

**UNIVERSITY OF MUMBAI**  
**CURRICULUM SCHEME R2016**  
**EXAMINATION: FINAL YEAR SEMESTER VII**

COURSE CODE ILO7019 COURSE NAME : DEVELOPMENT ENGINEERING

TIME: 1 Hr

Marks 50

QUESTION PAPER-1

QUESTION	Answer
<b>Q.No.1</b>	The 73rd amendment Act pertains to which of the following
Option A	Statehood of Delhi
Option B	Panchayti Raj Institutions
Option C	Municipalities
Option D	Land reforms
<b>Q.No.2</b>	The Panchayati Raj is included in the
Option A	Union list
Option B	State list
Option C	Concurrent list
Option D	Residuary list
<b>Q. No.3</b>	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
<b>Q.No.4</b>	Which of these is a factor that affects ethical and unethical behaviour
Option A	Ethical dilemma
Option B	Diversity
Option C	Teamwork
Option D	Open communication
<b>Q. No.5</b>	When is National Panchayati Day celebrated
Option A	23rd December
Option B	1st June
Option C	24th April
Option D	15th September
<b>Q.No.6</b>	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
<b>Q.No.7</b>	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
<b>Q.No8</b>	Which of the following principles is the essential principle of utilitarian school of ethics
Option A	Greatest health principle
Option B	Greatest Happiness principle

Option C	Greatest wealth principle		
Option D	Greatest respect principle		
<b>Q.No9</b>	Which of the following is an appropriate general principle with regard to engineering ethics		<b>A</b>
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		
<b>Q.No10</b>	Which of the following statements is the most correct description of the relationship between humans and technology		<b>C</b>
Option A	Technology impacts upon human action and human beings		
Option B	Human beings" act on, use,make" technology		
Option C	Technology provides apparatus for human action		
Option D	Technology hijacks human autonomy		
<b>Q.No 11</b>	Which of the following elements must always be in the mind of the engineer while performing his duties vis-a-visEthics (1)public safety, (2) economy, (3) health, (4) welfare		<b>D</b>
Option A	1,2,3		
Option B	1,2,3,4		
Option C	1,4		
Option D	1,3,4		
<b>Q.No 12</b>	73rd amendment gave practical shape to which article of the constitution		<b>C</b>
Option A	Article 14		
Option B	Article 32		
Option C	Article 40		
Option D	Article 51		
<b>Q.No 13</b>	Which one of the following is not correct ?		<b>C</b>
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.		

<b>Q.No 14</b>	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		<b>C</b>
Option A	1,2,3		
Option B	2,3,4		
Option C	1,3,4		
Option D	1,2,4		
<b>Q.No 15</b>	The multi-dimensional poverty index is a measure developed by the		<b>D</b>
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		
<b>Q.No 16</b>	Which state has no Panchayati Raj Institution at all		<b>A</b>
Option A	Mizoram		
Option B	Manipur		
Option C	Arunachal Pradesh		
Option D	Tripura		
<b>Q.No 17</b>	Which state first reserved 50% setas for women		<b>D</b>
Option A	Andhra Pradesh		
Option B	Uttar Pradesh		
Option C	Madhya Pradesh		
Option D	Bihar		
<b>Q.No 18</b>	Which of the following system is established on the basis of direct election		<b>A</b>
Option A	Gram Panchayat		
Option B	Block Committee		
Option C	Zila Parishad		
Option D	District		
<b>Q.No 19</b>	The following is true about khap panchayat		<b>A</b>
Option A	based on caste system		
Option B	Consists of elected representatives		
Option C	Are constitutional bodies		
Option D	Follow rule of law of the land		
<b>Q.No 20</b>	In which five year plan the Panchayat Raj System was introduced in India for the first time		<b>B</b>
Option A	First		
Option B	Second		
Option C	Fifth		
Option D	Sixth		
<b>Q.No 21</b>	Which of the following years has been declared year of Gram Sabha		<b>B</b>
Option A	2008-09		
Option B	2009-10		
Option C	2011-12		
Option D	2012-13		
<b>Q.No 22</b>	Engagement of local people in development project refers to		<b>C</b>

Option A	Economic development		
Option B	Socila development		
Option C	Participatory development		
Option D	Sustainable development		
<b>Q.No 23</b>	Panchayati Raj system is based on the vision of		<b>B</b>
Option A	Pandit Jawaharlal Nehru		
Option B	Mahatma Gandhi		
Option C	Lal Bahadur Shastri		
Option D	Sardar Patel		
<b>Q.No 24</b>	Panchayats are constituted for		<b>B</b>
Option A	four years		
Option B	five years		
Option C	six years		
Option D	three years		
<b>Q.No 25</b>	The G.V.K.Rao committee was appointed by		<b>B</b>
Option A	Government of India		
Option B	Planning Commission		
Option C	Block development office		
Option D	Zilla Parishad		

Q=QUESTION	question_description	question_explanation	question_type	question_difficulty
A=ANSWER	answer_description	answer_explanation	answer_isright	answer_position
Q	Which of them is not a wireless attack?		M	1
A	Eavesdropping		0	1
A	MAC Spoofing		0	2
A	Wireless Hijacking		0	3
A	Phishing		1	4
Q	Who deploy Malwares to a system or network?		M	1
A	Criminal organizations, Black hat hackers, malware developers, cyber-terrorists		1	1
A	Criminal organizations, White hat hackers, malware developers, cyber-terrorists		0	2
A	Criminal organizations, Black hat hackers, software developers, cyber-terrorists		0	3
A	Criminal organizations, gray hat hackers, Malware developers, Penetration testers		0	4
Q	Compromising confidential information comes under _____		M	1
A	Threat		1	1
A	Bug		0	2
A	Vulnerability		0	3
A	Attack		0	4
Q	What is the best option for thwarting social-engineering attacks?		M	1
A	Technology		0	1
A	Training		1	2
A	Policies		0	3
A	Physical controls		0	4
Q	Botnets are managed by _____		M	1
A	Bot-holders		0	1
A	Bot-herders		1	2
A	Bot-trainers		0	3
A	Bot-creators		0	4
Q	_____ is a code injecting method used for attacking the database of a system / website.		M	1
A	HTML injection		0	1
A	SQL Injection		1	2
A	Malicious code injection		0	3
A	XML Injection		0	4
Q	Try not to keep _____ passwords, especially fingerprint for your smart-phone, because it can lead to physical hacking if you're not aware or asleep.		M	1
A	Biometric		1	1
A	PIN-based		0	2
A	Alphanumeric		0	3
A	Short		0	4
Q	By default, Bluetooth devices operate in which security mode?		M	1
A	Mode 1; "non-secure" mode		1	1
A	Mode 2; leaving security up to each application.		0	2
A	Mode 3; enforce link encryption for all traffic.		0	3
A	Mode 4; security settings default to a mobile policy server.		0	4
Q	Which of the following is NOT real security threat?		M	1

A	Virus		0	1
A	Worms		0	2
A	Spam		1	3
A	Trojans		0	4
Q	A small piece of code used as a payload in the exploitation of software vulnerability, is called as _____		M	1
A	Assembly code		0	1
A	Shell code		1	2
A	C and C++ code		0	3
A	Malicious code		0	4
Q	If you fall for a phishing scam, what should you do to limit the damage?		M	1
A	Change Username		0	1
A	Delete the phishing email.		0	2
A	Unplug the computer. This will get rid of any malware		0	3
A	Change any compromised passwords		1	4
Q	What kind of attempts is made by individuals to obtain confidential information from a person by falsifying their identity?		M	1
A	Phishing		1	1
A	Computer viruses		0	2
A	Spyware		0	3
A	Malware		0	4
Q	Phishers often develop _____ websites for tricking users & filling their		M	1
A	Legitimate		0	1
A	Illegitimate		1	2
A	Genuine		0	3
A	Official		0	4
Q	_____ is a generic term which refers to all the legal and regulator aspects of Internet and the World Wide Web		M	1
A	Cyber law		1	1
A	Cyber dyne		0	2
A	Cyber café		0	3
A	Electronic law		0	4
Q	Which factor determines when your IT system will be available for knowledge workers to access?		M	1
A	Reliability		0	1
A	Accessibility		0	2
A	Availability		1	3
A	Admissibility		0	4
Q	Accessing data without permission is known as.....		M	1
A	unlawful access		0	1
A	Illegal Access		0	2
A	Legal Access		0	3
A	Unauthorised Access		1	4

Q	_____ is the application of information and communication technology (ICT) for delivering government services		M	1
A	Governance		0	1
A	Governance and ethics		0	2
A	Electronic governance		1	3
A	Risk and governance		0	4
Q	The following cannot be exploited by assigning or by licensing the rights to others		M	1
A	Patents		0	1
A	Designs		0	2
A	Trademark		1	3
A	Ownership		0	4
Q	When IT Act 2000 came into effect?		M	1
A	17 October,2000		1	1
A	11 November,2000		0	2
A	17 October,2001		0	3
A	11 November,2001		0	4
Q	Which section of IT Act deals with Hacking of computer systems and its penalties?		M	1
A	Section 65		0	1
A	Section 66		1	2
A	Section 67		0	3
A	Section 69		0	4
Q	Which are the sections of IT Act applicable for Cyber pornography?		M	1
A	66, 66A, 66B		0	1
A	67, 67A, 67B		1	2
A	67, 67C, 67D		0	3
A	43, 43D, 69D		0	4
Q	Penalty for Breach of confidentiality and privacy is defined in section ----		M	1
A	71		0	1
A	72		1	2
A	73		0	3
A	74		0	4
Q	Sarbanes-Oxley Act (SOX) is used for		M	1
A	to stop hacking		0	1
A	protect equity shares		0	2
A	protect employee		0	3
A	To protect shareholders and the general public from accounting errors and fraudulent practices in enterprises		1	4
Q	HIPPA Act of 1996 stands for _____		M	1
A	Health Insurance Policy and Administration Act		0	1
A	Health Insurance Policy and Accountability Act		0	2
A	Health Insurance Portability and Administration Act		0	3
A	Health Insurance Portability and Accountability Act		1	4
Q	NERC Stands for _____		M	1
A	North African Electric Reliability Corporation		0	1
A	North American Electric Reliability Corporation		1	2
A	North American Electronic Reliability Corporation		0	3
A	North American Electric Regulatory Corporation		0	4

Q=QUESTION question\_description  
 A=ANSWER answer\_description

question\_explanation question\_type question\_difficulty  
 answer\_explanation answer\_isright answer\_position

Q	_____ analyzes customer data for designing and executing targeted marketing campaigns.		M	1
A	Analytical CRM		1	1
A	Operational CRM		0	2
A	Collaborative CRM		0	3
A	Transactional CRM		0	4
Q	Cybersquatting refers to the practice of _____		M	1
A	Using someone else's domain names for profiting from their goodwill		1	1
A	Buying competitors information for profiting		0	2
A	Using illegal means to crash competitor's website		0	3
A	Selling competitors information for profiting		0	4
Q	Social computing forces companies to deal with customers _____		M	1
A	Reactively		0	1
A	Proactively		1	2
A	Neutrally		0	3
A	Economically		0	4
Q	Electronic commerce systems generally includes all of the following except:		M	1
A	Internet websites for online sales		0	1
A	Extranet access of inventory databases		0	2
A	Direct links to credit reporting services		1	3
A	Intranets that allow sales reps to access customer records		0	4
Q	Cloud computing can be best explained by _____		M	1
A	LAN operations		0	1
A	Intranet		0	2
A	Web application		0	3
A	Hadoop		1	4
Q	Pervasive computing systems are _____		M	1

A	Context aware		1	1
A	Content aware		0	2
A	Network specific		0	3
A	Range specific		0	4
Q	_____		M	1
A	Cost of data centres is higher		1	1
A	Cost of data centres is less		0	2
A	Cost of cloud is higher		0	3
A	Cost of cloud is less		0	4
Q	Sourcing, Ownership, reliability are the _____ provided by the cloud		M	1
A	Community		0	1
A	Applications		0	2
A	Services		1	3
A	Features		0	4
Q	systems, such as computer-assisted design (CAD), computer assisted		M	1
A	Sales force automation		0	1
A	Computer-integrated manufacturing		1	2
A	Product Lifecycle Management		0	3
A	Management of interdependent items		0	4
Q	Systems which typically provide information to managers in the functional areas include _____		M	1
A	ERP systems		0	1
A	Business Intelligence System		0	2
A	Transaction Processing System		1	3
A	HR Information Systems		0	4
Q	An adhoc report which includes only information that falls outside certain threshold standards includes _____		M	1
A	Comparative reports		0	1
A	Drill-down reports		0	2
A	Exception reports		1	3
A	Routine reports		0	4

Q	The three main business processes supported by ERP systems comprises of _____		M	1
A	Transaction and planning processes		0	1
A	Procurement, fulfillment, production processes		1	2
A	Analysis, Administrative and Adhoc Processes		0	3
A	Production planning and Administrative processes		0	4
Q	A business strategy that enables manufacturers to share product-related data that support product design and development and supply chain operations is _____			1
A	Planning Production and Operations		0	1
A	Quality Control		0	2
A	Product Lifecycle Management.		1	3
A	Control and Auditing		0	4
Q	The two different strategies that the production process can follow:			1
A	Make-to-store and Make-to-sell		0	1
A	Make-to-process and Make-to-store		0	2
A	Best order, Least order		0	3
A	Make-to-stock and Make-to-order		1	4
Q	Which out of the subsequent is NOT an example of data?		M	1
A	301062		0	1
A	Blue		0	2
A	32, Primrose Hill		1	3
A	Mumbai		0	4
Q	Definition of Sample in MIS is			1
A	A tool used to collect statistical data		0	1
A	Statistics collected from an entire population		0	2
A	The factual information collected from a survey or other source is		0	3
A	A group chosen from a population		1	4
Q	Cost leadership strategy of the competitive advantage is to			1
A	Produce products and/or services at the lowest cost in the industry.		1	1
A	competitors.		0	2
A	products		0	3

A	processes		0	4
Q	to management reports			1
A	Interface		0	1
A	Dashboard		1	2
A	Whiteboard		0	3
A	Openboard		0	4
Q	decisions fall?		M	1
A	Operational control		0	1
A	Management control		0	2
A	Inventory control		1	3
A	Strategic planning		0	4
Q	individual attributes.			1
A	First		1	1
A	Second		0	2
A	Third		0	3
A	Fourth		0	4
Q	text, graphics, and tables is known as:			1
A	Image Processing		0	1
A	Data Visualization		1	2
A	Human Machine Interaction		0	3
A	Data Segmentation		0	4
Q	something is called a _____			1
A	Hacker		1	1
A	Cracker		0	2
A	Jammer		0	3
A	Spammer		0	4
Q	program is _____		M	1
A	Worm		0	1
A	Virus		1	2
A	Sniffer		0	3
A	Spoofing		0	4
Q	technology is called _____			1
A	Snooping		0	1

A	Electronic Surveillance		1	2
A	Investigation		0	3
A	Data collection		0	4
Q	intended for general public reading is called _____			1
A	Weblog		1	1
A	Electronic bulletin boards		0	2
A	Newsgroups		0	3
A	Electronic discussions		0	4

Program: BE --CIVIL Engineering

Curriculum Scheme: Revised 2016

Examination: Final Year BE

Course Code: CEC701 and Course Name: Quantity Survey Estimation and Valuation

Time: 1 hour

Max. Marks: 50

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07 October 2020\_R16\_CE\_VII\_CEC701\_QP1

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	According to ISI the actual size of brick is
Option A:	23cm*11.5cm*7.5 cm
Option B:	25cm*13cm*7.5cm
Option C:	19cm*9cm*9cm
Option D:	20cm*10cm*10cm
Q2.	The unit of rate for payment of R.C Chajja Sun Shade is
Option A:	RMT
Option B:	Square Meter
Option C:	Meter
Option D:	Cubic Meter
Q3.	The rates of materials used for government works are approved by
Option A:	Executive Board
Option B:	Board of Chief Engineers
Option C:	Elective Board
Option D:	Sub Divisional Officer
Q4.	The quantity of sand required for RCC (1:2:4) for 15 cubic metres of work is
Option A:	4.76 m <sup>3</sup>
Option B:	6.51 m <sup>3</sup>
Option C:	8.43 m <sup>3</sup>
Option D:	10.32 m <sup>3</sup>
Q5.	Quantity of bricks required for 1 cubic meter of brick work is
Option A:	400
Option B:	50
Option C:	500
Option D:	100

Q6.	Approximate Estimate is also Called as
Option A:	Revised Estimate
Option B:	Supplementary Estimate
Option C:	Preliminary Estimate
Option D:	Materials Estimate
Q7.	Which Estimate is prepared for the item which requires renewal, replacement, in the form of detailed estimate?
Option A:	Supplementary Estimate
Option B:	Revised Estimate
Option C:	Item rate Estimate
Option D:	Repairs & Maintenance Estimate
Q8.	In Detailed Estimate, the provision for contingencies is usually?
Option A:	0.1 to 0.3%
Option B:	8 to 10%
Option C:	3 to 5%
Option D:	10 to 12%
Q9.	Unit of measurement for Plastering is
Option A:	Meter
Option B:	Square Meter
Option C:	Cubic Meter
Option D:	Quintal
Q10.	What is the length of hook for mild steel 180° Bend, where $\Phi$ is the diameter of the bar
Option A:	13 $\Phi$
Option B:	5 $\Phi$
Option C:	6 $\Phi$
Option D:	9 $\Phi$
Q11.	Which Concrete work for following part of the Building is measured in Square meter?
Option A:	Roof Slab
Option B:	Floor Slab
Option C:	D.P.C.
Option D:	PCC
Q12.	Brick walls are measured in sq. m if the thickness of the wall is
Option A:	10.00 cm
Option B:	15.00 cm
Option C:	20.00 cm
Option D:	25.00 cm
Q13.	Which of the following data is not required to prepare detailed estimate?

Option A:	Amplitude
Option B:	Drawings
Option C:	Specifications
Option D:	Rates
Q14.	In long and short wall method of estimation, the length of long wall is the centre to centre distance between the walls and
Option A:	Two times half the breadth of wall
Option B:	Breadth of the wall
Option C:	One fourth breadth of wall on each side
Option D:	One third breadth of wall on each side
Q15.	Area of filling and cutting can be calculated using following formula, Where B = formation width, d= depth, s = slope.
Option A:	$Bd+sd^3$
Option B:	$Bs+d^2$
Option C:	$Bd+sd^2$
Option D:	$Bd+sd$
Q16.	While calculating the volume of earthwork either in cutting or filling which of the two areas has to be considered?
Option A:	Average
Option B:	Ratio
Option C:	Sum
Option D:	Maximum
Q17.	Calculate the area of filling for formation width 7 m, depth is 3 m and slope is 1.5 (answer in sq.m)
Option A:	61.5
Option B:	25.5
Option C:	19.5
Option D:	34.5
Q18.	A voluntary agreement between two or more parties that is enforceable by law as a binding legal agreement is known as.
Option A:	Job
Option B:	Loan
Option C:	Contract
Option D:	Tender
Q19.	An invitation to tender might not include?
Option A:	Holiday packages
Option B:	Preliminary
Option C:	A letter of invitation to tender
Option D:	Design drawing

Q20.	The art of assessing the present value of a property is known as
Option A:	Cost
Option B:	Price
Option C:	Sale
Option D:	Valuation
Q21.	To raise the loan against security of the property is known as
Option A:	Valuation
Option B:	Tax
Option C:	Mortgage
Option D:	Price
Q22.	The value of dismantled of a property is
Option A:	Salvage value
Option B:	Scrap value
Option C:	Market value
Option D:	Mortgage value
Q23.	The type of contract in which owner give the complete contract for design, services, execution and supervision of a project to one contractor
Option A:	Lumpsum contract
Option B:	Turnkey contract
Option C:	Piece work contract
Option D:	Target contract
Q24.	Retention money is released
Option A:	after completion of work
Option B:	after final bill
Option C:	after each interim bill
Option D:	after defects liability period
Q25.	The amount to be deposited by the contractor with the owner, for assurance of work, when his tender is accepted
Option A:	Earnest money
Option B:	Compensation
Option C:	Security deposit
Option D:	Retention money

Program: BE Civil Engineering

Curriculum Scheme: Revised 2016

Examination: Fourth Year Semester VII

Course Code: CE-C702 and Course Name: Theory of Reinforced Concrete Structures

Time: 1hour

Max. Marks: 50

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Note to the students: - All the Questions are compulsory and carry equal marks.

For the numerical answers, **choose the closest option.**

Q1.	In Working Stress Method, factor of safety is applied to which of the following?
Option A:	Loads
Option B:	Material Strain
Option C:	Modular Ratio
Option D:	Material Strength
Q2.	What is the transformed area of steel in square mm if the section is reinforced with 3 bars of 16 mm diameter on tension side? Take modular ratio ( $m$ ) = 13.33. <b>Consider whole number after rounding off.</b>
Option A:	7045
Option B:	8038
Option C:	5957
Option D:	12756
Q3.	What percentage of design shear force is allowed to be resisted by bent up bars?
Option A:	50%
Option B:	30%
Option C:	10%
Option D:	70%
Q4.	A beam has 230 mm as width, 530 mm as effective depth and 942sq.mm as the area of reinforcement, what is the type of the section if M 20 and Fe 415 are used? <b>Use WSM</b>
Option A:	Balanced Section
Option B:	Under-Reinforced Section
Option C:	Over-Reinforced Section
Option D:	Doubly Reinforced Section
Q5.	What is the short terms modulus of elasticity of M20 grade of concrete in N/sq.mm?
Option A:	22360.68
Option B:	34512.62

Option C:	47518.36
Option D:	15367.24
Q6.	For HYSD bars, Characteristic strength is taken corresponding to 0.2% of,
Option A:	Stiffness
Option B:	Proof stress
Option C:	Strain
Option D:	Partial safety factor
Q7.	Limit state of serviceability does not deal with the following
Option A:	Deflection
Option B:	Cracking
Option C:	Durability
Option D:	Stability
Q8.	In Limit state Method of design, design stress in steel is taken as
Option A:	$0.0035f_y$
Option B:	$0.45 f_y$
Option C:	$0.87 f_y$
Option D:	$0.002 f_y$
Q9.	A rectangular beam cross section 300 x 440mm (effective) has an ultimate torsional moment of 30kNm, ultimate bending moment of 45kNm and ultimate shear force 38kN. Calculate the equivalent shear, $V_e$ , on the beam( <b>Use LSM</b> )
Option A:	198kN
Option B:	68kN
Option C:	57kN
Option D:	205kN
Q10.	Bond strength of beams can be increased most economically by
Option A:	Increasing the depth of the beam
Option B:	providing more number of thin reinforcement bars
Option C:	providing less number of thick reinforcement bars
Option D:	providing vertical stirrups
Q11.	What percentage of probable load on the structure due to all combinations is considered as characteristic load?
Option A:	5%
Option B:	70%
Option C:	95%
Option D:	10%
Q12.	What is the area of reinforcement required for a balanced section if it has 230 mm width and 450 mm effective depth? Take M 20 and Fe 415. <b>Use LSM.</b>
Option A:	988.65 sq. mm
Option B:	546.78 sq. mm

Option C:	359.45 sq. mm
Option D:	1256.43 sq. mm
Q13.	If we denote capacity of flanged beam as MF (for neutral axis lying in flange) and capacity of rectangular Beam as MR, then which of the following comparison of the two is correct?
Option A:	MF = MR
Option B:	MF > MR
Option C:	MF < MR
Option D:	MF = 0.5 x MR
Q14.	The limiting depth of neutral axis for a reinforced concrete rectangular beam having effective depth 400mm corresponding to mild steel reinforcement is
Option A:	192mm
Option B:	184mm
Option C:	212mm
Option D:	200mm
Q15.	In limit state design, the centroid of compressive force from extreme compression fibre lies at distance of
Option A:	0.42 Xu
Option B:	0.446 Xu
Option C:	0.36 Xu
Option D:	0.56 Xu
Q16.	A reinforced concrete slab with an effective depth of 100mm is subjected to a maximum factored moment of 18kNm at its midspan. Calculate the area of tension reinforcement required if grade of concrete is M20 and grade of steel is Fe415 (Use LSM)
Option A:	486sq. mm
Option B:	628sq. mm
Option C:	565sq. mm
Option D:	234sq. mm
Q17.	In the design of slabs, the most critical limit state to be considered is
Option A:	Limit State of Collapse
Option B:	Limit State of Durability
Option C:	limit state of collapse- Flexure
Option D:	Limit State of Serviceability
Q18.	For two way slabs of shorter span up to 3.5m and loading class up to 3KN/sq.m, the span to overall depth ratio for simply supported slabs, provided with High strength deformed bars is
Option A:	35
Option B:	28
Option C:	40

Option D:	20
Q19.	According to IS : 456- 2000, minimum slenderness ratio for a short column is
Option A:	less than 12
Option B:	between 18 to 24
Option C:	less than 18
Option D:	more than 24
Q20.	The load carrying capacity of a helically reinforced column as compared to that of a tied column is about
Option A:	5 % less
Option B:	10 % less
Option C:	5 % more
Option D:	10 % more
Q21.	IS 456–2000 recommends that in any column, area of longitudinal reinforcement shall not be more than_____ of gross cross sectional area of the column
Option A:	3%
Option B:	4%
Option C:	8%
Option D:	6%
Q22.	A reinforced short column with cross section 300 mm x 300 mm is provided with 4 bars of 20 mm diameter as longitudinal reinforcement. M 25 concrete & Fe 500 steel. The ultimate load on the column is: (Use LSM)
Option A:	1354KN
Option B:	1362kN
Option C:	1250kN
Option D:	1240kN
Q23.	According to IS: 456-1978, what is the thickness at the edge of R.C.footings?
Option A:	100 mm
Option B:	150 mm
Option C:	200 mm
Option D:	250 mm
Q24.	Critical section for one way shear in footings is
Option A:	at the face of the column
Option B:	at a distance $d/2$ from the face of the column
Option C:	at a distance $d$ from the face of the column
Option D:	at the edges of the footing
Q25.	An isolated footing is to be designed for a column carrying an ultimate load of 600kN. Safe bearing capacity of soil is $200\text{kN/m}^2$ . The required area of footing (considering self weight of footing also) is

Option A:	3.3 sq. m
Option B:	4.95 sq. m
Option C:	3 sq. m
Option D:	4.5 sq. m

Program: BE Civil Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester VII

Course Code: CEDLO 7041 and Course Name: prestressed concrete

Time: 1 hour

Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	Which type of concrete is preferred for prestressed concrete sections
Option A:	High workability concrete
Option B:	High strength concrete
Option C:	Light weight concrete
Option D:	High density concrete
Q2.	A prestressed concrete member is said to be axially prestressed when
Option A:	The entire cross section subjected to uniform compressive prestress
Option B:	The entire cross section subjected to uniform tensile prestress
Option C:	The central span section subjected to tensile prestress
Option D:	The support span section subjected to compressive prestress
Q3.	If $f_{ck} = 40\text{Mpa}$ the modulus of elasticity of concrete would be
Option A:	$31.6\text{KN/mm}^2$
Option B:	$3.16\text{KN/mm}^2$
Option C:	$20\text{ N/mm}^2$
Option D:	$200\text{KN/mm}^2$
Q4.	In case of prestressed concrete the kern zone can be expressed as
Option A:	The zone in which no compressive stresses are generated
Option B:	The zone in which no tensile stresses are generated
Option C:	The zone in which no shear stresses are generated
Option D:	The zone in which no bearing stresses are generated
Q5.	A concrete beam of rectangular cross section of 200 mm X 400 mm is prestressed with a force of 500kN at concentricity. The maximum compressive stress in the concrete is
Option A:	$12.5\text{ N/mm}^2$
Option B:	$6\text{ N/mm}^2$
Option C:	$6.25\text{ N/mm}^2$
Option D:	$5\text{ N/mm}^2$

Q6.	A prestressed concrete beam is loaded with uniformly distributed load. The profile of the cable is laid based on the load balancing concept, the shape of the profile is
Option A:	Parabolic
Option B:	Triangular
Option C:	Trapezoidal
Option D:	Circular
Q7.	A pre stressed concrete beam has a cross section with following properties: Area A= 46400 mm <sup>2</sup> I= 75.8x10 <sup>7</sup> mm <sup>4</sup> , Y <sub>bottom</sub> = 244 mm, Y <sub>top</sub> = 156 mm. The beam is subjected to a prestressing force at 100mm from soffit of the beam The value of e is given by
Option A:	66.66 mm
Option B:	69.66 mm
Option C:	104.72 mm
Option D:	144 mm
Q8.	A rectangular beam is subjected to pre-stressing force force using concentric tendons. The direct stress due to pre-stressing forces across the beam length will be
Option A:	Constant throughout the length
Option B:	Maximum at mid span
Option C:	Maximum at support
Option D:	Variable throughout the length
Q9.	A concrete beam subjected to an eccentric prestressing force of magnitude P located at an eccentricity e. The stress developed at the bottom fibers of the beam will be.(A and Z are the cross sectional area and sectional modulus respectively)
Option A:	$\frac{P}{A} + \frac{Pe}{Z}$
Option B:	$\frac{P}{A} - \frac{P}{Z}$
Option C:	$\frac{P}{A} - \frac{Pe}{Z}$
Option D:	$\frac{P}{A} + \frac{P}{Z}$
Q10.	A prestressed concrete beam of width 150mm and depth 300mm is subjected to a force of 180KN with a straight cable an an eccentricity of 50mm. The corresponding stress in concrete at level of steel f <sub>c</sub> would be
Option A:	13.33
Option B:	4.33
Option C:	1.33

Option D:	5.33
Q11.	If stress in concrete at level of steel $f_c = 5.45$ $E_c = 35\text{KN/mm}^2$ and $E_s = 210\text{KN/mm}^2$ . The percentage loss of stress would be elastic deformation is
Option A:	3270
Option B:	32.7
Option C:	327
Option D:	0.327
Q12.	In a post tensioned prestressed concrete beam if the wires are simultaneously tensioned from both ends then the loss of stress due to elastic deformation
Option A:	Does not occur
Option B:	Will be positive
Option C:	Will be negative
Option D:	Equal to stress at level of steel
Q13.	The final deflection due to all loads including the efforts of temperature, creep and shrinkage should normally exceed span up to
Option A:	Span/250
Option B:	Span/300
Option C:	Span/500
Option D:	Span/800
Q14.	Which type of deflections is solved by Mohr's theorem?
Option A:	Instantaneous
Option B:	Long
Option C:	Middle span
Option D:	End span
Q15.	The deflection including the effects of temperature, creep and shrinkage occurring after the erection should not normally exceed:
Option A:	Span/400
Option B:	Span/350
Option C:	Span/500
Option D:	Span/800
Q16.	Which of the following is the equation for Mohr's first theorem?
Option A:	Loads/flexural rigidity
Option B:	Moment/flexural rigidity
Option C:	Deflection/flexural rigidity
Option D:	Area of bending moment * c.g. of area /flexural rigidity
Q17.	The spacing provided for shear reinforcement is given as:
Option A:	$S_v = (A_{sv}0.87f_y/0.4b)$
Option B:	$(A_{sv}0.91f_y/0.4b)$
Option C:	$(A_{sv}0.12f_y/0.4b)$

Option D:	$(Asv0.23fy/0.4b)$
Q18.	A prestressed concrete beam span 10m of rectangular section, 120mm wide & 300mm deep is axially prestressed on effective force of 180kN, uniformly distributed load of 5kN/m include the self weight of member. The maximum shear stress at support is
Option A:	20.5 N/mm <sup>2</sup>
Option B:	1.05 N/mm <sup>2</sup>
Option C:	15.08 N/mm <sup>2</sup>
Option D:	4.05 N/mm <sup>2</sup>
Q19.	The web shear cracks generally start from :
Option A:	Interior point
Option B:	Exterior point
Option C:	Edge
Option D:	Mid span
Q20.	Ranges of stresses at top and bottom fibres are inversely proportional to
Option A:	Section moduli of top and bottom fibre
Option B:	Self weight and live load moment
Option C:	Efficiency of the section
Option D:	Amount of prestressing force
Q21.	If $Z = 14 \times 10^6 \text{ mm}^3$ and superior and inferior stresses are $-5.9 \text{ N/mm}^2$ and $22 \text{ N/mm}^2$ respectively, area of the section is $150 \times 10^3 \text{ mm}^2$ then the minimum prestressing force would be
Option A:	1207KN
Option B:	120.7KN
Option C:	1.27KN
Option D:	130kN
Q22.	If $Z = 14 \times 10^6 \text{ mm}^3$ and superior and inferior stresses are $-5.9 \text{ N/mm}^2$ and $22 \text{ N/mm}^2$ respectively area of the section is $150 \times 10^3 \text{ mm}^2$ the corresponding eccentricity would be
Option A:	165mm
Option B:	148mm
Option C:	161mm
Option D:	142mm
Q23.	The stress in the concrete must not exceed $17 \text{ N/mm}^2$ in compression and $0 \text{ N/mm}^2$ in tension and the loss of prestress may be assumed to be 15 percent the corresponding range of stresses at top and bottom fibres are
Option A:	$14.45 \text{ N/mm}^2, 17 \text{ N/mm}^2$
Option B:	$-14.45 \text{ N/mm}^2, 17 \text{ N/mm}^2$
Option C:	$14.45 \text{ N/mm}^2, -17 \text{ N/mm}^2$
Option D:	$17 \text{ N/mm}^2, 14.45 \text{ N/mm}^2$

Q24.	In Limiting zone or safe cable zone positive eccentricities are drawn
Option A:	Above the centroid of section
Option B:	Below the centroid of section
Option C:	At the centre of span section
Option D:	At the support of the section
Q25.	The overall depth of an I section is 1000mm having a cover of 110mm and the centroid of the section is located at a distance of 550mm from top of the section the maximum possible eccentricity is
Option A:	440mm
Option B:	340mm
Option C:	450mm
Option D:	890mm

Program: BE Civil Engineering  
Curriculum Scheme: Revised 2016  
Examination: BE Semester VII

Course Code: CE-DLO7042 and Course Name: Solid Waste Management

Time: 1 hour

Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	The term Refuse generally does not include
Option A:	Putrescible solid waste
Option B:	Excreta
Option C:	Non putrescible solid waste
Option D:	Ashes
Q2.	What is the most expensive component of solid waste handling?
Option A:	Collection
Option B:	Storage
Option C:	Treatment
Option D:	Separation
Q3.	Which characteristic of solid waste increase the weight
Option A:	density
Option B:	moisture content
Option C:	particle size
Option D:	particle shape
Q4.	Which of the following is biodegradable waste?
Option A:	Polythene bags
Option B:	synthetic fibre
Option C:	Food Waste
Option D:	paper
Q5.	Ferrous materials are recovered by
Option A:	Pyrolysis
Option B:	Kjheldal method
Option C:	Gasification
Option D:	Magnetic pully
Q6.	Curb service is a type of
Option A:	House to house collection
Option B:	container collection system

Option C:	landfilling method
Option D:	incineration method
Q7.	The container system in which containers are used for storage of wastes remain at the point of generation is called
Option A:	stationary container system
Option B:	Hauled container system
Option C:	Curbside collection
Option D:	Alley collection system
Q8.	Which of the following is not includes in 3R's?
Option A:	Reuse
Option B:	Recycle
Option C:	Refuse
Option D:	Reduce
Q9.	Level site is a kind of
Option A:	Curbside collection method
Option B:	Hauled container system
Option C:	Transfer station
Option D:	stationary container
Q10.	Which method is not helpful in planning vehicle routes?
Option A:	Heuristic
Option B:	Deterministic
Option C:	Probabilistic
Option D:	Deterministic-Heuristic
Q11.	Equipment not used for separation of waste constituents is
Option A:	Screens
Option B:	Shredders
Option C:	Suspended magnet
Option D:	Invessel composting
Q12.	Layout of collection route does not include
Option A:	Preparation of location maps
Option B:	Preliminary layout route
Option C:	Soil characterstics
Option D:	Development of Balanced routes
Q13.	Waste treatment process that involves combustion of waste at very high temperatures in the presence of oxygen and results in the production of ash, flue gas, and heat.
Option A:	Incineration
Option B:	Pyrolysis
Option C:	Composting

Option D:	Landfilling
Q14.	RDF typically consists of
Option A:	combustible fraction of MSW
Option B:	non- combustible fraction of MSW
Option C:	high moisture content
Option D:	wet waste
Q15.	A process of controlled decomposition of the organic waste, typically in aerobic conditions, resulting in the production of stable humus-like product is known as
Option A:	Composting
Option B:	Compaction
Option C:	Pyrolysis
Option D:	Gasification
Q16.	Which of the following is a biological aerobic treatment of solid waste?
Option A:	Landfilling
Option B:	Composting
Option C:	Incineration
Option D:	Pyrolysis
Q17.	The burning of solid waste is not recommended because
Option A:	It is very costly
Option B:	It requires a lot of space
Option C:	It requires modern technologies
Option D:	It causes several environmental issues
Q18.	The organic material of the solid waste will decompose
Option A:	By the flow of water
Option B:	By the soil particles
Option C:	By the action of microorganisms
Option D:	By pressure
Q19.	The process of burning municipal solid wastes under suitable temperature and conditions in a specific furnace is called _____.
Option A:	Landfill
Option B:	Incineration
Option C:	Recycling
Option D:	Vermicomposting
Q20.	Which of the following is the oldest and the most common method used to dump the solid wastes?
Option A:	River
Option B:	ocean
Option C:	landfill

Option D:	marshy land
Q21.	Which of the following gas is produced from landfill wastes?
Option A:	Biogas
Option B:	natural gas
Option C:	LPG
Option D:	chlorine
Q22.	Which of the following is a typical hazardous waste?
Option A:	Waste from nuclear plants
Option B:	Waste from paper industry
Option C:	Waste from hotel industry
Option D:	Waste from steel industry
Q23.	Waste is created by electronic product is discarded after the end of its useful life is called
Option A:	Hazardous Waste
Option B:	Industrial waste
Option C:	Electronic Waste
Option D:	Biomedical waste
Q24.	Containers of biomedical waste are marked with symbol of
Option A:	Leak Proof
Option B:	Special Boxes
Option C:	Biohazard
Option D:	Fire Triangle
Q25.	An e-waste, refrigerator, falls under which category/classification
Option A:	Large household appliances
Option B:	Toys, leisure and sports equipment
Option C:	Lightning equipment
Option D:	Consumer electronics

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**Examination 2020 under cluster**

Program: BE \_\_\_\_\_ Engineering

Curriculum Scheme: Revised 2016

Examination: Final Year Semester VII

Course Code: ILO 7017 and Course Name: Disaster Management and  
Mitigation Measures

Time: 1 hour

Max. Marks: 50

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Note to the students:-All the Questions are compulsory and carry equal marks .

Q1.	_____ can be explained as, tragic set of events which consequently cause damage to property and life?
Option A:	Hazards
Option B:	Vulnerability
Option C:	Disaster
Option D:	Risk
Q2.	Which natural disaster is a sudden and violent shaking of the ground, sometimes causing great destruction, as a result of movements within the earth's crust or volcanic action?
Option A:	Earthquake
Option B:	Tsunami
Option C:	Thunderstorm
Option D:	Flooding
Q3.	Which of the following is not a component of disaster management cycle?
Option A:	Preparedness
Option B:	Response
Option C:	Construction
Option D:	Recovery
Q4.	What is EMS?
Option A:	Emergency medical services
Option B:	Effective mitigation system
Option C:	Emergency management system
Option D:	Effective management system
Q5.	N.D.R.F Stands for
Option A:	National Disaster Response Fund
Option B:	Natural Disaster Relief Fund
Option C:	National Dedicated Relief Fund
Option D:	National Dynamic Response Fund
Q6.	Risk can be dealt with following ways except:

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**Examination 2020 under cluster**

Option A:	Risk acceptance
Option B:	Risk avoidance
Option C:	Risk reporting
Option D:	Risk reduction
Q7.	Which of the following is not a man-made hazard?
Option A:	Leakage of Toxic waste
Option B:	War
Option C:	Drought
Option D:	Environmental Pollution
Q8.	Which of the following are not the causes of manmade disaster?
Option A:	Technological
Option B:	Transportation
Option C:	Landslides
Option D:	Production errors
Q9.	Who heads the crisis management Committee
Option A:	Prime Minister
Option B:	President
Option C:	Cabinet Secretary
Option D:	Ministry Of Environment
Q10.	EMS technology helps in areas which are prone to effective disaster management except:
Option A:	Trials of evacuation and general disaster plans
Option B:	Training volunteers
Option C:	Construction of shelter
Option D:	Prevention of next emergency
Q11.	What is called for the manuals that identify the role of each officer in State for managing the natural disasters?
Option A:	State Relief Manuals
Option B:	State Environmental Protection Manuals
Option C:	State Disaster Manuals
Option D:	State Protection Manuals
Q12.	The risk mapping and control does not depend on:
Option A:	The efforts taken by an organization
Option B:	Money
Option C:	Vulnerability analysis
Option D:	The action plans
Q13.	Tsunami's can occur only during
Option A:	Evening
Option B:	Afternoon
Option C:	Any time of the day or night
Option D:	Morning

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Q14.	Under which ministry Disaster Management Authority comes
Option A:	Ministry Of Environment
Option B:	Ministry of Foreign Affaires
Option C:	Ministry of Pollution
Option D:	Ministry of Home Affairs
Q15.	Which of the following components is not the part of EMS?
Option A:	Communication
Option B:	Recovery
Option C:	Budget
Option D:	Materials requirement
Q16.	Which the first step adopted for the assessment of the requests made by the state government to CENTRAL Government.
Option A:	Central Govt directly sends funds to State Govt
Option B:	The central team is deputed to make the on the spot assessment
Option C:	Finance Ministry Guides Cental Govt to relese funds
Option D:	Union Home Secretary visits State Govt affected by Disaster
Q17.	What is CBDM?
Option A:	Customers biased disaster management
Option B:	Cluster based disaster management
Option C:	Community based disaster management
Option D:	Consumer based disaster management
Q18.	The Richter scale expresses an earthquakes
Option A:	Magnitude
Option B:	Location
Option C:	Duration
Option D:	Depth
Q19.	Who is not first responder
Option A:	Police
Option B:	SDRF
Option C:	Fire and Medical Services
Option D:	NDRF
Q20.	Which of the following component of EMS does not add a value to disaster management?
Option A:	Emergency medical services
Option B:	Hazardous Materials Management
Option C:	Prevention of disaster
Option D:	Response and Recovery
Q21.	Prompt and effective response minimizes loss of life and property.
Option A:	Prompt and effective response
Option B:	Resource Allocation

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Option C:	Planning
Option D:	Financing
Q22.	Floods can be prevented by
Option A:	Afforestation
Option B:	Cutting the forest
Option C:	Tilling the land
Option D:	Removing the top soil
Q23.	Which amongst the following ensures accurate documentation of all aspects of disaster events for creating good historical records for future research and mitigation planning
Option A:	NDMA
Option B:	MoUD
Option C:	NDRF
Option D:	NIDM
Q24.	The point of the earth's surface directly above the point where an earthquake occurs is called
Option A:	Focus
Option B:	Epicenter
Option C:	Fracture
Option D:	Fault
Q25.	Which committee recommend financial assistance to various disaster across country
Option A:	National Executive Committee
Option B:	Finance Committee
Option C:	Central Committee
Option D:	Cabinet Committee

# University of Mumbai

## Examination 2020

Program: \_\_\_\_\_

Curriculum Scheme: Rev 2016

Examination: Semester VII

Course Code: ILO7012 and Course Name: Reliability Engineering

Time: 1 hour

Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	If A and B are two events such that $P(a) = 0.3$ , $P(b) = 0.6$ , and $P(A/\sim B)$ is _____
Option A:	0.3
Option B:	0.5
Option C:	0.8
Option D:	0.2
Q2.	Previous probabilities in Bayes Theorem that are changed with help of new available information are classified as _____
Option A:	Independent Probabilities
Option B:	Posterior probabilities
Option C:	Interior probabilities
Option D:	Dependent probabilities
Q3.	Let X be a random variable with probability distribution function $f(x) = 0.2$ for $ x  < 1$ $= 0.1$ for $1 <  x  < 4$ $= 0$ otherwise The probability $P(0.5 < x < 5)$ is _____
Option A:	0.3
Option B:	0.5
Option C:	0.4
Option D:	0.8

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Q4.	If 'm' is the mean of a Poisson Distribution, the standard deviation is given by _____.
Option A:	$\sqrt{m}$
Option B:	$m^2$
Option C:	$m$
Option D:	$\frac{m}{2}$
Q5.	What is the mean time to failure if time to failure of a gadget follows Weibull distribution with scale =1000 hours and shape = 0.5?
Option A:	2500 hours
Option B:	1500 hours
Option C:	3000 hours
Option D:	2000 hours
Q6.	The failure density function f(t) is defined as the derivative of the
Option A:	Failure probability
Option B:	Intensity
Option C:	Pass probability
Option D:	Density
Q7.	Mean time between failures can be defined as:
Option A:	$\frac{\text{total number of failure}}{\text{total operation time}}$
Option B:	$\frac{\text{total operation time}}{\text{total number of failure}}$

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Option C:	$\frac{\text{total operation time}}{\text{total number of components}}$
Option D:	$\frac{\text{total number of components}}{\text{total operation time}}$
Q8.	A component with time to failure T has constant failure rate $z(t) = \lambda = 2.5 \times 10^{-5} [\text{hours}]^{-1}$ Determine the probability that the component survives a period of 2 months without failure.
Option A:	0.815
Option B:	0.965
Option C:	0.911
Option D:	0.864
Q9.	The system reliability of the parallel system
Option A:	Is greater than the reliability of any subsystem
Option B:	Is equal to the reliability of the best subsystem
Option C:	Decreases as more redundant subsystem are added to the system
Option D:	Increase if the subsystem with the lowest reliability is removed
Q10.	Consider a four component system of which the components are independent and identically distributed with Constant Failure Rate (CFR). If $R_2(100) = 0.95$ , find the individual component Mean Time to Failure?
Option A:	0.128
Option B:	0.0128
Option C:	0.000128
Option D:	1

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Q11.	What failure rate must each component of a series system have, so that the probability that the system operates beyond 1000 hours is 0.9917 (Assume that all three components are independent, operate simultaneously, and have identical constant failure rates.)
Option A:	0.00278 per hour
Option B:	$2.78 \times 10^{-6}$ per hour
Option C:	$2.78 \times 10^{-5}$ per hour
Option D:	0.0287 per hour
Q12.	The 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:	0.986
Option C:	0.458
Option D:	0.589
Q13.	If the probability of a car starting on a sub-zero morning is 0.5 and we have two such cars. What is the probability that at least one of the cars will start on a sub-zero morning?
Option A:	0.92
Option B:	0.75
Option C:	0.81
Option D:	0.60
Q14.	Calculate the system unavailability, if the failure rate of a system is 2 failures/year and the average repair time is 20 hours.
Option A:	14.97 hr/yr
Option B:	18.47 hr/yr
Option C:	39.81 hr/yr

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Option D:	32.17 hr/yr
Q15.	Which of the following approach is not the redundancy approach?
Option A:	Unit redundancy
Option B:	Component redundancy
Option C:	Strong component should be identified and strengthened for reliability
Option D:	Mixed redundancy
Q16.	For the successful operation of the system, the reliability of the system will be much better due to _____
Option A:	Absence of redundant element and proper operation one element
Option B:	Presence of redundant element and improper operation one element
Option C:	Absence of redundant element and improper operation one element
Option D:	Presence of redundant element and proper operation one element
Q17.	In unit redundancy, for improving the reliability of the system, a similar system should be added to the existing system in _____
Option A:	Series
Option B:	Both series and parallel
Option C:	parallel
Option D:	No connection
Q18.	Redundant system consisting of two or more component connected in parallel and both components were operating simultaneously is called _____
Option A:	Standby redundancy
Option B:	Active redundancy
Option C:	Sitting redundancy
Option D:	Inactive redundancy

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Q19.	In order to maintain maintainability in the system, repair time must _____
Option A:	Be increased
Option B:	Be reduced
Option C:	Be kept constant
Option D:	Keeps on changing
Q20.	While discussing the concept of parts interchangeability, "if new part does not meet the required functional substitution then,
Option A:	It should be fractionally interchangeability
Option B:	It should not be physically interchangeability
Option C:	It should be physically interchangeability
Option D:	It should not be fractionally interchangeability
Q21.	The inherent availability can be calculated for repairable system as:
Option A:	$A_I = \frac{MTBF}{MTTF + MTTR}$
Option B:	$A_I = \frac{MTTF}{MTTF + MTTR}$
Option C:	$A_I = \frac{MTTF}{MTBF + MTTR}$
Option D:	$A_I = \frac{MTTF}{MTTF + MTTR}$
Q22.	Risk priority number is
Option A:	Product of severity (S), Occurrence (O) & Detection (D)
Option B:	Sum of severity (S), Occurrence (O) & Detection (D)

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**Examination 2020**

Option C:	Maximum of Severity (S), Occurrence (O) & Detection (D)
Option D:	Minimum of Severity (S), Occurrence (O) & Detection (D)
Q23.	Failure mode and effect analysis (FMEA) provide a checklist procedure. Which of the following question is NOT likely to feature on the checklist?
Option A:	What would be the cost of avoiding failure be?
Option B:	How likely is such a failure to be detected before it affects the customer?
Option C:	What is the likelihood that failure will occur?
Option D:	What would the consequences of the failure be?
Q24.	Which of the following is not the advantage of Event Tree Analysis are:
Option A:	Structured, rigorous and methodical approach
Option B:	Can be effectively performed on varying levels of design detail
Option C:	Permits probability assessment
Option D:	Partial successes/failure are distinguishable
Q25.	What is the probability of an impossible event?
Option A:	0
Option B:	1
Option C:	Not defined
Option D:	Insufficient data



7.	Which of the following is a property of a dynamic programming problem?
	a) Optimal substructure
	b) Non-Overlapping sub problems
	c) Local Optimal choice
	d) The given problem can be reduced to the 3-SAT problem
8.	When a problem is solved using the top-down approach of dynamic programming, it usually .....
	a) Decreases both, the time complexity and the space complexity
	b) Increases the time complexity and decreases the space complexity
	c) Increases both, the time complexity and the space complexity
	d) Increases the space complexity and decreases the time complexity
9.	Which of the following problems should be solved using dynamic programming?
	a) Long Integer Multiplication
	b) Reliability problems
	c) Spanning Tree
	d) Matrix Multiplication
10.	When Minimax and Maximin criteria matches, then
	a) Fair game is exists
	b) Unfair game is exists
	c) Mixed strategy exists
	d) Saddle point exists.
11.	The games with saddle points are:
	a) Probabilistic in nature
	b) Normative in nature
	c) Stochastic in nature
	d) Deterministic in nature
12.	The size of the Payoff matrix of a game can be reduced by using the principle of
	a) Saddle point
	b) Dominance
	c) Game transpose
	d) Game Inverse
13.	If orders are placed with size the EOQ, then the re-order costs component is
	a) Equal to the holding cost component
	b) Greater than the holding cost component
	c) Less than the holding cost component
	d) Either greater or less than the holding cost component
14.	Which cost can vary with order quantity
	a) Unit cost only
	b) Re-order cost
	c) Holding cost only
	d) All of these
15.	Annual demand for product costing Rs. 100 per piece is Rs. 900 Ordering cost per order is Rs. 100 and inventory holding cost is Rs.2 per unit per year. The economic lot size is
	a) 200
	b) 300
	c) 400
	d) 500
16.	Consider the following 7 jobs J1, J2, J3, J4, J5, J6 and J7. They are processed on machines A and B in the order AB. The processing times on machine A for the 7 jobs are

	[3, 12, 13, 4, 10, 11, 9] and the processing times on machine B for the 7 jobs are [8, 9, 8, 6, 13, 1, 3]. The optimum sequence of the jobs will have the first job going to machine A as -
a)	J1
b)	J3
c)	J7
d)	J6
17.	Travelling Salesman Problem can be solved using: a-Simplex Method, b-Assignment Method, c-Dynamic Programming, d- Waiting line Method
a)	Only a
b)	Only b
c)	Only c
d)	With b and d
18.	The Vogel approximation method is used for solving transportation problems as it gives -
a)	neither optimum nor feasible solution
b)	both optimum and feasible solution
c)	Optimum but infeasible solution
d)	Feasible but non-optimum solution
19.	In the Dual Simplex Method, the Initial Table represents a solution -
a)	that is feasible but not Optimal
b)	that is both feasible and optimal
c)	that is optimal but not feasible
d)	neither optimal nor feasible
20.	For a Maximization LPP, if a constraint has a surplus variable, the artificial variable added in the Dual Simplex Method will have -
a)	positive large co-efficient in the objective function
b)	negative large co-efficient in the objective function
c)	zero co-efficient in the objective function
d)	artificial variables are not required in Dual Simplex Method
21.	If the primal LPP is Maximization, the dual of the dual for the primal LPP is
a)	Minimization
b)	Maximization
c)	Can be Minimization or Maximization
d)	Infeasible
22.	The optimal solution in a linear programming model will
a)	always be a slack variable
b)	always be a surplus variable
c)	always occur at an extreme point
d)	always be outside the feasible solution space
23.	A company produces two products: Product A and Product B. Each product must go through two processes. Each Product A produced requires 2 hours in Process 1 and 5 hours in Process 2. Each Product B produced requires 6 hours in Process 1 and 3 hours in Process 2. There are 80 hours of capacity available each week in each process. Each unit of Product A produced generates \$6.00 in profit for the company. Each unit of Product B produced generates \$9.00 in profit for the company. If A = the number of units of Product A to produce each week and B = number of units of Product B to produce each week, then the capacity constraint for Process 2 would be
a)	$5A + 3B \geq 80$
b)	$6A + 3B \leq 80$
c)	$5A + 3B \leq 80$
d)	$5A + 3B < 80$

24.	A company produces two products: Product A and Product B. Each product must go through two processes. Each Product A produced requires 2 hours in Process 1 and 5 hours in Process 2. Each Product B produced requires 6 hours in Process 1 and 3 hours in Process 2. There are 80 hours of capacity available each week in each process. Each unit of Product A produced generates \$6.00 in profit for the company. Each unit of Product B produced generates \$9.00 in profit for the company. The optimal weekly profit for the company would be																																																				
a)		\$125																																																			
b)		\$150																																																			
c)		\$156																																																			
d)		\$162																																																			
25.	<p>The following transportation table shows the cost of shipping one unit from each source to each destination in the upper right hand corner of each cell, as well as the supply capacities and demand requirements:</p> <table border="1" data-bbox="427 577 1262 772"> <thead> <tr> <th colspan="2" rowspan="2"></th> <th colspan="3">Destination</th> <th rowspan="2">Supply</th> </tr> <tr> <th>Los Angeles</th> <th>New York</th> <th>Houston</th> </tr> </thead> <tbody> <tr> <th rowspan="4">Source</th> <th>Memphis</th> <td><math>\lfloor_5</math></td> <td><math>\lfloor_4</math></td> <td><math>\lfloor_2</math></td> <td>6,000</td> </tr> <tr> <th>Boise</th> <td><math>\lfloor_3</math></td> <td><math>\lfloor_6</math></td> <td><math>\lfloor_4</math></td> <td>3,000</td> </tr> <tr> <th>Omaha</th> <td><math>\lfloor_6</math></td> <td><math>\lfloor_5</math></td> <td><math>\lfloor_3</math></td> <td>8,000</td> </tr> <tr> <th>Demand</th> <td>5,000</td> <td>7,500</td> <td>4,500</td> <td>17,000</td> </tr> </tbody> </table> <p>The optimal solution is:</p> <table border="1" data-bbox="507 846 1193 1008"> <thead> <tr> <th colspan="2" rowspan="2"></th> <th colspan="3">Destination</th> </tr> <tr> <th>Los Angeles</th> <th>New York</th> <th>Houston</th> </tr> </thead> <tbody> <tr> <th rowspan="3">Source</th> <th>Memphis</th> <td><b>0</b></td> <td><b>1500</b></td> <td><b>4500</b></td> </tr> <tr> <th>Boise</th> <td><b>3000</b></td> <td><b>0</b></td> <td><b>0</b></td> </tr> <tr> <th>Omaha</th> <td><b>2000</b></td> <td><b>6000</b></td> <td><b>0</b></td> </tr> </tbody> </table> <p>The total amount shipped from Boise to Los Angeles is:</p>				Destination			Supply	Los Angeles	New York	Houston	Source	Memphis	$\lfloor_5$	$\lfloor_4$	$\lfloor_2$	6,000	Boise	$\lfloor_3$	$\lfloor_6$	$\lfloor_4$	3,000	Omaha	$\lfloor_6$	$\lfloor_5$	$\lfloor_3$	8,000	Demand	5,000	7,500	4,500	17,000			Destination			Los Angeles	New York	Houston	Source	Memphis	<b>0</b>	<b>1500</b>	<b>4500</b>	Boise	<b>3000</b>	<b>0</b>	<b>0</b>	Omaha	<b>2000</b>	<b>6000</b>	<b>0</b>
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**University of Mumbai**  
**Examination 2020 under cluster**

Program: BE Engineering

Curriculum Scheme: Revised 2016

Examination: Final Year Semester VII

Course Code: ILO7018 and Course Name: Energy Audit and Management

Time: 1 hour

Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	Choose the correct source of renewable energy.
Option A:	Natural gas
Option B:	Coal
Option C:	Tidal
Option D:	Nuclear
Q2.	Primary energy content of all fuels are generally expressed in terms of
Option A:	KW
Option B:	KVA
Option C:	KVAR
Option D:	Ton of oil equivalent (toe)
Q3.	Which of the following is a form of secondary energy?
Option A:	Steam
Option B:	Petrol
Option C:	Crude oil
Option D:	Coal
Q4.	The objective of Energy Management is to
Option A:	Minimize energy costs
Option B:	Minimize production
Option C:	Minimize duration of work
Option D:	Minimize manpower
Q5.	Energy Audit is the key to a systematic approach for decision-making in the area of
Option A:	Time management
Option B:	Water management.
Option C:	Pollution management
Option D:	energy management
Q6.	The verification, monitoring and analysis of use of energy and its report with recommendations is
Option A:	Energy monitoring

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Option B:	Energy Conservation
Option C:	Energy Audit
Option D:	energy management
Q7.	Bench-mark in Energy Audit refers to:
Option A:	Trend of energy use
Option B:	Profit margin in energy business
Option C:	Reference point for managing energy in organization
Option D:	Energy Losses
Q8.	Energy Audit can be classified into the following types.
Option A:	Short Audit and Lengthy Audit
Option B:	Preliminary Audit and Secondary Audit
Option C:	Feasible Audit and non-feasible Audit
Option D:	Preliminary Audit, targeted energy audit and Detailed Audit
Q9.	For charging Maximum demand charges, maximum demand is measured in
Option A:	kWh
Option B:	kVA
Option C:	kVAr
Option D:	KV
Q10.	Power factor is ratio of
Option A:	Active power to apparent power
Option B:	Active power to reactive power
Option C:	Reactive power to apparent power
Option D:	Apparent power to active power
Q11.	Maximum demand controller is used to
Option A:	Switch off non-essential loads in a logical sequence
Option B:	Controls the power factor of the plant
Option C:	Switch off essential loads in a logical sequence
Option D:	Exceed the demand of the plant
Q12.	For which among the following consumers was penalty imposed for low power factor before 1st April, 2020
Option A:	Residential
Option B:	Industrial
Option C:	Agricultural
Option D:	BPL customers
Q13.	The basic functions of electronic ballast exclude one of the following:
Option A:	To ignite the lamp
Option B:	To reduce lumen output of the lamp
Option C:	To supply power to the lamp

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**Examination 2020 under cluster**

Option D:	To stabilize the gas discharge
Q14.	Find the <b>odd</b> retrofit group for illumination from the following
Option A:	capacitor based control
Option B:	photo-sensors
Option C:	timer based control
Option D:	Occupancy sensors
Q15.	Motor loading calculation is based on
Option A:	Ideal load of motor
Option B:	actual operating load of motor
Option C:	90 % load of motor
Option D:	future load of the motor
Q16.	The motor input power $P_i$ in pump can be measured by using
Option A:	Stroboscope
Option B:	Efficiency meter
Option C:	Portable power analyzer.
Option D:	Tachometer
Q17.	One Tons of refrigeration (TR) is equivalent to
Option A:	3420 Btu/h
Option B:	3024 kCal/h
Option C:	1200 thermal kW
Option D:	3024 kW/ton
Q18.	What does a LEED rating reflect?
Option A:	The cost of a building
Option B:	How green a building is
Option C:	The carbon footprint of a building's occupants
Option D:	The location of a building
Q19.	What is the name for the procedure used to clear buildings of contaminants before they are occupied?
Option A:	Flush-out
Option B:	Infiltration
Option C:	Ventilation
Option D:	Ex-filtration
Q20.	Which of the following trap has intermittent discharge for large load
Option A:	Inverted bucket
Option B:	Float
Option C:	Thermostatic
Option D:	Bimetallic

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Q21.	Which is the best steam for an industrial process heating
Option A:	Dry saturated steam
Option B:	Wet steam
Option C:	Dry steam
Option D:	Superheated steam
Q22.	Which one is the most efficient equipment having Star rating
Option A:	2 star
Option B:	5 star
Option C:	4 star
Option D:	1 star
Q23.	Which one is NOT the reason of incomplete combustion
Option A:	Shortage of air
Option B:	Excess of fuel
Option C:	Poor distribution of fuel
Option D:	GCV of fuel
Q24.	The heat loss from the surface is expressed in
Option A:	Watt
Option B:	Watt/sq. meter-deg K
Option C:	Watt/sq. meter-deg C
Option D:	Joules
Q25.	Which is the purpose of insulation
Option A:	To facilitate free flow of heat
Option B:	Offers better process control by maintaining process temperature
Option C:	Reduce temperature of steam
Option D:	Refrigerated surface below dew point

**University of Mumbai**  
**Examination 2020 under cluster**

Program: BE\_\_\_\_\_ Engineering

Curriculum Scheme: Rev2016

Examination: Fourth Year Semester VII

Course Code: ILO7011 and Course Name: Product Life Cycle Management

Time: 1hour

Max. Marks: 50

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Note to the students: - All the Questions are compulsory and carry equal marks .

Q1.	The PLC describes the stages a new product goes through in the---
Option A:	Introduction phase
Option B:	Test Market
Option C:	Product Development
Option D:	Market Place
Q2.	In introduction stage of PLC sales grow slowly and
Option A:	Competition becomes tough
Option B:	Profit is Minimal
Option C:	More Investors needed
Option D:	Profit is Maximum
Q3.	Marketing Objective for the maturity stage of PLC is
Option A:	Maintain Brand Loyalty
Option B:	Stress Differentiation
Option C:	Harvest
Option D:	Deletion
Q4.	PLC stage where Competitors appears is
Option A:	Introduction phase
Option B:	Decline Phase

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**Examination 2020 under cluster**

Option C:	Maturity
Option D:	Growth
Q5.	The stage when the cost of gaining new Buyers increases
Option A:	Growth
Option B:	Introduction
Option C:	Maturity
Option D:	Pre-Investment
Q6.	Color and size of the product, brand and packaging are considered as,
Option A:	Chemical features of product
Option B:	Physical features of product
Option C:	Product designing
Option D:	Product manufacture
Q7.	Developing a unique superior product with high quality, new features, and high value in use is _____ in new product development strategy.
Option A:	New product development process
Option B:	Typical reasons for failure
Option C:	Success factors
Option D:	Product concept
Q8.	Reason of product failure associated with its feature is due to,
Option A:	Good quality of product
Option B:	Good quantity of product
Option C:	Poor quality of product
Option D:	Poor quantity of product

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Q9.	Which of the following is the first step of product development process?
Option A:	Production ramp-up
Option B:	Prototyping
Option C:	Product design
Option D:	Identification of customer needs
Q10.	In which of the following stage of Product Development Process, a detailed specification for the product development and pricing is established?
Option A:	Launch
Option B:	Testing
Option C:	Feature specification
Option D:	Idea screening
Q11.	Product data management is the activity of _____
Option A:	Managing product data.
Option B:	Invention data recording.
Option C:	Managing computer for data.
Option D:	Manipulation of data.
Q12.	A _____ is a high-level data model that shows, from the user viewpoint, the main entities and the relationships between them. It may also define the entities, and show their attributes and structure
Option A:	Physical data model
Option B:	Conceptual data model
Option C:	Entity-relationship model
Option D:	Logical data model

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Q13.	A _____ is a very detailed model that is specific to the technology (e.g., database). It shows how the data will be physically stored and accessed.
Option A:	Logical data model
Option B:	Conceptual data model
Option C:	Physical data model
Option D:	Entity relationship model
Q14.	Virtual product development is the Practice of _____ and developing the products in entire 2D/3D environment
Option A:	prototyping
Option B:	producing
Option C:	protecting
Option D:	purchasing
Q15.	_____ is not the component of virtual product development
Option A:	Virtual product design
Option B:	Virtual product simulation
Option C:	Virtual product manufacturing
Option D:	shop floor manufacturing
Q16.	_____ is not a part of digital manufacturing
Option A:	virtual plant design
Option B:	virtual process planning
Option C:	virtual assembly visualization
Option D:	realistic manufacturing
Q17.	Sustainability Science is the study of the concepts of sustainable development and----- _____ .

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Option A:	Environmental Science
Option B:	General Science
Option C:	Social science
Option D:	Geo science
Q18.	UN decade of education for Sustainable development
Option A:	2002-11
Option B:	2003-12
Option C:	2004-13
Option D:	2005-14
Q19.	Number of sustainable development goals (SDGs) by UN are
Option A:	15
Option B:	16
Option C:	17
Option D:	18
Q20.	LCA stands for
Option A:	life cycle assessment
Option B:	life cycle analogy
Option C:	Life cycle assurance
Option D:	Life cycle Array
Q21.	Product is the ultimate objective of variety reduction
Option A:	Simplification
Option B:	Standardization
Option C:	Specialization
Option D:	Socialization

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Q22.	An attractive idea must be developed into a
Option A:	Product idea
Option B:	product concept
Option C:	Test market
Option D:	Product image
Q23.	There are _____ basic components of an EDM/PDM system
Option A:	NINE
Option B:	SEVEN
Option C:	SIX
Option D:	FIVE
Q24.	Select suitable potential reasons why to implement PDM
Option A:	Data missing in hard drives, systems not responding, less data is stored
Option B:	Life cycle is managed, less systems available, data is sufficient
Option C:	Data is not centralized, CAD versions are not supported, messed up with data in mapping
Option D:	Data is available but extended facility is not existing.
Q25.	Select suitable reasons, so that PDM can lead to major benefits
Option A:	Huge investments may attract more profits
Option B:	Eases data availability, no data is missing, data storage is done
Option C:	Generates revenues, quality of product improves
Option D:	Reduces product development times by 25%, reduces cost by 15%.

**University of Mumbai**  
**Examination 2020 under cluster**

Program: BE Engineering

Curriculum Scheme: Revised 2016

Examination: Final Year

Semester VII

Course Code: **ILO7014**

Course Name: **Design of Experiments**

Time: 1 hour

Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	_____ is a vital part of the scientific (or engineering) method
Option A:	Evaluation
Option B:	Experimentation
Option C:	Estimation
Option D:	Authentication
Q2.	The general approach to planning and conducting the experiment is called the _____.
Option A:	Strategy of experimentation
Option B:	Method of experimentation
Option C:	Preparation of experimentation
Option D:	Outline of experimentation
Q3.	The basic principles of experimental design are_____.
Option A:	Randomization, repetition, blocking
Option B:	Replication, blocking randomization
Option C:	Randomization, repetition, factorization
Option D:	Optimization, blocking, factorization
Q4.	Consider the mathematical model $Y = f(x, z);$ $\Delta y = \frac{\partial f}{\partial x} \Delta x + \frac{\partial f}{\partial z} \Delta z$ now Determining the most influential variables on the response y is called
Option A:	Process control
Option B:	Robust design
Option C:	Process characterization
Option D:	Process optimization

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Q5.	The strategy which fails to consider any possible interaction between the factors is called
Option A:	Multiple factors at a time (MFAT)
Option B:	one-factor-at-a-time (OFAT)
Option C:	Best guess
Option D:	Best fit
Q6.	Which of the following is a correct expression for a multiple linear regression model having three regressor variables?
Option A:	$y = x_1 + \beta_2x_2 + \beta_3x_3 + \epsilon$
Option B:	$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \epsilon$
Option C:	$y = \beta_1x_1 + \beta_2x_2 + \beta_3x_3$
Option D:	$y = \beta_0 - \beta_1x_1 + \beta_2x_2 - \beta_3x_3 + \epsilon$
Q7.	The _____ is typically used to estimate the regression coefficients in a multiple linear regression model.
Option A:	Method of least squares
Option B:	Method of Jacobians
Option C:	Runge-Kutta Method
Option D:	Method of Moments
Q8.	In multiple linear regression problems, certain _____ about the model parameters are helpful in measuring the usefulness of the model.
Option A:	tests of hypotheses
Option B:	tests of uniqueness
Option C:	tests of convergence
Option D:	tests of divergence
Q9.	How many dependent variables does a two-way ANOVA have?
Option A:	Four
Option B:	Two
Option C:	Three
Option D:	One
Q10.	The analysis of variance will have _____ parts
Option A:	One
Option B:	Three
Option C:	Two
Option D:	Four

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Q11.	In Split spot design, Randomization is done in _____ stages
Option A:	1
Option B:	2
Option C:	3
Option D:	4
Q12.	In field experiments certain factors may require _____ plots than for others.
Option A:	Lesser
Option B:	Same
Option C:	Larger
Option D:	Small
Q13.	The key idea used for the successful implementation of fractional factorial design are _____.
Option A:	Sparsity of effects principle, randomization, repetition
Option B:	Sparsity of effects principle, projection property, sequential experimentation
Option C:	Sparsity of effects principle, projection property, randomization
Option D:	Sparsity of effects principle, projection property, randomization, repetition
Q14.	When we estimate A, B, and C with complementary one-half fraction, we are really estimating _____.
Option A:	(A X BC, B X AC, C X AB)
Option B:	(A + BC, B + AC, C + AB)
Option C:	( A – BC, B – AC, C – AB)
Option D:	( A – BC, B X AC, C + AB)
Q15.	ANOVA is a statistical method of comparing the _____ of several populations
Option A:	Variance
Option B:	Standard deviations
Option C:	Means
Option D:	Mean deviation
Q16.	In a factorial experiment _____.
Option A:	Testing one factor at a time
Option B:	Cannot estimate interactions
Option C:	all possible combination of factor levels are tested
Option D:	Levels are not tested
Q17.	Factorial designs allow us to study both _____ effects of the independent variables on the dependent(s).
Option A:	Main and interactive

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Option B:	Rank order and correlational
Option C:	Symbiotic and dichotomous
Option D:	Dependent and independent
Q18.	What statistical procedure is used to assess the statistical significance of the main effects and the interaction(s) in a factorial design?
Option A:	Analysis of covariance
Option B:	Correlation
Option C:	T-test
Option D:	Analysis of variance
Q19.	Which of the following item is required to be considered in logistics of testing?
Option A:	a plan to acquire materials needed for various test combinations
Option B:	regression model
Option C:	Taguchi Orthogonal Array
Option D:	missing runs
Q20.	Which of the following is an example of a plan for identifying results of the experimental trials?
Option A:	conducting missing trials
Option B:	tagging parts with trial and repetition numbers
Option C:	confounding
Option D:	preparing data sheets
Q21.	Large differences in results from trial to trial can happen in case of _____.
Option A:	good data sets
Option B:	bad data sets
Option C:	sample data sets
Option D:	attribute data sets
Q22.	Consistent results within a trial can be achieved with _____.
Option A:	good data sets
Option B:	bad data sets
Option C:	sample data sets
Option D:	conducting missing trials
Q23.	Which of the following is known as a structured approach for determining the "best" combination of inputs to produce a product or service _____.
Option A:	Taguchi approach
Option B:	signal to noise ratio

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Option C:	design of experiments
Option D:	linear regression
Q24.	The factors whose values are hard-to-control during normal process or use conditions are called as-
Option A:	control factors
Option B:	noise factors
Option C:	random factors
Option D:	robust factors
Q25.	Which of the following is not an example of common types of noise factors?
Option A:	environmental factors
Option B:	customer usage
Option C:	Degradation that occurs through usage and environmental exposure
Option D:	cake mixture ingredients