University of Mumbai
Examination 2020 under cluster 09 (FAMT)
Examinations Commencing from 7th January 2021 to 20th January 2021
Program: **MECHANICAL ENGINEERING**
Curriculum Scheme: Rev2016

Examination: BE   Semester VII
Course Code: MEC701   Course Name: MACHINE DESIGN-II
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 bearing number 6210 indicates that the bearing is having bore diameter _____
Option A:	10 mm
Option B:	20mm
Option C:	40mm
Option D:	50mm
2.	The gears are termed as medium velocity gears, if their peripheral velocity is _____
Option A:	1-3 m/s
Option B:	3-15 m/s
Option C:	15-30 m/s
Option D:	30-50 m/s
3.	The variation in chain speed is due to _____
Option A:	Creep
Option B:	Slip
Option C:	Backlash
Option D:	Chordal action
4.	A zero film bearing is a bearing _____
Option A:	Where the surfaces of journal and the bearing are separated by a thick film of lubricant
Option B:	Where the surfaces of journal and the bearing are partially separated by a film of lubricant and there is partial metal to metal contact
Option C:	Where the surfaces of journal and the bearing are separated by a film created by elastic deflection of parts
Option D:	Where there is no lubricant
5.	What should be the minimum number of teeth on the sprocket in case of chain drive in order to keep speed variation less than 1%.
Option A:	17
Option B:	21
Option C:	24
Option D:	30
6.	If T is the actual number of teeth on a helical gear and Ø is the helix angle for the teeth, the formative number of teeth is written as _____
Option A:	$T \sec^3 \emptyset$
Option B:	$T \sec^2 \emptyset$
Option C:	$T/\sec^3 \emptyset$
Option D:	$T/\csc \emptyset$

7.	Temperature rise in partial bearing is _____ than full bearing.
Option A:	Lesser
Option B:	Greater
Option C:	Equal
Option D:	Undeterminable
8.	Crowning of a flat belt pulley is done _____.
Option A:	To Prevent the slipping of a belt
Option B:	To increase the tension of a belt
Option C:	To increase the angle of contact
Option D:	To decrease the slip
9.	Prime circle radius means _____
Option A:	Radius of base circle + radius of roller follower
Option B:	Radius of base circle - radius of roller follower
Option C:	Radius of base circle
Option D:	Radius of pitch circle
10.	A pair of straight bevel gears consists of 16 pinion teeth and 42 gear teeth. What are the pitch cone angles of pinion and gear?
Option A:	67.60 degree & 22.40 degree
Option B:	52.14 degree & 37.86 degree
Option C:	20.85 degree & 69.15 degree
Option D:	35.12 degree & 54.88 degree
11.	The displacement equation for uniform velocity is____, where h is maximum rise of follower, Ө is cam angle for displacement, β is cam angle for rise h
Option A:	$h\,Ө/β$
Option B:	$h\,Ө/β^2$
Option C:	$h\,Ө/2β$
Option D:	$2h\,Ө/β$
12.	When the length of journal is greater than the diameter of the journal then the bearing is said to be _____
Option A:	Short bearing
Option B:	Long bearing
Option C:	Medium bearing
Option D:	Square bearing
13.	The property of a bearing material which has the ability to accommodate small particles of dust, grit etc., without scoring the material of the journal, is called _____
Option A:	Bondability
Option B:	Embeddability
Option C:	Comformability
Option D:	Fatigue strength
14.	During braking the brake shoe is moved outward to press against the _____
Option A:	Wheel piston or cylinder
Option B:	Brake lining
Option C:	Brake drum or disc
Option D:	Wheel rim or axle
15.	Number of starts used on the worm for velocity ratio 36 and above is _____ start
Option A:	Single
Option B:	Double

Option C:	Triple
Option D:	Quadruple
16.	In case of a multiple disc clutch, if n1 are the number of discs on the driving shaft and n2 are the number of the discs on the driven shaft, then the number of pairs of contact surfaces will be _____
Option A:	n1 + n2
Option B:	n1 + n2 – 1
Option C:	n1 + n2 + 1
Option D:	n1 - n2
17.	Sommerfeld no is given by _____where, Z is absolute viscosity of lubricant, N is speed of journal, p is bearing pressure, d is diameter of journal and c is diametral clearance.
Option A:	$(ZN/p) (d/c)^2$
Option B:	$(ZN/p) (d/c)$
Option C:	$(ZN/p) (2d/c)$
Option D:	$(ZN/p) (d/2c)$
18.	Which type of brakes have wooden blocks placed inside flexible steel band?
Option A:	Band and Block brake
Option B:	Band brake
Option C:	Block brake
Option D:	Pivoted block brake
19.	Offset is provided to a cam follower mechanism to _____
Option A:	minimize the side thrust
Option B:	accelerate
Option C:	avoid jerk
Option D:	maximize the side thrust
20.	Brake efficiency is a term which denotes _____
Option A:	Efficiency of the braking system as a whole
Option B:	Efficiency of the braking linings
Option C:	The deceleration as percentage of gravity
Option D:	Efficiency of the operating linkage

Q2.
(20 Marks)
	Solve any Two questions out of three questions 10 marks each
	   i) **Assume suitable data if necessary,**
	   ii) **Use of Design Data book is permitted**

A	A worm reduction unit is required to transmit 15 KW from an electric motor operating at 1440 rpm. The output speed is 72 rpm and the load is with mild shock, duty normal.
	  i) Select suitable material and stresses, design worm and worm wheel for strength and wear.
	  ii) Check the unit for heat dissipation capacity and modify the dimension if necessary.

B	The turning moment diagram for a petrol engine is drawn to the following scale: turning moment 1mm = 6 N-m, crank angle 1mm = 1 degree. The turning moment diagram repeats itself every half revolution of the engine and the area above and below the mean torque line taken in order are 295, 685, 40, 340, 960, 270 mm^2. Determine the mass of 400 mm diameter of flywheel rim when the coefficient of fluctuation of speed is 0.3% and the engine runs at 1700 rpm. Also determine the cross section of the rim when width of the rim is twice of thickness. Assume density of rim material as 7250 Kg/m^3

C	An electric motor is coupled to a machine through multiple clutch operation under dry condition. The clutch is required to transmit 10kW at 740 rpm. The frequency of operation is 32 in 8 hours. Due to space constraint overall size of clutch is limited to 250 mm in radial direction. Design the following components. i) Input shaft ii) Output shaft iii) Friction plates

Q3.
(20 Marks)
	Solve any Two questions out of three questions 10 marks each
	   i) **Assume suitable data if necessary,**
	   ii) **Use of Design Data book is permitted**

A	Determine the maximum velocity and acceleration from the motion analysis of the rotary disc cam with central translatery roller follower. Forward stroke 25 mm in 70 degree of cam rotation with cycloidal motion, dwell of 30 degree of cam rotation and return stroke of 25 mm in 50 degree of cam rotation in SHM and remaining dwell. Mass of follower is 1 Kg. Cam speed is 600 rpm. Maximum pressure angle during forward stroke and return stroke is 25 degree. The external force during forward stroke is 400N and during return stroke is 100N.
B	A deep groove ball bearing is to be selected for an intermediate shaft of an helical gear box which is subjected to an axial load of 5 KN and a radial load of 10 KN when operate at 500 rpm. Select suitable size of bearing if it is required to have a life of 20000 hrs with a probability of survival 92%.
C	A pair of helical gear is used to transmit power from an electric motor rated at 50 KW, 960 rpm. The motor is coupled to the pinion shaft and reduction ratio is approximately 4.2. The helix angle is 17^0. The gears are with 20^0 pressure angle full depth involute profile. i) Select suitable material and design stresses. ii) Using Lewis equation and Barth velocity factor determine module and face width.

University of Mumbai
Examination 2020 under cluster 9 (FAMT)
Examinations Commencing from 7ᵗʰ January 2021 to 20ᵗʰ January 2021
Program: **Mechanical Engineering**
Curriculum Scheme: **2016**
Examination: BE Semester VII
Course Code: **MEC702** and Course Name: **CAD/CAM/CAE**

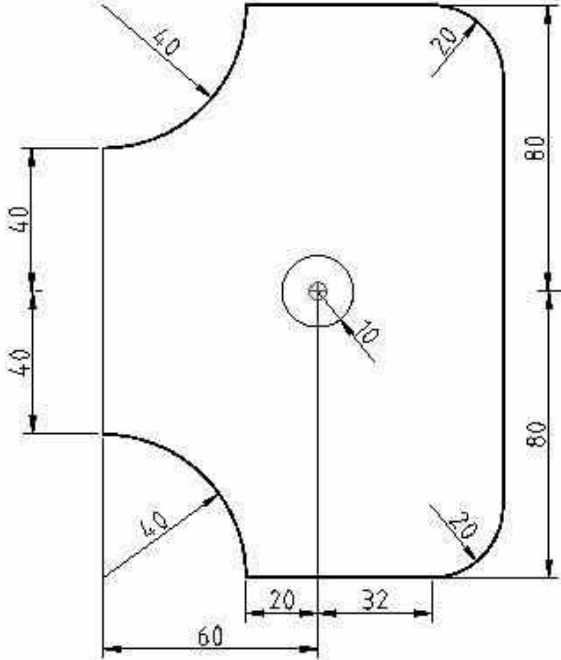Time: 2-hour   Max. Marks: 80

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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)**
	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 9 (FAMT, Ratnagiri)

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

Program: Mechanical Engineering

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: MEC703 and Course Name: Production Planning and Control

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 routing function in a production system design is concerned with
Option A:	Manpower utilization
Option B:	Quality assurance of the product
Option C:	Machine utilization
Option D:	Optimizing material flow through the plant
2.	Material Requirement Planning typically determine
Option A:	How to order
Option B:	What to order
Option C:	Where to order
Option D:	When to order
3.	There are 3 workstations in the assembly flow line and their time consumption is 4min, 5min, 3min respectively. What is the efficiency of the assembly line?
Option A:	100%
Option B:	80%
Option C:	75%
Option D:	70%
4.	Given the data 92, 93, 92, 91, 93, 94, 92 find the forecast range for the eighth period using Simple average
Option A:	92.00 - 93.00
Option B:	94.00 - 95.00
Option C:	91.00 - 92.00
Option D:	93.00 - 94.00
5.	A work shift is for 8 hours duration; 30 minutes lunch break and two 15 minutes (each) tea breaks are allowed per shift. If products are to go out after assembly at the rate of 60 per shift, and total assembly time content for a product is 42 minutes, then minimum number of work stations needed is:
Option A:	8
Option B:	12

Option C:	6
Option D:	5
6.	A manufacturer has to supply his customers 3000 units of his product per year. Inventory carrying cost is Re. 1 per annum and the set up cost per run is Rs. 100. What is the EOQ in units?
Option A:	775
Option B:	675
Option C:	575
Option D:	625
7.	Which one of the following is not an input to the manufacturing system?
Option A:	Man
Option B:	Information
Option C:	Energy
Option D:	R & D
8.	Following is NOT the selective control of inventory
Option A:	ABC analysis
Option B:	HML analysis
Option C:	PQR analysis
Option D:	SOS analysis
9.	In an assembly line for assembling toys, five workers are assigned each task, which take times of 10, 8, 6, 9 and 10 minutes respectively. The balance delay for assembly the line is
Option A:	43.5%
Option B:	14.8%
Option C:	14%
Option D:	16.3%
10.	Which one of the following does not fall under qualitative methods of forecasting?
Option A:	Judgmental methods
Option B:	Moving average methods
Option C:	Market research
Option D:	Delphi method
11.	The length of time between placing an order and receipt of items is
Option A:	Demand
Option B:	Order cycle
Option C:	Re-order level
Option D:	Lead time

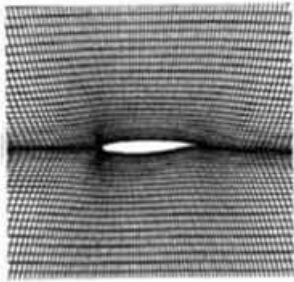|	
12.	The critical path
Option A:	is a path that operates from the starting node to the end node
Option B:	is a average of all paths
Option C:	is the longest path
Option D:	is the shortest path
13.	Which one of the following is the manufacturing strategy adopted for Umbrella manufacturing?
Option A:	Make to Order
Option B:	Make to Stock
Option C:	Assemble to order
Option D:	Engineer to order
14.	In PERT, if the pessimistic time were 14 weeks, the optimistic time were 8 weeks, and the most likely time were 11 weeks,
Option A:	the variance would be 1 week.
Option B:	the variance would be 11 weeks.
Option C:	the expected time would be 5.5 weeks.
Option D:	there is not enough information.
15.	Which of the following is most appropriate statement for forecasting?
Option A:	Qualitative forecasting is the most accurate.
Option B:	Quantitative forecasting is most accurate.
Option C:	Forecasting always has some errors.
Option D:	Prediction
16.	Following is one of the replenishment system in inventory control
Option A:	P system
Option B:	R system
Option C:	L system
Option D:	T system
17.	In PERT, slack time equals
Option A:	EST + t
Option B:	LST - EST
Option C:	zero
Option D:	EFT - EST.
18.	Decisions relating to production scheduling involve:
Option A:	Short-term forecasts
Option B:	Medium-term forecasts
Option C:	Long-term forecasts
Option D:	Short-term, medium-term and long-term forecasts
19.	Sequencing
Option A:	assigns dates to specific jobs
Option B:	assigns jobs to work centres

Option C:	specifies the order in which jobs should be done at each centre
Option D:	assigns workers to jobs
20.	The heart of any ERP system is
Option A:	Information
Option B:	Database
Option C:	Customers
Option D:	Employees

Q2 (20 Marks)	Solve any Four out of Six (5 marks each)
A	What are the information required to develop process planning?
B	A washing machine manufacturing company establishes a fact that there is a relationship between the sale of washing machines and the population of the city. The market research carried out reveals the following information. Fit linear equation and estimate the demand for 45 million population.
C	Explain the different stages in the evolution of ERP system.
D	Describe the Functions of Production Planning and Control.
E	A project has the following characteristics
F	Derive the equation of EOQ for basic inventory model.

B table:

Population (million)	5	7	15	22	27	36
Washing machine demand ('000)	28	40	65	80	96	130

E table:

Activity	Optimistic time	Pessimistic time	Most likely time
1-2	1	5	1.5
2-3	1	3	2
2-4	1	5	3
3-5	3	5	4
4-5	2	4	3
4-6	3	7	5
5-7	4	6	5
6-7	6	8	7
7-8	2	6	4
7-9	5	8	6
8-10	1	3	2
9-10	3	7	5

Construct network diagram. Find critical path and variance of each event.

Q3 (20 Marks)	Solve any Four out of Six (5 marks each)
A	Classify the following items into ABC and draw the ABC curve. <table><tr><td>Item No.</td><td>501</td><td>502</td><td>503</td><td>504</td><td>505</td><td>506</td><td>507</td><td>508</td><td>509</td><td>510</td></tr><tr><td>Annual Consumption</td><td>300</td><td>2800</td><td>30</td><td>1100</td><td>40</td><td>2200</td><td>150</td><td>800</td><td>600</td><td>80</td></tr><tr><td>Unit price (Rs)</td><td>10</td><td>15</td><td>10</td><td>5</td><td>5</td><td>10</td><td>5</td><td>5</td><td>15</td><td>10</td></tr></table>
B	Differentiate between PERT and CPM
C	Explain manufacturing methods with suitable examples.
D	It is required to make 144 units of products in 4hrs shift. Each tasks, their time and predecessor are shown below. <table><tr><th>Task</th><th>Task time (s)</th><th>Immediate predecessor</th></tr><tr><td>A</td><td>90</td><td>-</td></tr><tr><td>B</td><td>30</td><td>-</td></tr><tr><td>C</td><td>70</td><td>A</td></tr><tr><td>D</td><td>10</td><td>A,B</td></tr><tr><td>E</td><td>30</td><td>D</td></tr><tr><td>F</td><td>60</td><td>C</td></tr><tr><td>G</td><td>50</td><td>C</td></tr><tr><td>H</td><td>50</td><td>E,F,G</td></tr></table> Construct precedence diagram. Determine minimum number of work-stations, allocate the tasks in the stations according to Largest candidate rule.
E	What are the objectives of MRP system?
F	Describe three qualitative forecasting methods with suitable examples

University of Mumbai
Examination 2020 under cluster 9 (FAMT)
Examinations Commencing from 7th January 2021 to 20th January 2021
Program: BE – MECHANICAL ENGINEERING
Curriculum Scheme: Rev 2016
Examination: BE Semester VII
Course Code: MEDLO7034 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 $(\Gamma \text{grad } \Phi)$
Option D:	grad $(\Gamma \text{div } \Phi)$
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 jth 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:	$\tau_{yx} = 2\mu \left(\dfrac{\partial v}{\partial y}\right) + \lambda(\nabla . V)$
Option B:	$\tau_{xy} = \mu \left(\dfrac{\partial u}{\partial y} + \dfrac{\partial v}{\partial x}\right)$
Option C:	$\tau_{xy} = 2\mu \left(\dfrac{\partial u}{\partial y} + \dfrac{\partial v}{\partial x}\right)$
Option D:	$\tau_{yx} = \mu \left(\dfrac{\partial u}{\partial x} + \dfrac{\partial v}{\partial y}\right)$
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, $\rho = 1.0 \text{ kg/m}^3$, $\Gamma = 0.1$ 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 9 (FAMT)
Examinations Commencing from 7th January 2021 to 20th January 2021
Program: Mechanical Engineering
Curriculum Scheme: Rev2016
Examination: BE Semester VII
Course Code: MEDLO7031 and Course Name: Mechanical Vibration

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.	_____ method is not based on energies.
Option A:	Energy
Option B:	Lagrange
Option C:	Rayleigh
Option D:	Newton
2.	The mass moment of inertia of a disc, with radius R and mass M, about the axis of rotation passing through its center is _____.
Option A:	$M\,R\,R$
Option B:	$2\,M\,R\,R$
Option C:	$0.5\,M\,R\,R$
Option D:	$0.5\,M\,R$
3.	A solid wooden cylinder of cross sectional area A and height h is partially immersed in a bath of water of density ρ. The cylinder is depressed slightly and released. The square of the natural frequency of oscillation of the cylinder if it stays upright all the time is _____.
Option A:	$mg/A\rho hh$
Option B:	g/h
Option C:	$2g/h$
Option D:	$A\rho g/m$
4.	Flexibility and stiffness matrices have _____ relation.
Option A:	Direct
Option B:	No
Option C:	Direct exponential
Option D:	Inverse
5.	At _____ point, the deflection is maximum.
Option A:	Node
Option B:	Anti-node
Option C:	Saddle
Option D:	Triple
6.	_____ coordinates give equations of motion that are uncoupled both statically and dynamically.

Option A:	Dependent
Option B:	System
Option C:	Principal
Option D:	No
7.	If two equations of motion contain second derivatives of both displacement variables, it is called as _____.
Option A:	Nothing as such
Option B:	Elastic or static coupling
Option C:	Damping or velocity coupling
Option D:	Dynamic or inertia coupling
8.	In the case of overdamped response, the roots of the characteristic equation are _____.
Option A:	Real and distinct
Option B:	Equal
Option C:	Imaginary
Option D:	Zero
9.	In the case of viscous damping, the reduction in the consecutive amplitudes is _____.
Option A:	Linear
Option B:	Exponential
Option C:	Quadratic
Option D:	Cubic
10.	The equation of motion depicting forced vibration with viscous damping is a _____, _____ equation.
Option A:	Linear, Homogeneous
Option B:	Linear, Non-homogeneous
Option C:	Nonlinear, Homogeneous
Option D:	Nonlinear, Non-homogeneous
11.	In the case of forced vibration, the phase angle between the spring force and damping force is _____.
Option A:	π
Option B:	$\pi/2$
Option C:	2π
Option D:	0
12.	The springs of an automobile trailer are compressed 0.1 m under its own weight. The trailer is travelling over a road with a profile approximated by a sine wave of amplitude 0.08 m and wavelength 14 m. Assuming no damping present in the system, the amplitude of vibration of the trailer at 60 km/h is _____.
Option A:	0.086 m
Option B:	0.186 m
Option C:	1.186 m
Option D:	0

13.	An accelerometer works well when the frequency ratio is _____.
Option A:	Very high
Option B:	Very small
Option C:	1
Option D:	0
14.	In the case of _____ tachometer, multiple reeds of same length with different masses are used to find the natural frequency of a vibrating body.
Option A:	Frahm
Option B:	Fullarton
Option C:	Newton
Option D:	Multi-reed
15.	_____ maintenance does not support a safe environment.
Option A:	Predictive
Option B:	Preventive
Option C:	Breakdown
Option D:	Condition monitoring
16.	The time waveforms obtained from two transducers whose outputs are shifted by 90° in phase give _____.
Option A:	Phase plot
Option B:	Power spectrum
Option C:	Frequency spectrum
Option D:	Orbits
17.	The principle of linear superposition cannot be used to analyze _____ system subjected to multi-frequency excitation.
Option A:	Linear
Option B:	Any
Option C:	Linear-homogeneous
Option D:	Nonlinear
18.	_____ equation is a model of a structural system which includes nonlinear restoring forces.
Option A:	Newton
Option B:	Maxwell
Option C:	Duffing
Option D:	Lagrange
19.	In the case where all the neighboring trajectories approach the limit cycle as time approaches infinity, it is called _____ limit cycle.
Option A:	Unstable
Option B:	Semi-stable
Option C:	Stable
Option D:	Infinite
20.	If eigenvalues of a second-order viscously damped system have both real and imaginary components, its phase portrait will have _____ shape.

Option A:	Elliptical
Option B:	Parabolic
Option C:	Spiral
Option D:	Hyperbolic

Q2.	Solve any Two Questions out of Three (10 marks each)
A	An exhaust fan rotating at 1000 rpm, is to be supported by four springs, each having a stiffness of K. If only 10 percent of the unbalanced force of the fan is to be transmitted to the base, what should be the value of K? Assume the mass of the exhaust fan to be 40 Kg.
B	Derive differential equations of motion for a double pendulum (with string lengths l_1 and l_2; masses m_1 and m_2) using the coordinates θ_1 and θ_2, assuming small amplitudes. Write the equations in the matrix form.
C	In a single degree of freedom spring-mass-damper system, mass = 20 Kg, Spring stiffness = 10 N/mm, and Damping = 0.15 N/mm/s. If the system is initially at rest and a velocity of 100 mm/s is imparted to the mass, then determine (i) displacement and velocity of mass as a function of time, and (ii) displacement and velocity at time equal to one second.

Q3.	Solve any Two Questions out of Three (10 marks each)
A	A vehicle of mass 1,200 kg is travelling on a road, the surface of which varies sinusoidally with an amplitude of 0.05 m and wave length of 6 m. The suspension system has a spring constant of 400 kN/m and a damping ratio of 0.50. If the vehicle speed is 100 km/h, find the amplitude of the vehicle.
B	Explain how a simple seismic pick-up can measure the amplitude of motion or the acceleration of a vibrating body depending upon the ratio of its natural frequency to the frequency of the vibrating body.
C	Explain various sources of nonlinearity in vibration; and differentiate between linear and nonlinear vibration.

University of Mumbai
Examination 2020 under cluster 9 (FAMT, Ratnagiri)
Examinations Commencing from 7th January 2021 to 20th January 2021
Program: **B.E Mechanical**
Curriculum Scheme: Rev 2016
Examination: BE Semester VII
Course Code: MEDLO7032 and Course Name: Automobile 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.	A Single plate clutch has __.
Option A:	A driven plate which has one driving surface.
Option B:	A driven plate which has two driving surface.
Option C:	The main thrust springs plate between the plate and cover.
Option D:	Friction facing riveted to the pressure plates.
2.	Which aspect is not correct in the context of wet clutch when compared with dry clutch?
Option A:	Greater torque capacity
Option B:	Can tolerate long engagement time.
Option C:	Long life
Option D:	Clutch plate wetter by oil circulation.
3.	A freewheel_____ i. is always in action during the motion of the wheel. ii. gets automatically locked. iii. is mounted just after gearbox iv. involves a cam and spring loaded balls in its construction.
Option A:	ii & iii
Option B:	i & iii
Option C:	ii,iii & iv
Option D:	i,iii & iv
4.	In the coupling stage of conventional torque converter _____.
Option A:	Both the stator and turbine are stationary.
Option B:	Both stator and impeller are stationary.
Option C:	The stator free wheels.
Option D:	Both the impeller and turbine turn almost at same speed.
5.	The full floating axle has to withstand the following loads : i. driving torque ii. Weight of vehicle. iii. end thrust
Option A:	Only i
Option B:	i & iii
Option C:	ii & iii
Option D:	i , ii & iii

6.	Identify the smallest gear inside the differential casing.
Option A:	Sun gear
Option B:	Pinion gear
Option C:	Side gear
Option D:	ring gear
7.	The center part of typical universal joint is called as _____.
Option A:	Shear pin
Option B:	Fork
Option C:	Spider
Option D:	Trunnion
8.	The function of propeller shaft is to _____.
Option A:	Allows sharp turn to be taken smoothly
Option B:	Connect the engine to drive wheels
Option C:	Assist in final gear reduction
Option D:	Transmit power from gearbox to differential
9.	The term castor is associated with _____.
Option A:	steering system
Option B:	Braking system
Option C:	transmission system
Option D:	Suspension system
10.	On cars having rack and pinion gear, the rack is attached to _____.
Option A:	Relay rod
Option B:	Tie rod
Option C:	Track rod
Option D:	Drag link
11.	The brake fade applied to braking system means_____.
Option A:	Fall in efficiency due to heat
Option B:	Discolorisation of oil soaked lining
Option C:	Excessive wear causing decrease in friction
Option D:	Requirement of greater effect due to increased shoe clearance.
12.	All the followings are true about radial tires except.
Option A:	All plies run parallel to each other.
Option B:	All plies are vertical to tyre bead.
Option C:	Greater rolling resistance compared to bias ply tyre.
Option D:	A circumferential belt is applied over the plies.
13.	Consider the following statements with respect to wheel imbalance. i. bounces vertically or deflects side to side ii. causes steering wheel vibration and uneven tyre wear. iii. can be adjusted by tyre rotation.
Option A:	i , ii & iii
Option B:	i & ii
Option C:	ii & iii

Option D:	i & iii
14.	The liners of zinc or any other soft material are occasionally inserted between the blades of leaf springs to _____.
Option A:	Improves fatigue life
Option B:	Provide damping
Option C:	Decrease vibration
Option D:	Prevents squeaking sound
15.	Which is not true in the context of coil springs used mainly with independent suspension system?
Option A:	Capability to take torque reaction and side front.
Option B:	Can store more energy per unit volume.
Option C:	No static friction and noise problem.
Option D:	Can be well accommodated in restricted space.
16.	The stationary magnetic field in the starting motor is produced by _____.
Option A:	Relay or solenoid
Option B:	Field windings of permanent magnets
Option C:	Brushes or Commutator
Option D:	Armature windings
17.	The purpose of dynamo is to _____.
Option A:	Convert the mechanical energy into electric energy.
Option B:	Act as reservoir of electric energy
Option C:	Supply the electric power
Option D:	Continually recharge the battery
18.	Which aspect is not true in the context of frameless construction when compare to conventional framed construction?
Option A:	Passenger safety during accidents.
Option B:	Reduced weight
Option C:	Greater strength and durability
Option D:	Increased stability
19.	Which aspect is true in the context of profile drag?
Option A:	Sum of skin friction and pressure drags.
Option B:	Drag due to shape and form of the body.
Option C:	Drag produced by end effects due to finite length of an object.
Option D:	Results from occurrences of wake.
20.	Following type of sensors are used to generate information in object grasping and obstacle avoidance.
Option A:	Hall Effect sensor
Option B:	Proximity sensor
Option C:	Light sensor
Option D:	Optical sensors

Q2.	Attempt the following	
A	**Solve any Two.**	**5 marks each**
i.	Explain overdrive with neat sketch.	
ii.	Explain various battery ratings.	
iii.	Explain bendix drive.	
B	**Solve any One**	**10 marks each**
i.	Explain various types of automobile chassis with neat sketch.	
ii.	Explain the difference between sprung and un-sprung mass.	

Q3.	Attempt the following	
A	**Solve any Two.**	**5 marks each**
i.	Explain electronic brake distribution.	
ii.	Explain under-steer and over-steer phenomenon.	
iii.	Write a short note on automobile differential.	
B	**Solve any One**	**10 marks each**
i.	Explain different types of final drive with neat sketch.	
ii.	Explain working of synchromesh gearbox in detail with neat sketch.	

University of Mumbai
Examination 2020 under cluster 9 (FAMT Ratnagiri)
Examinations Commencing from 7th January 2021 to 20th January 2021
Program: Mechanical Engineering
Curriculum Scheme: Rev2016
Examination: BE Semester VII
Course Code: MEDLO7033 and Course Name: PUMPS COMPRESSORS AND FANS

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.	According to Euler's equation in relation to hydraulic machines, the rate of energy transfer by the fluid to the rotor can be expressed in terms of the head as: (here, **Vw** is the whirl component of velocity of the fluid and **U** is the linear velocity of the rotor. Subscripts 1 and 2 represent inlet and outlet of the rotor respectively)
Option A:	$H = Vw_1U_1 - Vw_2U_2$
Option B:	$H = Vr_1U_1 - Vr_2U_2$
Option C:	$H = V_1U_1 - V_2U_2$
Option D:	$H = Vw_1V_1 - Vw_2V_2$
2.	Dimesnionless parameter (Q / ND^3) is called as
Option A:	Head coefficient
Option B:	Capacity coefficient
Option C:	Reynolds number
Option D:	Power coefficient
3.	Negative slip in reciprocating pump occurs when...
Option A:	Actual discharge is more than theoretical discharge
Option B:	Delivery pipe is long
Option C:	Suction pipe is short
Option D:	Pump is running at slow speed
4.	An operation in which liquid is completely filled in the chamber of pump so that air or gas or vapour from the portion of pump is driven out and no air pocket is left is called ……
Option A:	emptying
Option B:	blowing
Option C:	priming
Option D:	scavenging
5.	Fans and blowers are turbo machines which deliver air at a .....
Option A:	at high velocity and low pressure
Option B:	at low velocity and low pressure
Option C:	at high velocity and high pressure
Option D:	at low velocity and high pressure
6.	Impellers are useful in the pumping of liquids containing suspended solid matter,

	such as paper pulp, sewage and water containing sand or grit. These impellers are .....
Option A:	Semi open impellers
Option B:	Closed impellers
Option C:	Open impellers
Option D:	Semi closed impellers
7.	For best efficiency of the pump, it is commonly assumed that the liquid should enters the impeller.........
Option A:	Axially
Option B:	Radially
Option C:	tangentially
Option D:	at an angle 45
8.	Value of slip factor for 24 number of vanes
Option A:	1.01
Option B:	0.99
Option C:	0.85
Option D:	0.91
9.	The main function of centrifugal pump is to
Option A:	Transfer Pressure
Option B:	Transfer Speed
Option C:	Transfer Temperature
Option D:	Transfer Energy
10.	The device used to obtain a continuous supply of water at uniform rate, to save a considerable amount of work and to run the pump at a high speed without seperation is called as....
Option A:	Air vessel
Option B:	Suction valve
Option C:	Delivery valve
Option D:	foot valve
11.	What is the specific ratio for a blower?
Option A:	<1.1
Option B:	1.11 to 1.2
Option C:	>1.2
Option D:	1.11
12.	_____ can be defined as the ratio of the pressure rise in rotor blades to the pressure rise in stages in an axial flow compressor.
Option A:	Degree of pressure
Option B:	Reaction ratio
Option C:	pressure ratio
Option D:	Degree of reaction
13.	In centrifugal compressors, working fluid i.e. air will enter to the compressor at the impeller eye ....and will be released ....
Option A:	Axially, radially inward

Option B:	tangentially, radially outward
Option C:	Axially,radially outward
Option D:	radially,radially outward.
14.	Vaneless space in centrifugal compressor provided because
Option A:	Mach number of flow of air need to be increased.
Option B:	Mach number of flow of air need to be reduced.
Option C:	Mach number of flow of air should not be affected.
Option D:	Mach number of flow be 1.2.
15.	Overall efficiency of a centrifugal pump is the ratio of
Option A:	Energy available at the impeller to the energy supplied to the pump by the prime mover
Option B:	Actual work done by the pump to the energy supplied to the pump by the prime mover
Option C:	Energy supplied to the pump to the energy available at the impeller
Option D:	Manometric head to the energy supplied by the impeller per Newton of water
16.	The discharge through a single acting reciprocating pump is
Option A:	Q = 2ALN/60
Option B:	Q = ALN/60
Option C:	Q = ALN
Option D:	Q = 2NT/60
17.	A fan produces 1000 m3/hour at an impeller speed of 2000 rpm. What is the resulting airflow if the speed was reduced to 1000 rpm?
Option A:	250 m3/hour
Option B:	500 m3/hour
Option C:	650 m3/hour
Option D:	150 m3/hour
18.	In which of the following exhaust fan air flows radially (diverging from the center)
Option A:	Axial fan
Option B:	Tube axial fan
Option C:	Centrifugal fan
Option D:	Propeller fans
19.	On pump head curve the maximum volume flow rate through a pump occurs when its net head is zero is called as _____
Option A:	Pump free delivery
Option B:	Shut off head
Option C:	Best efficiency point
Option D:	Operating point
20.	The metallic surfaces are damaged and cavities are formed on the surfaces.This is the effect of _____
Option A:	Prewhirl
Option B:	Vapour pressure
Option C:	Discharge pressure

Option D:	Priming

Q2	**Solve any Four out of Six (5 marks each)**
A	State and Define various dimensionless parameter used in fluid machines
B	A single acting reciprocating pump, running at 50 rpm delivers 0.00736 m3/s of water. The diameter of the piston is 200 mm and stroke length 300 mm. The suction and delivery heads are 3.5 m and 11.5 m respectively. Determine percentage slip of the pump and power required to run the pump.
C	Write a note pump in series and parallel.
D	Explain the term Stall, Surging and choking with respect to centrifugal compressor.
E	In one stage of an axial flow compressor, the pressure ratio is to be 1.22 and the air inlet stagnation temperature is 288K. If the stagnation temperature rise of the stages is 21K, the rotor tip speed is 200 m/s, and the rotor rotates at 4500 rpm, calculate the stage efficiency and diameter of the rotor.
F	Write a note on Classification of fan.

Q3.	**Solve any Two Questions out of Three (10 marks each)**
A	*A single acting reciprocating pump has a piston dimeter 150 mm and stroke length 350 mm. The centre of the pump is 3.5 m above the water surface in the sump and 22 m below the delivery water level. Both the suction and delivery pipes have the same diameter of 100 mm and are 5m and 30m long respectively. If the pump is working at 30 rpm. Determine* *1) Pressure head on the piston at teh beginning,middle and end of both suction and delivery strokes* *2) The power required to drive the pump. Take atmospheric pressure as 10.3 m of water.*
B	*A centrifu*gal pump impeller *having external and internal diameter 480 mm and 240 mm respectively is running at 100 rpm.The rate of flow through the pump is 0.576 m3/s and velocity of flow is constant and equal to 2.4 m/s. The diameters of the suction and delivery pipes are 180 mm and 120 mm respectively and suction and delivery heads are 6.2 m(abs) and 30.2 m of water respectively.If the power required to drive the pump is 23.3 kw and the outlet vane angle is 450. Determine:* *1) Inlet blade angle* *2) The overall efficiency* *3)The manometric efficiency of the pump.*
C	An axial flow compressor has a tip diameter of0.95 m and a hub diameter of 0.85 m. The absolute velocity of air makes an angle of 288 measured from the axial direction and relative velocity angle is 568.The absolute velocity outlet angle is 568 and the relative velocity outlet angle is 288.The rotor rotates at 5000 rpm and the density of air is 1.2 kg/m. Determine: 1. The axial velocity. 2. The mass flow rate. 3. The power required. 4. The flow angles at the hub. 5. The degree of reaction at the hub.

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.

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 11th 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

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:	$\dfrac{m}{2}$
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:	$A_I = \dfrac{MTBF}{MTTF + MTTR}$
Option B:	$A_I = \dfrac{MTTF}{MTTF + MTTR}$
Option C:	$A_I = \dfrac{MTTF}{MTBF + MTTR}$
Option D:	$A_I = \dfrac{MTTR}{MTTF + MTTR}$
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