University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: Mechanical Engineering

Curriculum Scheme: Rev2012(CBSGS)

Examination: B.E.(MECHANICAL)(Sem VIII) (CBSGS)

Course Code: MEC801 and Course Name: Design of Mechanical Systems

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	For the optimum design, which of the following objective is not acceptable?
Option A:	Maximizing the power transmitting capacity
Option B:	Maximizing the load carrying capacity
Option C:	Maximizing the energy storing capacity
Option D:	Maximizing the cost of the system
2.	In optimum design, the undesirable effects are _____
Option A:	Not considered
Option B:	Maximized
Option C:	Minimized
Option D:	Kept constant
3.	Design process begin with the realization of unfulfilled need of the society and ends with _____.
Option A:	Satisfying the need
Option B:	Manufacturing planning
Option C:	Distribution planning
Option D:	Consumption planning
4.	The recommended value of D_{min}/d for 3 bends pulley system is___
Option A:	25
Option B:	23
Option C:	26.5
Option D:	28
5.	The desirable cross section of the hook for EOT is ____

Option A:	Rectangular
Option B:	Circular
Option C:	Trapezoidal
Option D:	Elliptical
6.	The maximum velocity of the rope is on the____
Option A:	Rope drum
Option B:	Sheave pulley
Option C:	Compensating pulley
Option D:	Dummy pulley
7.	For a 4 fall system the total number of bearing used in the pulleys of EOT crane are___
Option A:	8
Option B:	4
Option C:	2
Option D:	0
8.	In case of belt conveyors, the permissible slope will be maximum while conveying ____
Option A:	Gravel
Option B:	Lime stone
Option C:	Saw dust
Option D:	Dry sand
9.	The carriage type take-up is _____
Option A:	gravity take-up
Option B:	Screw type
Option C:	Hydraulic type
Option D:	Spring-based gravity type
10.	From the following is not standard belt width in mm ____
Option A:	300
Option B:	400
Option C:	450
Option D:	650
11.	The belt of conveyor should have ____
Option A:	High strength
Option B:	Heavy mass
Option C:	Low elasticity (flexibility)
Option D:	Low coefficient of friction
12.	A piston has allowable tensile stress of 50 N/mm^2 and has bore diameter 150

	mm. Considering strength of piston, what will be the thickness of piston head if maximum pressure of 10 N/mm^2 acts on it?
Option A:	29 mm
Option B:	35 mm
Option C:	53 mm
Option D:	40 mm
13.	Which of the following parts of piston act as bearing for connecting rod side thrust?
Option A:	Reinforcing ribs
Option B:	Piston barrel
Option C:	Piston gudgeon
Option D:	Piston skirt
14.	Which stress is induced in cylinder wall due to side thrust of the piston?
Option A:	Axial stress
Option B:	Circumferential stress
Option C:	Longitudinal stress
Option D:	Bending stress
15.	Shaft of gear of external gear pump is designed by assuming as _____
Option A:	centrifugal beam
Option B:	moderate beam
Option C:	simply supported beam
Option D:	overhanging beam
16.	The flow rate in gear pump
Option A:	Increases with increase in pressure
Option B:	Decreases with increase in pressure
Option C:	More or less remains constant with increase in pressure
Option D:	Unpredictable
17.	Following gears are not recommended in gear pump
Option A:	Bevel gear
Option B:	Helical gear
Option C:	Herringbone gear
Option D:	Spur gears
18.	For 12 speed gear box, which of the following structural formula will give the best structural diagram.
Option A:	2(1).3(4).2(2)
Option B:	2(1).3(2).2(6)
Option C:	2(3).3(4).2(1)
Option D:	2(6).3(2).2(1)

19.	In the structural formula, $Z = P_1(X_1).P_2(X_2).P_3(X_3)$, the value of X_3 is determined as ….
Option A:	Co-efficient of X_1
Option B:	Co-efficient of X_2
Option C:	(Co-efficient of X_1) *(Co-efficient of X_2)
Option D:	1
20.	Which of the following statement is correct
Option A:	The horizontal ray in the speed chart means that there is no speed change.
Option B:	The upward inclination ray represents speed reduction.
Option C:	The downward inclination ray means speed increasing.
Option D:	The inclination of the ray does not affect the speed change.

Q2	**Solve any Four out of Six (5 marks each)**
A	Draw the flow chart of design morphology showing all seven steps.
B	What do you mean by optimum design? How can you optimize the design of impeller of centrifugal pump?
C	Enlist the materials suitable for the following parts of EOT crane along with proper justification. A) Hook B) Sheave C) Cross piece
D	For 2 stroke, single cylinder petrol engine, piston is made of alloy steel having diameter 100mm subjected to maximum pressure of 10MPa. Determine the piston crown thickness using thermal stress criteria and check for induced stress using maximum pressure criteria.
E	Draw the pressure distribution diagram in gear pump and show the forces acting on the driver shaft of gear pump.
F	Milling machine is provided with 9 Speed two Stage Gear Box to meet the Following Specifications- Electric Motor Speed = 1400 RPM Maximum Speed = 1350 RPM Minimum Speed = 200 RPM Motor rating = 10 kW. Draw all possible Structural diagrams and select the optimum one.

Q3.	**Solve any Two Questions out of Three (10 marks each)**
A	Hoisting mechanism of an EOT crane has following specifications. Lifting Capacity – 5 tonnes

	Hoisting Speed – 8 m/min Span – 10m Class – II Trolley Traveling Speed – 30 m/min. a. Select a standard hook and draw the diagram. Find stresses at minimum four sections of hook. b. Recommend suitable bearing for hook.
B	A 20° troughing belt conveyor was the following specifications. Material to be conveyed – Coke Capacity – 300 TPH Lump Size – 100 mm Length – 50 m Inclination Angle - 10° Determine the width of belt based on capacity as well as lump size. Determine total resistance to the belt.
C	For a centrifugal pump following Specification is given- Static Suction Head – 3 m Static Delivery Head – 10 m Pump discharge – 1000 lpm Working Fluid Water at 32°C temperature Design suction pipe, discharge pipe and impeller selecting suitable material.

University of Mumbai

Program: Mechanical
Curriculum Scheme: Rev 2016
Examination: BE Semester VIII
Course Code: **MEC 801** and Course Name: **Design of Mechanical Design**
Time: 2 hour Max. Marks: 80

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0106_R16_Mech_VIII_MEC801_QP1

Notice Board :

- There are two sections in the paper viz. Multiple-Choice Question type and DESCRIPTIVE type
- Use of PSG and Kale design data book is permitted.
- All questions in MCQ are compulsory. Descriptive questions have internal choices.
- Write answers to the questions on a paper neat and clean in descriptive section and UPLOAD the scanned pdf /image of answer for each question, separately.
- Figures drawn should be neat and clear
- Assume suitable data if required and state clearly.
- Students have to write their Roll No. and Name on each page and also have to Sign on each page.

Q1. Choose the correct option for following questions. All the Questions are compulsory and carry equal marks ($20 \times 2 = 40$)

1. Which of the following is not a design parameter

Option A: Functional requirements parameters
Option B: Material parameter
Option C: Geometric parameter
Option D: Distribution system design

2. With the pressure remains constant, if flow rate will be raised, what will be minimum alteration possible

Option A: redesign of gear for diameters
Option B: keeping gear diameters fixed, increment in facewidth
Option C: keeping all gear dimensions fixed, increment in clearance with casing
Option D: selecting motor of high capacity

3. For the area of wire rope given by the equation

$$Area\ of\ rope = \frac{T_{max}}{\frac{\sigma_{ut}}{n} - 3600\frac{d_r}{D_P}}$$

The functional requirement parameter is

(a) n ;(b) σ_{ut}; (c) $\frac{d_r}{D_p}$; (d) T_{max}

Option A: a

Option B: b

Option C: c
Option D: d

4. If belt tension in the two sides is 730N and 140N and belt is moving with a velocity of 10m/s, calculate the power transmitted.

Option A: 4.5kW
Option B: 5.9kW
Option C: 6.2kW
Option D: 3.4 kW

5. Maximum and minimum diameter of a shaft to be machined is 100 mm and 80 mm respectively. What is the maximum spindle speed if cutting velocity is 40 m/min?

Option A: 120rpm
Option B: 127rpm
Option C: 160rpm
Option D: 636rpm

6. If connecting rod carries compressive load of 70 kN , taking length to diameter ratio 1.2 and bearing pressure 7 N/mm^2, then the crank pin diameter will be

Option A: 91.28 mm
Option B: 89.25 mm
Option C: 56.53 mm
Option D: 78.21 mm

7. Arrange these Phases in Methodology of Design in proper sequence

1) Prepare specific list 2) Rough sketch of possible mechanism 3) Prepare blueprints 4) Block diagram /general layout for mechanism 5) Design individual component

Option A: (1-2-3-4-5)
Option B: (1-2-4-5-3)
Option C: (2-1-3-4-5)
Option D: (2-1-4-3-5)

8. For the hoisting speed is 6 m/min and design load is 144 kN in case of EOT crane, determine the motor capacity taking efficiency of 85%.

Option A: 10 kW
Option B: 13.678 kW
Option C: 16.94 kW
Option D: 18.21 kW

9. For the belt conveyor, with motor capacity of 11.13kW at a velocity of 1.35 m/s, the working tensions in the belt at angle of lap 240 degree are

Option A: 11.52kN,3.38kN
Option B: 5.2 kN,1.2 kN
Option C: 0.639kN, 0.45 kN
Option D: 20.2 kN, 15.85 kN

10. Thermal stress in cylinder liners can be reduced by

Option A: increasing the wall thickness of cylinder liner

Option B: increasing velocity of flowing water through jacket

Option C: decreasing the wall thickness of cylinder liner

Option D: decreasing velocity of flowing water through jacket

11. In case of centrifugal pump, the centrifugal force due to unbalanced mass generated at impeller having diameter 168 mm and mass is 3.46 kg running at 2880 rpm is

Option A: 76.40 N

Option B: 90 .13 N

Option C: 56.96 N

Option D: 40.32 N

12 For $N_{min} = 30\ rpm$ and $N_{max} = 375\ rpm$, number of spindle speed, Z =12 and cutting speed 20 m /min, according to the harmonic progression speed at second step is

Option A: 36.85 rpm

Option B: 32.74 rpm

Option C: 40 rpm

Option D: 39.41 rpm

13. If shaft diameter is having range $40.2\ mm \leq d \leq 58.23\ mm$, the diameter represent the type of design parameter

Option A: Specified parameter

Option B: Limited parameter

Option C: Unspecified parameter

Option D: Unspecified and unlimited parameter

14. In case of crane hook, if M76 nut with 84% core diameter subjected to bearing stress 20 N/mm^2 under design load of 144 kN, for safe design the number of threads required are

Option A: 4.36

Option B: 5.39

Option C: 1.25

Option D: 10.56

15. Snub pulley in case of belt conveyor function as

Option A: To remove debris from the belt

Option B: To increase the velocity of the belt conveyor

Option C: To increase the tension in the belt

Option D: To increase angle of lap around drive pulley

16. In case of engine cylinder ,the design of length of the threaded portion for stud is based on

Option A: Material of stud , and stress applied at core diameter of stud

Option B: Material of cylinder block and stress applied on internal threads of cylinder block

Option C: Material of cylinder block and stress applied on core diameter of stud

Option D: Material of stud, and stress applied on internal threads of cylinder block

17. For gear pump having design pressure 30 bar and actual flow rate 51.28 LPM, assuming overall efficiency 88 %, the motor capacity required is

Option A: 2 kW
Option B: 2.9 kW
Option C: 3.2 kW
Option D: 3.4 kW

18. Speed diagram gives information about

Option A: Order of changing transmission in individual transmission group to get desired spindle speed.
Option B: Motor capacity and transmission between motor and input shaft
Option C: Machine tool spindle torque
Option D: Diameter range of workpiece

19. Hook of EOT crane s manufactured by method

Option A: Casting
Option B: Cold rolling
Option C: Forging
Option D: bending

20. Embodiment design discusses about

Option A: Identification of problem
Option B: Manufacturing operations to be performed
Option C: Product architecture
Option D: Maintenance schedule

Q2 Solve any Two Questions out of Three 10 marks each

2A A shaft is to be designed for minimum weight of torque transmitting capacity 900 N-m having a torsional rigidity 90 Nm/degree. Assume a factor of safety of 1.5 based on yield strength. Use maximum shear stress theory. Following material may be considered for the shaft.

Material	Mass density kg/m^3	Yield Strength MPa	Shear Modulus GPa
M1	2100	20	16
M2	3000	50	26.7
M3	4800	90	40
M4	8500	130	80

2B Following specification refers to an EOT crane
Application-Class II
Load to be lifted =150 kN ,
Maximum lift = 8 m
Hoisting Speed = 10 m/min.
1) Design the hook and calculate maximum stress induced at critical cross section of hook
2) Select bearing for hook and design cross piece.

2C A 25° troughing belt conveyor has the following data:
Material conveyed: Dry sand,
Capacity: 300 TPH,
lump size- 80 mm,

Centre distance = 50m.
Inclination=20^0
1)Determine the width of belt
2) Determine the power and speed of driving motor

Q3 Solve any Two Questions out of Three 10 marks each

3A Design the gear pump to deliver 60 LPM of SAE 30 oil at a pressure of 40 bar.
1) Design Gear 2) Select suitable motor for gear pump.3) gear shaft

3B A single cylinder four stroke water cooled diesel engine develops 3.7 kW brake power when operating at 1500 rpm
1)Determine bore and stroke of engine
2) Design the piston pin

3C A multi-speed gear box is to be designed for a medium size general purpose machine tool for spindle speed varying between 20 rpm and 894 rpm . If the recommended geometric progression ratio is as per R20/3 series
i. Determine the candidate structure diagrams for machine tool gear box
ii. Select the optimum structure diagram

1T01418 / / B.E.(MECHANICAL) (SEM VIII) (CBSGS)
50033 / / Industrial Engineering & Management (Subject code-53302) **SET 2**

Name of the Faculty: Prof. Dr. A.B. Rane
College Name: Fr. Conceicao Rodrigues College of Engineering
Mobile Number: 9969573889

Q1 MCQ: COVERING ALL SIX MODULE (20 nos. x 2 marks each = 40 marks)		
1		Who is father of scientific management and industrial engineering?
	A	Gantt
	B	Gilbreth
	C	F. Taylor
	D	Babbage
2		Main objective of Industrial Engineering & Management is---------
	A	Skill improvement
	B	To improve productivity
	C	Interchangeability
	D	Macro control
3		Determine productivity, if 200 chairs (weighing 155 kg) are produced by 200 kg of granules in plastic industry
	A	77.50%
	B	67.50%
	C	87.50%
	D	100%
4		The cost reduction technique in comparison to the worth of a product is known as_____
	A	Reverse engineering
	B	Value engineering

	C	Material engineering
	D	Quality engineering
5		The sum of labour, material and various other costs required to produce it, is called as_____
	A	Use Value
	B	Esteem value
	C	Exchange value
	D	Cost value
6		The process of allocating a larger number of tasks to individuals is called-----
	A	Job enlargement
	B	Job enrichment
	C	Job Empowerment
	D	Job rotation
7		Micromotion study involves following number of fundamental hand motions----------
	A	12
	B	14
	C	16
	D	18
8		Merit Rating is the method of determining worth of---------
	A	Job
	B	Individual employee
	C	Particular division in workshop
	D	Machine
9		TMU in method time measurement stands for---------
	A	Time motion unit

	B	Time measurement unit
	C	Time movement unit
	D	Time method unit.
10		Neutral position is----------
	A	The position that places the least amount of stress on the body
	B	The most difficult position for the body to hold
	C	A safe position that protects only the back
	D	The only position you can work in
11		Ergonomics principle suggests that----------
	A	Monitoring displays should be placed outside peripheral limitations
	B	Glow-in-the dark dials made of reflective substances are good for viewing in the nights
	C	Visuals systems should be preferred over auditory systems in noisy locations
	D	Ergonomics principle suggests that
12		Psychology, Physiology, Anthropometry are related to--------
	A	Agile manufacturing
	B	Ergonomics
	C	Facility design
	D	Motion economy
13		Cellular manufacturing is an approach whereby production can be done in----
	A	Small batches
	B	Medium batches
	C	Large batches
	D	Extra large batches

14		What type of process would a Cement plant be most likely to use?
	A	Flow shop
	B	Project c
	C	Job shop
	D	Continuous flow
15		Material handling in automobile industry is done by--------
	A	Belt conveyor
	B	Trolley
	C	Overhead crane
	D	Roller conveyor
16		In which layout the workstations are brought to the material--------
	A	Fixed-position layout
	B	Product layout
	C	Group layout
	D	Process layout
17		The flexibility generally considered in FMS is---------
	A	Routing and machine flexibility
	B	Only routing flexibility
	C	Only machine flexibility
	D	Only operator flexibility
18		Agile Manufacturing focuses on _____response to customer demands
	A	Slow
	B	Quick
	C	Short
	D	Long
19		One of the LEAST effective supplier strategies for lean systems is--------

	A	To include suppliers during the product design phase.
	B	Smaller, more frequent stock shipments.
	C	Use of local suppliers.
	D	A short-term, competitive relationship between the company and the supplier.
20		How is Agile planning different from the traditional approach to planning?
	A	Agile planning is done only once
	B	Agile planning is non iterative
	C	Agile planning places emphasis on the plan
	D	Agile planning places emphasis on planning and is iterative
Q 2		Attempt any four (4 nos. x 5 marks each = 20 marks)
	A	List types of productivity and explain any one of them
	B	Discuss FAST technique used in value analysis
	C	Explain how a job is selected for method study?
	D	Define ergonomics and explain its benefits
	E	Discuss different types of plant layouts and their merits
	F	Write short note on Value Stream Mapping
Q3		Attempt any two (2 nos. x 10 marks each = 20 marks)
	A	Explain how standard time is estimated by taking an example?
	B	List any three methods of line balancing and explain any one with example
	C	Explain product and process development in agile manufacturing

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: Mechanical Engineering

Curriculum Scheme: Rev 2016

Examination: BE Semester VIII

Course Code: MEC802 and Course Name: Industrial Engineering and Management

Time: 2 hour Max. Marks: 80

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 is the most flexible production system?
Option A:	Job-shop production
Option B:	Batch production
Option C:	Mass production
Option D:	Continuous production
2.	A measure of productivity which reflects a combination of some or all of the resources used to obtain a certain output is
Option A:	Labour productivity
Option B:	Machine productivity
Option C:	Multi-factor productivity
Option D:	Materials productivity
3.	Which of the following is not the part of seven phases of value analysis?
Option A:	General phase
Option B:	Information phase
Option C:	Optimization phase
Option D:	Evaluation phase
4.	FAST considers the people to resolve the issue from
Option A:	Industrial engineering area
Option B:	Mechanical engineering
Option C:	Operations management
Option D:	Multidisciplinary
5.	Therblig is described by standard symbol and colour in
Option A:	Macro-motion study
Option B:	Gantt chart
Option C:	Micro-motion study
Option D:	Curve chart
6.	The symbol ‘O’ in work study is used for
Option A:	Operation
Option B:	Inspection
Option C:	Delay

<table>
<tr><td>Option D:</td><td>Storage</td></tr>
<tr><td></td><td></td></tr>
<tr><td>7.</td><td>The observed times and the performance ratings for the five elements are given. Compute the standard time assuming rest and personal allowance as 15% and contingency allowance as 2% of the basic time.

<table><tr><td>Element</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Observed time (min)</td><td>0.2</td><td>0.08</td><td>0.5</td><td>0.12</td><td>0.1</td></tr><tr><td>Performance Rating</td><td>85</td><td>80</td><td>90</td><td>85</td><td>80</td></tr></table></td></tr>
<tr><td>Option A:</td><td>1.7320 minutes</td></tr>
<tr><td>Option B:</td><td>1.0732 minutes</td></tr>
<tr><td>Option C:</td><td>2.7320 minutes</td></tr>
<tr><td>Option D:</td><td>2.0732 minutes</td></tr>
<tr><td></td><td></td></tr>
<tr><td>8.</td><td>Material handling equipment, roller/belt conveyor are used for the</td></tr>
<tr><td>Option A:</td><td>Continuous movement, and relatively short distance</td></tr>
<tr><td>Option B:</td><td>Interrupted movement, and relatively short distance</td></tr>
<tr><td>Option C:</td><td>Interrupted movement, and relatively large distance</td></tr>
<tr><td>Option D:</td><td>Continuous movement, and relatively large distance</td></tr>
<tr><td></td><td></td></tr>
<tr><td>9.</td><td>The characteristics of process layout are
I. Machines are arranged as per their functions
II. A variety of products can be produced
III. Always systematic flow of material occurs through operational areas
IV. General-purpose machines are used</td></tr>
<tr><td>Option A:</td><td>I & II</td></tr>
<tr><td>Option B:</td><td>I & III</td></tr>
<tr><td>Option C:</td><td>I, II & IV</td></tr>
<tr><td>Option D:</td><td>I, II, III & IV</td></tr>
<tr><td></td><td></td></tr>
<tr><td>10.</td><td>Time taken by individual work station A, B, C, D, E, F, and G are 9, 8, 6, 10, 7, 7, and 9 minutes in an assembly line, then the line efficiency of the assembly line is</td></tr>
<tr><td>Option A:</td><td>20 %</td></tr>
<tr><td>Option B:</td><td>70 %</td></tr>
<tr><td>Option C:</td><td>80 %</td></tr>
<tr><td>Option D:</td><td>90 %</td></tr>
<tr><td></td><td></td></tr>
<tr><td>11.</td><td>The discipline(s) that has direct influence on human factors in ergonomics is(are)- I. Anthropometry. II. Psychology. III. Mechanics. IV. Value Engineering</td></tr>
<tr><td>Option A:</td><td>I, II & III</td></tr>
<tr><td>Option B:</td><td>I & II</td></tr>
<tr><td>Option C:</td><td>II, III & IV</td></tr>
<tr><td>Option D:</td><td>III & IV</td></tr>
<tr><td></td><td></td></tr>
<tr><td>12.</td><td>_____ is the amount, if money paid to the worker in cash for the effort of the workers towards production and no other benefits are given to the worker..</td></tr>
</table>

Option A:	Minimum wage
Option B:	Real Wage
Option C:	Fair Wage
Option D:	Nominal wage
13.	Center of Gravity method is
Option A:	The method that determines the location of a facility that will minimize the shipping cost and travel time to various destinations
Option B:	The method that determines the location of a facility closest to the maximum number of customers
Option C:	The method that determines the location of a facility closest to the main supplier
Option D:	The method that determines the location of a facility in the middle point of all suppliers
14.	Four key elements for developing agile manufacturing are
Option A:	Strategic planning, Product design, Virtual enterprise, Enterprise Resource Planning
Option B:	Strategic planning, Product design, Virtual enterprise, Automation and Information Technology
Option C:	Virtual enterprise, Product design, Value Analysis, Automation and Information Technology
Option D:	Automation and Information Technology, Strategic planning, Product design, Virtual enterprise, Digital Scanning
15.	Which of the following component is not included in the flexible manufacturing system?
Option A:	Processing Stations
Option B:	Material Handling and Storage System
Option C:	Auxiliary Equipment
Option D:	Value stream mapping
16.	Tools and techniques of Lean Manufacturing are- I. Takt Time II. Cellular Manufacturing III. Supplier relation IV. Pull Systems and Kanban
Option A:	I, II & III
Option B:	II, III & IV
Option C:	I, II & IV
Option D:	I, III & IV
17.	Production time per unit product for manufacturing a product is generally maximum in
Option A:	Process layout
Option B:	Cellular layout
Option C:	Product layout
Option D:	Mixed layout
18.	Similar type of machines are placed together in the

Option A:	Product layout
Option B:	Process layout
Option C:	Fixed position layout
Option D:	All of above
19.	The working area should be illuminated _____ their surroundings.
Option A:	More than
Option B:	Less than
Option C:	Equal to
Option D:	Depends upon type of job performed
20.	An agile supply chain takes care of
Option A:	a high level of both demand and supply uncertainty
Option B:	either demand or supply uncertainty
Option C:	a high level of supply disruptions/uncertainty
Option D:	a high level of demand uncertainty

Descriptive questions

Q.2	**Solve any four out of six 5 marks each**
A	Define productivity, what are the factors influencing productivity of an enterprise?
B	Describe process or phases of value analysis.
C	Enlist principles of Motion Economy.
D	What is job evaluation? What objectives are achieved from scientific job Evaluation?
E	What is facility location decision? Describe the factors which influence the Location decisions while setting up a mall.
F	Short Note- Lean Manufacturing

Q.3	**Solve any Two Questions out of Three 10 marks each**
A	Discuss various Recording Techniques of Method Study.
B	A work sampling study was conducted for 100 hours in the machine shop in order to estimate the standard time. The total number of observations was 2500, No. of working activity could be noticed for 400 observations. The ratio between manual and machine elements was 2:1. average rating factor was estimated as 1.15 and total number of articles produced during the study period was 6000. rest and personal allowances are 12% of the normal time. Estimate standard time to perform the operation.
C	Explain process for developing Agile Manufacturing.

University of Mumbai
Examination June 2021
Program: Mechanical Engineering
Curriculum Scheme: Rev2016
Examination: BE Semester VIII
Course Code: MEC803 and Course Name: Power 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.	Adiabatic flame temperature of fuel is depended on initial temperature of
Option A:	Fuel
Option B:	Air
Option C:	fuel and air
Option D:	does not depend on any of the factors mentioned
2.	When the fuel is burned and water is released in the liquid phase, the heating value of fuel is called
Option A:	higher heating value
Option B:	lower heating value
Option C:	enthalpy of formation
Option D:	enthalpy of combustion
3.	High pressure boiler is the one in which pressure of steam generated is
Option A:	greater than 70 bar
Option B:	greater than 20 bar
Option C:	greater than 80 bar
Option D:	greater than 40 but less than 80 bar
4.	Cochran boiler is
Option A:	horizontal and externally fired boiler
Option B:	horizontal and internally fired boiler
Option C:	vertical and internally fired boiler
Option D:	vertical and water tube boiler
5.	In case of impulse steam turbine
Option A:	there is enthalpy drop in fixed and moving blades
Option B:	there is enthalpy drop only in moving blade
Option C:	no change in enthalpy
Option D:	there is enthalpy drop in nozzles
6.	In case of reaction steam turbine
Option A:	there is enthalpy drop in fixed and moving blades
Option B:	there is enthalpy drop only in moving blade

Option C:	there is enthalpy drop in nozzles
Option D:	no change in enthalpy
7.	A close gas turbine plant work on
Option A:	Brayton Cycle
Option B:	Rankine cycle
Option C:	Reverse Brayton Cycle
Option D:	Reverse Rankine cycle
8.	Ideally the expansion in gas turbine is assume to be
Option A:	Isentropic
Option B:	Isothermal
Option C:	Isochoric
Option D:	Isobaric
9.	Compare to steam turbine the weight of the gas turbine per kW Power is
Option A:	Less
Option B:	More
Option C:	it can be more or less
Option D:	Same
10.	In case of reciprocation pump the acceleration head at the beginning of the suction head is
Option A:	Zero
Option B:	Minimum
Option C:	Maximum
Option D:	Negative
11.	In double acting reciprocation pump total volume flow rate compare to single acting reciprocating pump having same cylinder dimensions is
Option A:	2 time the volume flow rate of single acting reciprocating pump
Option B:	less than the volume flow rate of single acting reciprocating pump
Option C:	less than 2 time the volume flow rate of single acting reciprocating pump
Option D:	more than 2 time the volume flow rate of single acting reciprocating pump
12.	Acceleration head is responsible for
Option A:	Increase in power consumed by the pump
Option B:	Decrease in power consumed by the pump
Option C:	Some time Decreases and sometimes increases power consumed by the pump
Option D:	Does not affect on the power Consumed
13.	In case of centrifugal pump(running at constant speed) with the increase in discharge
Option A:	Pressure head increases
Option B:	Pressure head decreases
Option C:	Pressure head remain constant

Option D:	Pressure head first decreases and then increases
14.	In case of centrifugal pump if the vane tips are radial at the outlet then
Option A:	Relative velocity is equal to flow velocity at the exit
Option B:	Relative velocity is less than flow velocity at the exit
Option C:	Relative velocity is more than flow velocity at the exit
Option D:	Cannot predict
15.	Inc case of reaction turbine energy of water entering the reaction turbine is __
Option A:	fully the kinetic energy
Option B:	fully the pressure energy
Option C:	partly the pressure energy and partly the kinetic energy
Option D:	Unpredictable
16.	Which of the following is an example of impulse turbine?
Option A:	Propeller turbine
Option B:	Francis turbine
Option C:	Kaplan turbine
Option D:	Pelton wheel
17.	Power required to drive a centrifugal pump is directly proportional to _____ of its impeller.
Option A:	cube of diameter
Option B:	fourth power of diameter
Option C:	Diameter
Option D:	square of diameter
18.	In the velocity triangle of the turbine the whirl component indicates
Option A:	Kinetic energy of the fluid
Option B:	Velocity of the rotor
Option C:	Mass flow rate of the fluid
Option D:	Total energy of the fluid
19.	Momentum is define as the product of
Option A:	Mass and velocity of the body
Option B:	Mass and acceleration of the body
Option C:	Mass of the body and force acting on it
Option D:	Velocity of a body and force acting on it
20.	The force exerted by a jet of water on a fixed semicircular plate in the direction of the jet when the jet strikes at the centre of the plate is
Option A:	Equal to the force exerted by the jet on the fixed vertical plate
Option B:	Half of the force exerted by the jet on the fixed vertical plate
Option C:	Two times the force exerted by the jet on the fixed vertical plate
Option D:	Square of force exerted by the jet on the fixed vertical plate

Q2	**Solve any two of the following (10 Marks each)**
A	A single acing reciprocating pump has stroke length of 15 cm. the suction pipe is 7 m long and the ratio of suction pipe diameter to the plunger diameter is ¾. The water level in the sump is 2.5 m below the axis of the pump. Cylinder and pipe connecting the sump and pump cylinder is 7.5 cm in the diameter. Take f=0.01. If the crank running at 75 rpm then determine the pressure head on the piston 1. At the beginning of the suction stroke 2. In the middle of suction stroke
B	Liquid propane (C_3H_8) enters a combustion chamber at 25 °C at a rate of 0.05 kg/min where it is mixed and burned with theoretical air that enters the combustion chamber at 7 °C. an analysis of combustion gases reveals that all the hydrogen in the fuel burns to H_2O but only but only 90% of carbon burn to CO_2 with the remaining 10% forming Co if the exit temperature of combustion gases is 1500 K (a) the mass flow rate of air and (b) the rate of heat transfer from the combustion chamber
C	Describe about **Essentials of good boiler.** Explain the construction and working of Cochran boiler

Q3	**Solve any two of the following (10 Marks each)**
A	A Lancashire boiler generates 2400 kg of dry steam per hour at a pressure of 11 bar. The grate area is 3 m2 and 90 kg of coal is burnt per m2 of grate area per hour. The calorific value of the coal is 33180 kJ/kg and the temperature of feed water is 17.5 °C. Determine Actual evaporation per kg of coal Equivalent evaporation from and at 100 °C Efficiency of the boiler
B	Consider a gas turbine working on Brayton cycle. The air enters the compressor at 0.15 MPa and 20 °C. The maximum pressure and temperature of the cycle are 1.2 MPa and 1200 °C respectively. Calculate pressure and temperature at each point in the cycle and cycle efficiency and turbine work for following two cases. i) Theoretical Brayton cycle ii) Actual Brayton cycle with turbine and compressor efficiencies of 0.85 each Also write and explain the significance of compression of fluid in multistage (Draw suitable diagram).
C	Describe construction and working of Pelton Wheel. Describe velocity triangle at the tip of the blade.

University of Mumbai
Examination 2021
Examinations Commencing from 1st June-2021

Program: Mechanical Engineering
Curriculum Scheme: Rev 2016
Examination: BE Semester VIII
Course Code: MEDLO8041 and Course Name: Power Plant 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.	In a thermal power plant, coal from the coal handling plant is moved to the boiler bunker through a
Option A:	Belt conveyor
Option B:	Bucket conveyor
Option C:	Fork lift truck
Option D:	Overhead crane
2.	The most practical fuel for a thermonuclear reactor, both from economical and nuclear consideration is
Option A:	Plutonium
Option B:	Uranium
Option C:	Deuterium
Option D:	Thorium
3.	National Thermal Power Corporation was incorporated in _____
Option A:	November – 1975
Option B:	November – 1976
Option C:	November – 1977
Option D:	November – 1974
4.	In hydroelectric power, what is necessary for the production of power throughout the year?
Option A:	High amount of air
Option B:	High intense sunlight
Option C:	Nuclear power
Option D:	Dams filled with water

5.	Which element of hydroelectric power plant prevents the penstock from water hammer phenomenon?
Option A:	Valves and Gates
Option B:	Surge Tank
Option C:	Spillway
Option D:	Draft tubes
6.	The annual depriciation of a hydro power plant is about.....
Option A:	15% to 20%
Option B:	0.5% to 1.5%
Option C:	10% to 15%
Option D:	20% to 25%
7.	In high head hydro power plant the velocity of water in penstock is about.....
Option A:	4 m/s
Option B:	1 m/s
Option C:	12 m/s
Option D:	7 m/s
8.	What is the effect of increasing steam temperature of thermal power plant on its thermal efficiency?
Option A:	Decreases
Option B:	Increases nonlinearly
Option C:	Increases linearly
Option D:	It does not depends on temperature
9.	Gas and Steam turbine combined power plant produces more electricity than traditional power plants by how much percent?
Option A:	50
Option B:	40
Option C:	70

Option D:	25
10.	What happens to the availability in a combined cycle plant?
Option A:	Increases
Option B:	Decreases
Option C:	remains same
Option D:	cannot say
11.	Which of the following is not a type of Combined Plant?
Option A:	Gas turbine-Steam turbine plant
Option B:	Thermoelectric steam plant
Option C:	Thermionic steam plant
Option D:	Sodium- mercury-Potassium plant
12.	The overall efficiency of thermal power plant is equal to
Option A:	Regenerative cycle efficiency
Option B:	Rankine cycle efficiency
Option C:	Carnot cycle efficiency
Option D:	Boiler efficiency x turbine efficiency x generator efficiency
13.	The most commonly used moderator in nuclear plants is
Option A:	heavy water
Option B:	graphite and concrete
Option C:	Graphite
Option D:	Deuterium
14.	One gram of uranium will produce energy equivalent to approximately
Option A:	10 tonnes of high grade coal
Option B:	4.5 tonnes of high grade coal
Option C:	1000 tonnes of high grade coal

Option D:	100 tonnes of high grade coal
15.	The breeding gain in case of thermal breeder reactor as compared to fast breeder reactor is
Option A:	Higher
Option B:	Higher/lower depending on the size of reactor
Option C:	Unity
Option D:	Lower
16.	Superheated steam is generated in following reactor
Option A:	gas cooled
Option B:	pressurized water
Option C:	boiling water
Option D:	all of the above
17.	For economic load division which parameter of energy supplying units should be equal
Option A:	Load factor
Option B:	Efficiency
Option C:	Incremental rate
Option D:	Heat Rate
18.	The coolant used in boiling water reactor is
Option A:	liquid metal
Option B:	Mercury
Option C:	pressurized water
Option D:	mixture of water and steam
19.	Hopkinson’s Demand rate is
Option A:	Four -Part tariff Method
Option B:	Single part tariffs Method
Option C:	Three-part tariffs Method
Option D:	Two-part tariffs Method

20.	For smaller dust particles in the range of 1 microns which type of method is suitable
Option A:	cyclone separators
Option B:	Electrostatic precipitators
Option C:	Pulse jet bag house dust collectors
Option D:	gravitational separators

Q2 (20 Marks)	**Solve any Four out of Six (5 marks each)**
A	What are the points taken in to account while selection of power plant
B	Explain Run-off river plant
C	Explain the Parameters affecting thermodynamics efficiency of combined cycle
D	Write a short note on nuclear waste disposal
E	Explain Modified Rankine cycle
F	Explain PFBC systems

Q2 (20 Marks)	**Solve any Two out of Three (10 marks each)**
A	The data for a weekly flow at a particular site is given by 12 weeks Week | Weekly Flow m^3/ sec 1 | 3000 2 | 2000 3 | 2700 4 | 1000 5 | 750 6 | 500 7 | 600 8 | 2250 9 | 4000 10 | 200 11 | 1500 12 | 1000 (i) Draw hydrograph and Mas (ii) Find the size of the reservoir and the possible rate of flow available after reservoir has been built.
B	Explain Sodium Graphite Reactor with advantages and disadvantages.
C	Explain different tariff methods of electrical energy.

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: 1T01428 / / B.E (Mechanical Engineering) (SEM-VIII) (Choice Base Credit Grading System) (R2016)

Curriculum Scheme: Rev2016

Examination: BE Semester VIII

Course Code: **MEDLO8043** Course Name: **Renewable Energy Systems**

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All Questions are compulsory and carry equal marks**
1.	Which Indian enterprise has the Motto "ENERGY FOREVER"?
Option A:	Indian Renewable Energy Development Agency
Option B:	Indian Non-Renewable Energy Development
Option C:	Indian Agricultural Development
Option D:	Indian Biotechnology Development
2.	A hydrogen fuel cell bus was launched in 2019 in India by?
Option A:	Tata Motors
Option B:	Ford Motors
Option C:	Tesla
Option D:	Mahindra & Mahindra
3.	The natural gas industry in India began in which of the following year?
Option A:	1970s
Option B:	1960s
Option C:	1980s
Option D:	1990s
4.	How much would be the angle of declination on DECEMBER 21 at 09:00 h (LAT). The collector s located in New Delhi (28˚35'N, 77o12'E) and is tilted at an angle of 36˚ with the horizontal and is pointing south?
Option A:	-44.28˚
Option B:	-28.92˚
Option C:	-23.45˚
Option D:	-42.22˚
5.	The angle between the sun's rays and a line perpendicular to the horizontal plane through angle the beam of the sun and vertical is called _____
Option A:	Solar Azimuth angle
Option B:	Zenith angle
Option C:	Altitude angle
Option D:	Declination
6.	In which collector does airflow without any obstruction?
Option A:	Porous absorber plate
Option B:	Non-porous absorber plate

Option C:	Over lapped glass absorber
Option D:	Finned absorber
7.	Angular distance of sun's rays north or south of the equator is called _____
Option A:	Declination
Option B:	Hour angle
Option C:	Latitude
Option D:	Air mass
8.	Anemometry is defined as the process of ascertaining the _____
Option A:	Nature, pattern, and direction of wind or an airflow
Option B:	Force, speed, and direction of weather or a monsoon
Option C:	Force, speed, and direction of wind or an airflow
Option D:	Nature, speed, and direction of tidal waves of ocean
9.	The mechanisms for producing forces from wind are,
Option A:	Lift & draft force
Option B:	Lift & drag force
Option C:	Lift & axial force
Option D:	Airfoil & wing force
10.	What does TSR stand for in design consideration of wind mills?
Option A:	Tip speed ratio
Option B:	Torque-synchronous ratio
Option C:	Tip suspension ratio
Option D:	Temporary speed restriction
11.	Power co-efficient is the fraction of the free-flow wind power that can be extracted by _____
Option A:	The wind
Option B:	The rotor
Option C:	The transmission
Option D:	The grid
12.	Indian fixed dome digesters are designed for holding what pressure capacity?
Option A:	0 – 90 cm of water column
Option B:	70 – 90 cm of water column
Option C:	50 – 65 cm of water column
Option D:	10 – 25 cm of water column
13.	How much thick layer of insulation is done inside of digester?
Option A:	10 cm
Option B:	15 – 25 mm
Option C:	8 mm
Option D:	50 – 100 cm
14.	Which among the following best suitable treatment of waste products?
Option A:	Aerobic fermentation
Option B:	Anaerobic fermentation
Option C:	Autolysis

Option D:	Thermal reaction
15.	The temperature at the inner core of the earth is about
Option A:	1000^0C
Option B:	4000^0C
Option C:	40000^0C
Option D:	500^0C
16.	The oceanic tides are due to
Option A:	Heavy Winds
Option B:	Slight earth quakes
Option C:	Water force
Option D:	Gravitational interaction
17.	The working fluid chosen by Anderson OTEC cycle is
Option A:	Propane
Option B:	Water
Option C:	Engine oil
Option D:	ISO-butane
18.	Fuel cell performance is not limited by _____
Option A:	First law of Thermodynamics
Option B:	Second law of Thermodynamics
Option C:	Third law of Thermodynamics
Option D:	Zeroth law of Thermodynamics
19.	Which of the following is not an example of a fuel cell?
Option A:	Hydrogen-oxygen cell
Option B:	Methyl-oxygen-alcohol cell
Option C:	Propane-oxygen cell
Option D:	Hexanone-oxygen cell
20.	The residual product discharged by the hydrogen-oxygen cell is _____
Option A:	Hydrogen peroxide
Option B:	Alcohol
Option C:	Water
Option D:	Potassium permanganate

Q2 **(20 Marks Each)**	
A	**Solve any Two** **5 marks each**
i.	Describe the potential of renewable energy sources in India
ii.	Differentiate between Horizontal axis and Vertical axis wind turbines.
iii.	What is wave energy? Explain any one wave energy conversion system
B	**Solve any One** **10 marks each**
i	Wind at 1 bar 20°C has a velocity of 12m/s. Calculate: i)Total power density in wind stream ii) maximum power density iii) A reasonable obtainable power density iv) Total power produced if rotor

	diameter is 60m and its runs at 50rpm. v) The torque and the axial thrust produced at maximum efficiency.
ii	Estimate monthly average total daily radiation of FPC facing south, at Delhi (28°35'N,77°12'E) during the month of November if the average sunshine hours per day is 9.5. Assume the values of a=0.31 and b=0.43.

Q3 **(20 Marks Each)**	
A	**Solve any Two** **5 marks each**
i.	What is the liquid dominated hydrothermal resources?
ii.	Write short notes on "prospects of geothermal energy in India".
iii.	Write short notes on "Methods of Hydrogen Production".
B	**Solve any One** **10 marks each**
i	Following data are given for a family biogas digester suitable for the output of eight cows. Given: Calorific value of methane: 28MJ/m^3, Burner efficiency: 70%, Retention period: 20days, Temperature of fermentation: 30°C, dry matter (cow dung) collected per cow per day: 2 kg, Density of dry matter in fluids (slurry) in the digester: 50 kg/m^3, Biogas yield: 0.2m^3 per kg of dry input, Methane proportion in the biogas 0.7. Calculate: 1) The volume of biogas digester 2) The power available from the digester.
ii	State various parameters which affect performance of solar collectors. State limitations of flat plate collectors.

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: **IT01028**

Curriculum Scheme: Rev2016

Examination: BE Semester VIII

Course Code: 52965 and Course Name: Environmental Management

Time: 2 hour Max. Marks: 80

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

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

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

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

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

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

University of Mumbai

Examination June 2021

Examinations Commencing from 1st June 2021

Program: **Mechanical Engineering**

Curriculum Scheme: Rev 2016

Examination: BE Semester VIII

Course Code: ILO 8021 and Course Name: Project Management

Time: 2 hour Max. Marks: 80

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

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

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

20.	Goldratt's critical chain method is based on
Option A:	Theory of constraints
Option B:	Critical path method
Option C:	Supply of raw material in time
Option D:	Use of concurrent engineering principle

Q.2 **Solve any Four out of Six . 5 Marks Each**

A. What are the knowledge areas and process groups in Project Management as per PMI?

B. Explain various project selection models.

C. What is Goldratt's critical chain method?

D. Determine the net present value for a project that costs Rs. 2,40,000/- would yield after tax cash flows as follows. Assume cost of capital is 10%

Year	CASH Flow in Rs.
1	25,000
2	75,000
3	80,000
4	100,000

Comment on feasibility of project based on NPV

E. Explain importance of ethics in projects.

F. What are the different ways of closing the project?

Q.3 **Solve any Two Questions out of Three 10 Marks Each**

A. a. A consulting project has an actual cost of Rs. 45000, Scheduled cost Rs. 35000, and value of completed work is Rs. 40000. Find the Schedule and Cost Variance. Also find SPI and CPI.

b. What is a contract? Explain different types of contracts.

B. R & D project has a list of tasks to be performed whose time estimates are given in the as follows.

Table-1-Time Estimation for R &D Project

Activity *i* *j*	Activity Time	t_o	t_m	t_p
1-2	A	4	6	8
1-3	B	2	3	10
1-4	C	6	8	16
2-4	D	1	2	3
3-4	E	6	7	8
3-5	F	6	7	14
4-6	G	3	5	7
4-7	H	4	11	12
5-7	I	2	4	6
6-7	J	2	9	10

a. Draw the project network.
b. Find the critical path.
c. Find the probability that the project is completed in 19 days. If the probability is less than 20%, find the probability of completing it in 24 days.

C. Write short notes on.
a. Work Breakdown Structure
b. Project Procurement Management,

University of Mumbai

Examinations Commencing from 1st June 2021

Program: Mechanical Engineering

Curriculum Scheme: Rev 2016

Examination: BE Semester VIII

Course Code: ILO8023 and Course Name: Entrepreneurship Development & 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.	The act of creating a new enterprise in response to identified opportunities is called_____ ___
Option A:	Industrialist
Option B:	Businessman
Option C:	Investor
Option D:	Entrepreneur
2.	The term "Entrepreneur" was first defined by the _____ as the person who pays a certain price for a merchandise to resell it at an uncertain price, thereby making decisions about obtaining and using the resources while consequently taking the risk
Option A:	Irish-French economist Richard Cantillon
Option B:	Jean Baptiste
Option C:	Schumpeter
Option D:	Carl Menger
3.	One person one company is a _____
Option A:	A private company
Option B:	Cooperative company
Option C:	Joint Hindu family business
Option D:	Sole proprietorship firm
4.	Capital output ratio is the amount of capital needed to produce_____
Option A:	One unit of output
Option B:	Long term capital
Option C:	Capital investment
Option D:	Daily production
5.	Shri Mahila Griha Udyog Lijjat Papad, Started in _____ by seven women in Mumbai with a seed capital of only _____
Option A:	1959; Rs 80.
Option B:	1961; Rs 180
Option C:	1958; Rs 500
Option D:	1949; Rs 100
6.	The Achiever types of entrepreneurs have personal desires to excel are

	determined like____
Option A:	Mr Harshad Mehta
Option B:	Mr Vijay Mallya
Option C:	Mr Narayan Murthy
Option D:	Mr Anil Ambani
7.	If a new idea is accepted by the market, they copy the new idea and hence join in the competition are termed as_____
Option A:	Innovative entrepreneur
Option B:	Fabian entrepreneur
Option C:	Drone entrepreneur
Option D:	Imitative entrepreneur
8.	During a festive season, he sensed the problem of ticket information not reaching the passengers, many passengers are not getting the tickets. He converted this challenge into an opportunity and started his website Redbus.in, the setting the pace for selling the bus tickets online. He is_____.
Option A:	Dhirubhai Ambani
Option B:	Phanidra Sama
Option C:	Sabir Bhatia
Option D:	Rajanikant
9.	If one or more women manage a SSI unit/industry, is called Women Entrepreneurs' Enterprise if _____
Option A:	Individually or jointly have a share capital of not less than 51 per cent
Option B:	Individually or jointly have a share capital of less than 51 per cent
Option C:	Individually or jointly have a share capital of 51 per cent
Option D:	Individually have a share capital of not less than 51 per cent
10.	Every business concern requires two types of finance.
Option A:	Angel finance and venture capital
Option B:	Bootstrap and start up finance
Option C:	Long term capital and short term capital
Option D:	Bank finances
11.	The capital are raised by companies through the **issue of shares, debentures and bonds** in the capital market is _____
Option A:	Short term Capital
Option B:	Long term capital
Option C:	Market Loan
Option D:	Margin money
12.	As per the notification dated February 17, 2017, issued by the Ministry of Commerce and Industry, a startup means:
Option A:	Not older than five years
Option B:	Not older than ten years
Option C:	Not older than seven years
Option D:	Not older than two years

13.	_____is a blue print for marketing, operations and finance of a business venture, demonstrate the viability of the entrepreneur's ideas. It clarifies how a business can be profitable, highlights financial requirements and warns about barriers to success.
Option A:	Project report
Option B:	Business plan
Option C:	Break-even point analysis
Option D:	Product life cycle
14.	To boost the development of small enterprises in the country, the Government of India has recently enacted "Micro Small and Medium Enterprises Development (MSMED) Act, _____
Option A:	1948
Option B:	2015
Option C:	2000
Option D:	2006
15.	_____ in which, The Internet and the World Wide Web provide marketers with new tools and added convenience that can increase the success of their marketing efforts, improve customer service by sending e-mail for order confirmation, product announcements, and order tracking, through corporate web sites, integrated call centres, online help desks, and online customer services.
Option A:	Tele marketing
Option B:	BPO
Option C:	E-Marketing
Option D:	Marketing
16.	Manufacturing Micro Enterprises is one, whose investment is_____
Option A:	Above Rs 25 Lakh and up to Rs 5 Crore
Option B:	Up to Rs 25 Lakh
Option C:	Above Rs 2 Crore and up to Rs 5 Crore
Option D:	Above Rs 10 Lakh
17.	_____ indicates a single lump-sum which is given by a government to an entrepreneur to cover up the cost. The purpose is to motivate an entrepreneur to set up a new venture in well-built interest of nation and society.
Option A:	Subsidy
Option B:	Grants
Option C:	Incentives
Option D:	Loans
18.	_____ provides seed, start-up and first stage finance to companies and also funding expansion of companies that have demonstrated business potential but do not have access to public securities market or other credit
Option A:	Margin money
Option B:	Angel capital
Option C:	Bank loans
Option D:	Venture capital

19.	Identify correct sequence of Stages of Starting and Running a Business
Option A:	Start-Up Stage, Growth Stage, Established Stage, Seed Stage, Expansion Stage, Decline Stage, Exit Stage
Option B:	Seed Stage, Start-Up Stage, Growth Stage, Established Stage, Expansion Stage, Decline Stage, Exit Stage
Option C:	Established Stage, Expansion Stage, Seed Stage, Start-Up Stage, Growth Stage,, Decline Stage, Exit Stage
Option D:	Start-Up Stage, Growth Stage, Established Stage, Expansion Stage, Decline Stage, Exit Stage
20.	At the beginning "Seed stage" of business life cycle, our focus should be____
Option A:	On establishing a customer base and market presence along with tracking and conserving cash flow
Option B:	on running the business in a more formal fashion to deal with increased sales and customers
Option C:	on a business ownership structure, finding professional advisors, and business planning
Option D:	To compete in an established market, you will require better business practices along with automation and outsourcing to improve productivity.

Subjective/descriptive questions

Q2. **(20 Marks Each)**	**Solve any Four out of Six 5 marks each**
A	Explain characteristic properties of an entrepreneur.
B	What are the types entrepreneur and define each one.
C	What is the significance of Capital market ?
D	What is your understanding on "Business plan of a startup"
E	Explain activities of starting a new business.
F	Discuss the schemes supporting women entrepreneurship and its promotion.

Q3. **(20 Marks Each)**	**Solve any Four out of Six 5 marks each**
A	Explain MSMED Act 2006, and its scope.
B	What are the government`s financial contribution for entrepreneurship promotion?
C	Write note on "Credit Guarantee Fund".
D	Explain Startup India scheme in brief.
E	What are the problems faced by Small and Medium Enterprise SME?
F	How does "small business life cycle" helps in deciding, the closing or harvesting of it?