
Option A:	General vehicle width
Option B:	Given variable wheel base
Option C:	Gross vehicle weight
Option D:	Gross vehicle width
11.	The pockets to the driver side can be avoided by_____
Option A:	Making front of the door pillar straight
Option B:	Changing the design of dash panel and cowl air plenum
Option C:	Suitable slopping the door post
Option D:	By reducing the size of door
12.	In 4 Wheel Drive (4WD), the number of gear boxes used are
Option A:	1
Option B:	2
Option C:	3
Option D:	4
13.	Thinner is added to paint in order to
Option A:	Makes pigment and resin mix easily.
Option B:	Make paint film hard.
Option C:	Optimise its viscosity.
Option D:	Increase the life of paint.
14.	The air resistance to a car at 20 kmph is R, the air resistance at 40 kmph will be
Option A:	$R^2$
Option B:	2R
Option C:	4R
Option D:	$4R^2$
15.	Torsion on the structure of vehicle is a case of

Option A:	Vertical symmetrical loading case
Option B:	Vertical asymmetrical loading case
Option C:	Longitudinal casing
Option D:	Lateral casing
16.	ULSAB stands for
Option A:	Ultra Light Steel Autobody.
Option B:	Ultra Light Steel Autocar.
Option C:	Ultra Light Steel Automotive.
Option D:	Ultra Light Steel Automobile.
17.	Tumbling is used to _____ the small sized articles of vehicle.
Option A:	Joint
Option B:	Paint
Option C:	Cut
Option D:	Weld
18.	Which of the following is not a significance of load bearing structure is- _____
Option A:	We can establish proper load distribution on the structure part or assembly without failure.
Option B:	We can relatively manipulate the rigidity of skeleton of idealized structure.
Option C:	We can strengthen the skin of idealized structure as per the requirement.
Option D:	Better thermal insulation.
19.	Which one of the following below is considered under the category of vehicle equipments and accessories?
Option A:	Car bonnet, engine, body & body panel.
Option B:	Chassis, chassis components, fuel tank & suspension.
Option C:	Door locks, seats, windows & HVAC.
Option D:	Gear box
20.	Low floor of automobile is easy to design if _____ body is used instead of a separate chassis.
Option A:	An open
Option B:	Flat
Option C:	Semi-integral
Option D:	An integral

<b>Q2</b>	<b>Solve any Four out of Six5 marks each</b>
A	Explain Sheet Stamping Process.
B	What are the effects of loads on vehicle body?
C	What are the various types of metal selection used for vehicle body?
D	Write short notes on Master Model.
E	What are the requirements of passenger seat?
F	Write short notes on various car Style.

<b>Q3.</b>	<b>Solve any Two Questions out of Three 10 marks each</b>
A	What is aerodynamics? Explain various aerodynamics forces and moments acting on the vehicle.
B	Explain various power plant locations on chassis frame with advantages and disadvantages
C	Explain general principal of the Thin Walled Structures and behavior in torsion.

**University of Mumbai**

**Examination June 2021**

**Examinations Commencing from 15<sup>th</sup> JUNE 2021 to 30<sup>th</sup> JUNE 2021**

Program: B.E. Automobile Engineering

Curriculum Scheme: Rev2016

Examination: BE SemesterVII

Course Code: AEC701 and Course Name: Automotive Design

Time: 2 hour

Max. Marks: 80

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<b>Q1.</b>	<b>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks</b>
1.	when piston is at TDC position means
Option A:	maximum compressive stress acting on crankshaft
Option B:	maximum bending moment acting on crankshaft with twisting moment
Option C:	maximum bending moment acting on crankshaft and no twisting moment
Option D:	maximum shear stress acting on crankshaft
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.	Rise is the motion of follower
Option A:	away from cam
Option B:	follower is at rest
Option C:	follower moving towards cam centre

Option D:	none of the above
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 of 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 pivot of 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:	$n \cdot \mu \cdot w \cdot R^2$
Option B:	$n \cdot \mu \cdot w \cdot R$
Option C:	$n \cdot \mu \cdot w$

Option D:	$\mu \cdot w \cdot R$
15.	The heat generation in brake depends upon
Option A:	$p \cdot v$
Option B:	$p/v$
Option C:	$pv/2$
Option D:	$1/2pv^2$
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, $T = 150 \text{ N-m}$ , $n = 4$ , $\mu = 0.3$ and $R = 0.1 \text{ m}$ . 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:	$p = \text{constant}$
Option B:	$p/r = \text{constant}$
Option C:	$p \cdot r = \text{constant}$
Option D:	$r = \text{constant}$
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

<b>Q2</b>	<b>Solve any Four out of Six5 marks each</b>
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<b>(20 Marks Each)</b>	
A	What are the design considerations of clutch
B	Explain self-locking and self-energizing brakes.
C	Explain design considerations of belts
D	What are the forces acting on connecting rod?
E	Explain valve gear mechanism for horizontal engine
F	Write design procedure for helical Gear

<b>Q3</b> <b>(20 Marks Each)</b>	<b>Solve any Two Questions out of Three 10 marks each</b>
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 is 25% more than the inner radius. The intensity of pressure between the plate is not to exceed $0.07\text{N/mm}^2$ . the coefficient 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= $0.35\text{N/mm}^2$ Mechanical efficiency=80% Determine 1) bore and length of cylinder 2) thickness of cylinder head 3) size of the stud for cylinder head
C	A cast steel pinion running at 900 rpm transmit maximum power of 25 KW to a cast iron spur gear running at 144 rpm. Take safe static stress as 103 MPa and 55 Mpa for cast steel and cast iron respectively. Calculate module and static strength for the gear.

**University of Mumbai**  
**Examination 2021 under cluster 8 (Lead College: PHCET)**

Examinations Commencing from 15<sup>th</sup> June 2021 to 28<sup>th</sup> June 2021

Program: Automobile Engineering

Curriculum Scheme: Rev 2012

Examination: BE Semester VII

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

Time: 2 hour

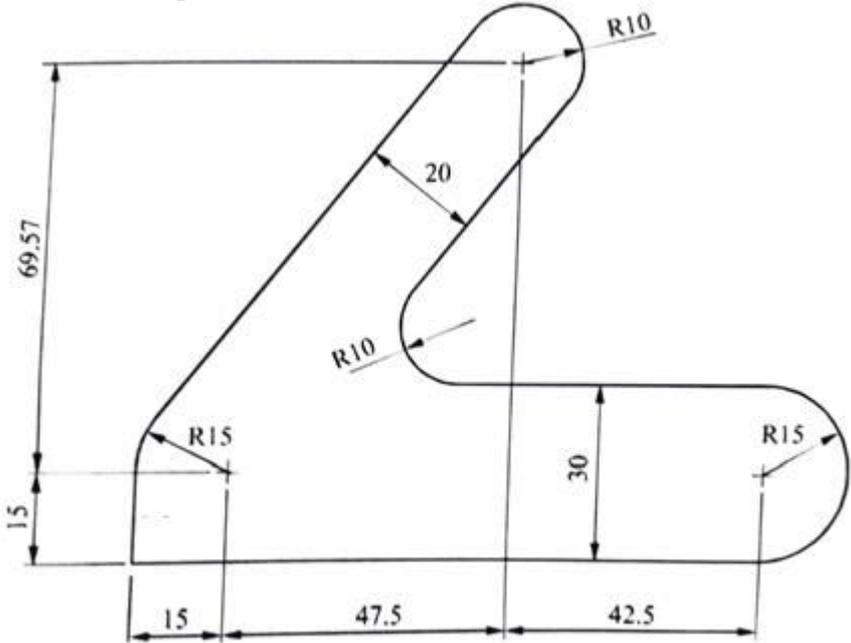
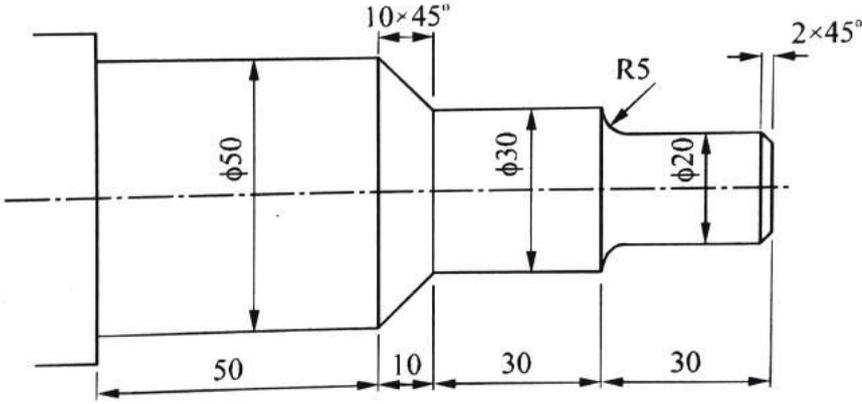
Max. Marks: 80

<b>Q1.</b>	<b>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks</b>
1.	The model which is created by using basic entities of two dimensioning is called
Option A:	Surface model
Option B:	Wireframe model
Option C:	Solid model
Option D:	Isometric model
2.	When the curve passes through all the data points, then the curve is known as
Option A:	Approximate Curve
Option B:	Pitch curve
Option C:	Data Curve
Option D:	Interpolation Curve
3.	The degree of the curve is independent of the number of control points in_____
Option A:	Hermite Curve
Option B:	Bezier curve
Option C:	B-Spline curve
Option D:	Hyperbola
4.	B-rep and C-rep are methods of_____
Option A:	Solid Modeling
Option B:	Surface Modeling
Option C:	Wireframe Modeling
Option D:	2D Modeling
5.	For reducing the size of an object, we set both scale factors as
Option A:	Less than 0
Option B:	Greater than 1
Option C:	Equals to 1
Option D:	In between 0 and 1
6.	After applying 2D shearing transformation in X-direction, unit square becomes
Option A:	Parallelogram
Option B:	Parabola
Option C:	Rectangle
Option D:	Hyperbola
7.	Translation equation $X_1=X+T_x$ $Y_1=Y+T_y$ What is another name for the

	translation pair $(T_x, T_y)$ ?
Option A:	Shift scaling
Option B:	Shift coordinates
Option C:	Translation points
Option D:	Rotate points
8.	The software that is used to provide the users with various functions to perform geometric modeling and construction is known as
Option A:	Operating software
Option B:	Graphics software
Option C:	Application software
Option D:	Programming software
9.	G95 represents,
Option A:	Incremental positioning
Option B:	Absolute positioning
Option C:	Per minute feed rate
Option D:	Per revolution feed rate
10.	A machine tool is called as a fixed zero type if,
Option A:	the origin is always predefined.
Option B:	the origin can be set by operator
Option C:	The part programming is done in absolute positioning
Option D:	The part programming is done in incremental positioning
11.	One of the following is the letter is used for representing speed, in G-M code part programming
Option A:	T
Option B:	S
Option C:	F
Option D:	M
12.	One of the following is not a type of statements in APT
Option A:	Geometry
Option B:	Motion
Option C:	Friction
Option D:	Auxiliary
13.	One of the following is not a CAE tool
Option A:	2D sketching in AUTOCAD
Option B:	Hypermesh
Option C:	Ansys
Option D:	Ansys Fluent
14.	CIM fulfill the goal of :
Option A:	Delivering high variety of products at low cost and short production cycles
Option B:	Manufacturing customized products at high cost and short production cycles
Option C:	Manufacturing customized products at low cost and short production cycles
Option D:	Delivering high quality of product irrespective of cost and production cycle time

15.	Just In Time technology attempts to:
Option A:	Avoid all costs that do not add any value to product
Option B:	Manufacture highest quality product
Option C:	Manufacture products at lowest cost
Option D:	Manufacture low quality product
16.	For any factory using CIM technology, which of the following is the center of control?
Option A:	Computer
Option B:	Robot
Option C:	AGV
Option D:	Automated assembly lines
17.	Rapid prototyping is used in
Option A:	Mass production
Option B:	Batch production
Option C:	Continuous production
Option D:	Customized and intricate products
18.	Stereo-lithography is based on
Option A:	Friction
Option B:	Fusion
Option C:	Photo-polymerization
Option D:	Extrusion
19.	Layers of adhesive coated materials is used in
Option A:	Shaping
Option B:	Milling
Option C:	MSL
Option D:	LOM
20.	Fused Deposition Modeling is
Option A:	Indirect tooling RP technique
Option B:	Solid based RP technique
Option C:	Liquid based RP technique
Option D:	Powder based RP technique

<b>Q2</b>	<b>Solve any Four out of Six5 marks each.</b>
A	Illustrate the steps in FEA
B	Explain the challenges in CIM implementation.
C	Explain the characteristics of Bezier Curve
D	Discuss additive manufacturing's applications in various fields.
E	Explain advantages, limitations and functions of CNC technology.
F	Explain the steps for 2D Mirror transformation

<b>Q3</b>	<b>Solve any Two Questions out of Three. 10 marks each</b>
A	<p>Write a computer assisted part program using APT, to machine an outline of the part as shown in figure below. Assume appropriate data, if required. Thickness of the part is 5mm.</p> 
B	<p>A triangle PQR has its vertices at P(0,0) Q(4,0) and R(2,3). It is to be translated by 4 units in X direction and 2 units in Y direction, then it is to be rotated in anticlockwise direction about the new position of point R through 90 degree. Find the new position of the triangle P"Q"R".</p>
C	<p>Write a manual part program using G-M codes, to create the part, as shown in figure below. Work piece material is mild steel. Calculate speed and feed. Assume any other appropriate data, if required and mention the same. Raw Material Size <math>\phi 50\text{mm}</math> by 125mm.</p> 

**University of Mumbai**  
**Examination 2020 under cluster 8 (Lead College: PHCET)**

Examinations Commencing from 15<sup>th</sup> June to 20<sup>th</sup> January 2021

Program: **Automobile Engineering**

Curriculum Scheme: **2016**

Examination: BE Semester VII

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

Time: 2-hour

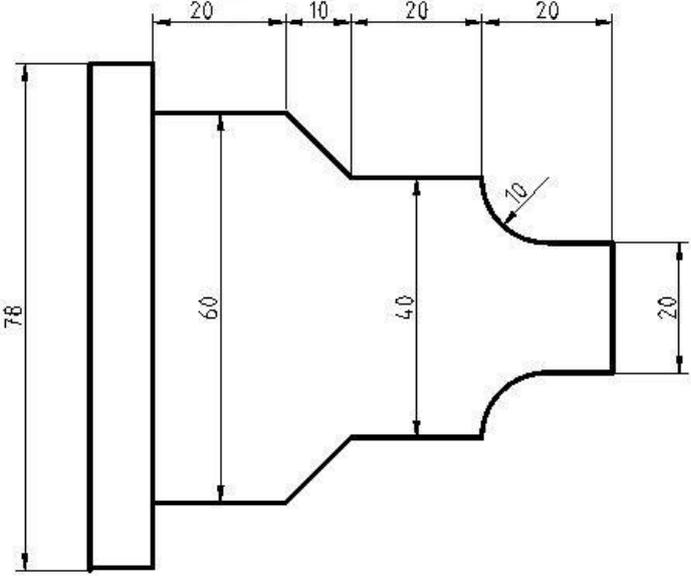
Max. Marks: 80

<b>Q1.</b>	<b>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks</b>
1.	G codes are
Option A:	Sequence numbers
Option B:	Preparatory Codes
Option C:	Miscellaneous Codes
Option D:	Given Codes
2.	Plane stress analysis is
Option A:	1D analysis
Option B:	2D analysis
Option C:	3D analysis
Option D:	2D or 3D analysis
3.	By default, the controller interprets the code in
Option A:	Metric and absolute mode
Option B:	Metric and incremental mode
Option C:	Inch and absolute mode
Option D:	Inch and incremental mode
4.	Which of the following code is NOT a canned cycle for Milling
Option A:	G71
Option B:	G81
Option C:	G82
Option D:	G84
5.	_____ systems are complex rule-based systems that help in solving problems that are solved by experts.
Option A:	Drafting based
Option B:	Coordinate based
Option C:	Knowledge based
Option D:	Projection based
6.	The _____ transformation distorts an object by scaling one coordinate using the other.
Option A:	mirror
Option B:	translation
Option C:	shear
Option D:	rotation

7.	A scaling constant $> 1$ , represents
Option A:	expansion
Option B:	compression
Option C:	unchanged values
Option D:	reflection
8.	The model which is created by using basic entities of two dimensioning is called
Option A:	Solid model
Option B:	Surface model
Option C:	Isometric model
Option D:	Wire frame model
9.	Which of the following is an analytical entity?
Option A:	Hyperbola
Option B:	Bezier curve
Option C:	B-spline curve
Option D:	Cubic spline curve
10.	One of the benefits of CIM is:
Option A:	Increase in machine utilization
Option B:	Increase in inventory
Option C:	Increase in cost
Option D:	No customer satisfaction
11.	Which of the following is the correct data structure for solid models?
Option A:	solid part $\rightarrow$ faces $\rightarrow$ edges $\rightarrow$ vertices
Option B:	solid part $\rightarrow$ edges $\rightarrow$ faces $\rightarrow$ vertices
Option C:	vertices $\rightarrow$ edges $\rightarrow$ faces $\rightarrow$ solid parts
Option D:	vertices $\rightarrow$ faces $\rightarrow$ edges $\rightarrow$ solid parts
12.	Choose the correct sequence to generate prototype.
Option A:	3D CAD data - CAD solid model - STL file - RP prototype
Option B:	CAD solid model - 3D CAD data - RP prototype - STL file
Option C:	STL file - 3D CAD data - CAD solid model - RP prototype
Option D:	3D CAD data - STL file - CAD solid model - RP prototype
13.	Which one of the following is purely technological aspects of CIM?
Option A:	Government policy
Option B:	Increase in productivity
Option C:	Increase in profit
Option D:	Trade union resistance
14.	STL file format is represented by interaction of _____.
Option A:	lines and hexagons
Option B:	lines and rectangles
Option C:	lines and triangles
Option D:	lines and circles
15.	CIM is most useful where a high level_____ is used in the company or facility,

	such as CAD/CAM system.
Option A:	Computer coding
Option B:	Information and Communication Technology
Option C:	Prediction
Option D:	Analysis
16.	Which of the following is a process of redesigning an existing product to improve its functions, add quality to increase the useful life?
Option A:	Reverse engineering
Option B:	Value engineering
Option C:	Rapid prototyping
Option D:	Computer aided design
17.	In CIM, the entire range of product development and manufacturing activities with all the functions are carried out with the help of dedicated Software packages in which the data required for various functions are;
Option A:	Used to transfer imprecisely to various software
Option B:	Passed from one application software to another in a warped manner
Option C:	Passed from one application software to another in a seamless manner
Option D:	Used to transfer cracked details of the various software
18.	Rapid Tooling is a _____ process
Option A:	Better, Slower and cost effective
Option B:	Faster, better and less expensive
Option C:	Faster, better and costly
Option D:	Better and complex
19.	Which of the following is used as base material in SLA process?
Option A:	Thermoplastics, Metal powders
Option B:	Titanium alloy
Option C:	Photopolymer
Option D:	Ceramic
20.	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

<b>Q2</b>	<b>Answer any Four out of Six (5 marks each)</b>
A	Explain Cutter radius Compensation with example.
B	Explain Parametric Optimization.
C	Explain Procedure of creating scripts for API.
D	Explain Feature based modeling technique used for 3D modeling.
E	Explain the applications of RP in Medical field
F	Illustrate the role of CAD/CAM in CIM

<b>Q3</b>	<b>Solve any Two Questions out of Three (10 marks each)</b>
A	<p>Write a manual part program in G and M codes to generate a part as shown in figure 1. Size of raw material is 85 mm in diameter and 100mm in length. Assume suitable data.</p>  <p style="text-align: center;"><i>Figure 1.</i></p>
B	Explain Cohen-Sutherland Clipping Algorithm with example.
C	Find the Transformation matrix aligns a given vector $V = aI+bJ+cK$ in three-dimensional space with positive Z-axis.

**University of Mumbai**  
**Examination 2020 under cluster 8 (Lead College: PHCET, Rasayani)**  
**Examinations Commencing from 15<sup>th</sup> JUNE 2021 to 30<sup>th</sup> JUNE 2021**

Program: **B.E. Automobile**  
Curriculum Scheme: Rev2016  
Examination: BE Semester VII

Course Code: AEC703 and Course Name: Autotronics

Time: 2 hour

Max. Marks: 80

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<b>Q1.</b>	<b>Choose the correct option for following questions. All the Questions are compulsory and carry equal marks</b>
1.	Battery capacity is expressed as....
Option A:	Amperes
Option B:	Watts
Option C:	Ampere hour
Option D:	kilowatts
2.	When lead acid battery discharges its plates are:
Option A:	Two dissimilar metals in the presence of an electrolyte.
Option B:	Two dissimilar metals in the presence of water.
Option C:	Two similar metals in the presence of water.
Option D:	Two similar metals in the presence of an electrolyte.
3.	What should be the position of bulb filament to achieve high beam condition?
Option A:	Closer to the lens
Option B:	Closer to the reflector
Option C:	Away from reflector
Option D:	At a focal point of parabolic reflector
4.	A lead acid battery may become hotter than normal during charge if
Option A:	Specific gravity is too high
Option B:	Charging voltage is too low
Option C:	Battery has shorted cell
Option D:	Vent cap is open
5.	Standard open circuit voltage for Lead-acid battery at standard conditions is
Option A:	3 Volts
Option B:	2.048 Volts
Option C:	2.50 Volts
Option D:	3.508 Volts
6.	The Electromagnetic recuperative Suspension system uses.....
Option A:	Servo motors
Option B:	Linear electromagnetic motors
Option C:	Drive motors
Option D:	Linear induction motors

7.	For battery ignition system, the energy required for producing spark is obtained from a _____ battery.
Option A:	6 V to 12 V
Option B:	12 V to 24 V
Option C:	24 V to 30 V
Option D:	30 V to 44V
8.	A _____ is a way in which a dependable variable is 'written' in conjunction to an independent variable in the engine management
Option A:	Loop
Option B:	Lookup Table
Option C:	Engine maps
Option D:	ECU Algorithms
9.	If turn indicators are working in only one direction not in other, what may be the reason?
Option A:	Bulb failure or poor ground
Option B:	Problem of wheel alignment
Option C:	Low battery voltage
Option D:	Faulty flasher
10.	Throttle Position sensor works on the principle of.....
Option A:	Optical type
Option B:	Inductive type
Option C:	Resistive type
Option D:	Thermistor type
11.	In Active suspension system, the damper fluid contains metallic particles, and, through the on board computer, the dampers'compliance characteristics are controlled by an electro-magnet is ....
Option A:	Viscous Damper
Option B:	Visco-Elastic Damper
Option C:	Magneto rheological damper
Option D:	Tuned Mass Damper
12.	When fuel level changes, which parameter varies in the fuel tank unit of the fuel gauge?
Option A:	Resistance
Option B:	Voltage
Option C:	Capacitance
Option D:	Charge
13.	Which type of stator winding produces higher AC generator output at low speeds?
Option A:	Wye
Option B:	delta
Option C:	trio
Option D:	series
14.	Due to sulphation in batteries the internal resistance
Option A:	Increases

Option B:	Decreases
Option C:	Remains same
Option D:	Is not affected
15.	GPS receivers are composed of_____, tuned to the frequencies transmitted by the satellites,
Option A:	Tuner
Option B:	an antenna
Option C:	A Radar
Option D:	A wire
16.	A fully-charged 6 cell automotive battery indicates ____
Option A:	12.6 V
Option B:	14 V
Option C:	The specific gravity of 1.29 at 32°C
Option D:	12.6 V and the specific gravity of 1.29 at 32°C
17.	What is the role of flasher in turn indicator circuit?
Option A:	To emit warning sound
Option B:	To protect circuit from high voltage
Option C:	To keep head lamps on when turn indicators are on
Option D:	To cause turn lights to flash on and off rapidly
18.	Electric Power steering is so far limited to passenger cars, as a higher - _____ electrical system is necessary to operate EPS in larger vehicles.
Option A:	Power
Option B:	torque
Option C:	Current
Option D:	voltage
19.	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
20.	The dryer drive uses the principle of
Option A:	Bendix drive and Overrunning clutch
Option B:	Bendix and Folo through drive
Option C:	Bendix and Rubber compression drive
Option D:	Bendix and spool drive

<b>Q2</b> (20 Marks )	<b>Solve any Four out of Six 5 marks each</b>
A	Write short note on : Dry charge battery
B	Differentiate between lead acid battery and alkaline battery with respect to their construction and working.
C	Explain in detail two types of starting motor drives
D	Write the requirements of starting and charging systems.
E	Differentiate between CDI and distributor less ignition systems
F	Write short notes on : Spark plug and Glow plug
<b>Q3.</b> (20 Marks )	<b>Solve any Two 10 marks each</b>
A	Explain in detail any three types of automotive sensors with their suitable sketches.
B	Explain cables, their sizes, color codes , connectors and wiring harness system used in automobiles
C	Describe the working of any two intelligent vehicle systems with suitable schematic diagrams and mention their application.