Special Instruction:
Students are allowed to refer to IS 1893, IS 13920 for examination purpose

Id	**1**
Question	Earthquake induce acceleration in ----------
A	all directions
B	vertical and lateral directions
C	Only horizontal direction
D	Only vertical direction
Answer	
Marks	1.5
Unit	1

Id	2
Question	Epicenter is a _____
A	point on earths surface above hypocenter,
B	origin of earthquake
C	Center of earth
D	center of energy release
Answer	
Marks	1.5
Unit	1

Id	**3**
Question	Hypocenter is a _____
A	Center of earth
B	origin of earthquake
C	point above epicenter
D	center of energy release
Answer	
Marks	1.5
Unit	1

Id	**4**
Question	As per records of Seismograph, the sequence of wave arrival at a station is described as ---___
A	first arrival of surface waves, next it is secondary waves and finally Primary waves are received
B	first arrival of primary waves, next it is secondary waves and finally Surface waves are received
C	all waves arrive simultaneously
D	particular type of wave will arrive depending up on geological conditions and focal depth of an earthquake
Answer	
Marks	1.5
Unit	1

Id	**5**
Question	In general, Permissible Increase in allowable bearing pressure for isolated footings resting on medium soil is -----
A	25 %
B	10 %
C	50 %
D	0%
Answer	
Marks	1.5
Unit	1

Id	**6**
Question	Intensity of an earthquake is -----
A	measure of energy release
B	measure of extent of damage
C	a quantitative measure
D	distance in km over which earthquake is felt
Answer	
Marks	1.5
Unit	1

Id	**7**
Question	Magnitude of an earthquake is -----
A	measure of energy release
B	measure of extent of damage
C	a quantitative measure
D	distance in km over which earthquake is felt
Answer	
Marks	1.5
Unit	1

Id	**8**
Question	Focal depth is -----
A	Depth of epicenter
B	Depth of hypocenter
C	Depth of earth center
D	Distance over which earthquake is felt
Answer	
Marks	1.5
Unit	1

Id	**9**
Question	Elastic Rebound Theory says that -----
A	accumulated strain energy gets released when resilience of storing material is exceeded.
B	earthquake occur because of elastic rebound between faults inside earth
C	earthquake occur because of elastic rebound between rock masses
D	for rebound to occur bodies (rocks) must be elastic in all directions
Answer	
Marks	1.5
Unit	1

Id	**10**
Question	Plate Tectonic Theory says that
A	Some of the major earthquakes have occurred due to collision like activities between lithospheric plates
B	All Earthquakes occur due to collision like activities between lithospheric plates.
C	Volcanoes occur due to collision like activities between lithospheric plates.
D	None of these
Answer	
Marks	1.5
Unit	1

Id	**11**
Question	Studies for Reservoir Induced Seismicity show that ----
A	Only a small % of occurrence of earthquakes can be related to creation of reservoirs so that this concept can not be considered as a major basis for earthquakes
B	a large % of occurrence of earthquakes is related to creation of reservoirs so that this concept is considered as a major basis for earthquakes
C	Considerable % of occurrence of earthquakes can be related to creation of reservoirs so that this concept can be considered as a major basis for earthquakes
D	all of these
Answer	
Marks	1.5
Unit	1

Id	**12**
Question	Prediction of earthquake is ----
A	not possible but a statistical analysis can be used for estimation of seismic hazard at a site
B	not possible with reference to its location
C	not possible with reference to its magnitude
D	not possible with reference to its time of occurrence
Answer	
Marks	1.5
Unit	1

Id	**13**
Question	As per IS 1893, maximum intensity of earthquake is ------
A	100
B	defined mathematically
C	12
D	Not defined numerically
Answer	
Marks	1.5
Unit	1

Id	**14**
Question	Proper sequence of wave arrival at a site is
A	Love, Rayleigh, S and P
B	P, S, Love and Rayleigh,
C	S, Love, and P Rayleigh
D	Rayleigh, Love, S and P
Answer	
Marks	1.5
Unit	1

Id	**15**
Question	Gravity measurements are used for detection of -------- on basis of ---------____
A	focus, seismometer
B	intensity, seismograph readings
C	magnitude, seismograph readings
D	faults, gravity anomaly
Answer	
Marks	1.5
Unit	1

Id	**16**
Question	Isoseismal map stands for
A	contour map of earthquake prone area
B	seismic zone map of India
C	map showing area of same earthquake intensity
D	map showing reduction of earthquake forces
Answer	
Marks	1.5
Unit	1

Id	**17**
Question	Permissible Increase in allowable bearing pressure for Raft Foundations resting on Type 1 soil is -----
A	25 %
B	50 %
C	75 %
D	100%
Answer	
Marks	1.5
Unit	1

Id	**18**
Question	Permissible Increase in allowable bearing pressure for Raft Foundations resting on Type II soil is -----
A	25 %
B	50 %
C	75 %
D	100%
Answer	
Marks	1.5
Unit	1

Id	**19**
Question	Permissible Increase in allowable bearing pressure for Raft Foundations resting on Type III soil is -----
A	25 %
B	50 %
C	75 %
D	100%
Answer	
Marks	1.5
Unit	1

Id	**20**
Question	Zone factor represent ------
A	seismic risk of an area in terms of MCE
B	seismic risk of an area in terms of DBE
C	random factors assigned by government
D	Ground acceleration factor
Answer	
Marks	1.5
Unit	1

Id	**21**
Question	Which of the following is not categorised under geologic hazard?
A	Tropical cyclone
B	Earthquakes
C	Volcano
D	Floods
Answer	
Marks	1.5
Unit	1

Id	**22**
Question	Which one of the following is a secondary phenomenon during an earthquake?
A	Fault scarp
B	Terrace offset
C	Liquefaction
D	All of these
Answer	
Marks	1.5
Unit	1

Id	**23**
Question	Which of the following is not categorised under the Himalayan earthquake?
A	Uttarkashi Earthquake
B	Kangra Earthquake
C	Gorkha Earthquake
D	Bhuj Earthquake
Answer	
Marks	1.5
Unit	1

Id	**24**
Question	In which tectonic environment, the surface expression in the form of folding is seen?
A	Extensional
B	Compressional
C	Strike slip
D	All of these
Answer	
Marks	1.5
Unit	1

Id	**25**
Question	Surface along which the block of rock slip is called --------
A	Fault Plane
B	Fault scarp
C	Fault zone
D	None of these
Answer	
Marks	1.5
Unit	1

Id	**26**
Question	---------- is the suitable location for the construction of dams in a folded terrain
A	Crest of the fold
B	Trough of the fold
C	Limbs of the fold
D	None of these
Answer	
Marks	1.5
Unit	1

Id	**27**
Question	Tsunami waves are generated ------- the earthquake
A	before
B	much later
C	due to
D	irrespective of
Answer	
Marks	1.5
Unit	1

Id	**28**
Question	The earth’s shape is -------- with a -------- diameter -------- diameter
A	an oblate spheroid, equatorial, larger than polar
B	spheroid, polar, larger than equatorial
C	spheroid, polar, same as equatorial
D	None of these
Answer	
Marks	1.5
Unit	1

Id	**29**
Question	Average specific gravity of materials that constitute the surface of earth is about -------, while the average specific gravity of earth is about ------ indicating presence of -------- materials towards ---------
A	5.5, 2.8, very heavy, surface of earth
B	2.8, 5.5, very heavy, interior of earth
C	3.0, 3.0, uniform, section of earth
D	1.0, 1.5, very heavy, interior of earth
Answer	
Marks	1.5
Unit	1

Id	**30**
Question	The interior of the earth can be classified into three major categories as Crust, Mantle and Core respectively of average thickness -------
A	70 km, 5100 km, 1370 km
B	5100 km, 5100 km, 5100 km
C	1370 km, 1370 km, 1370 km
D	2100 km, 2100 km, 2100 km
Answer	
Marks	1.5
Unit	1

Id	**31**
Question	Spreading ridges are ------- which are areas along the edges of plates move ------
A	Convergent boundaries, apart from each other
B	divergent boundaries, towards each other
C	divergent boundaries, apart from each other
D	convergent boundaries, towards each other
Answer	
Marks	1.5
Unit	1

Id	**32**
Question	---------- seismic wave does not pass through a fluid
A	Surface wave
B	Body wave
C	S-wave
D	P-wave
Answer	
Marks	1.5
Unit	1

Id	**33**
Question	------- waves are capable of traveling through solids, liquids and gases.
A	Surface wave
B	Body wave
C	S-wave
D	P-wave
Answer	
Marks	1.5
Unit	1

Id	**34**
Question	-------- travel through the ------ and does not propagate into the -----
A	P waves, earth crust, interior of earth
B	all waves, earth crust, interior of earth
C	Surface waves, earth crust, interior of earth
D	None of above
Answer	
Marks	1.5
Unit	1

Id	**35**
Question	The damage and destruction associated with earthquakes can be mainly attributed to ----
A	Surface wave
B	Body wave
C	S-wave
D	P-wave
Answer	
Marks	1.5
Unit	1

Id	**36**
Question	The record obtained from a -------- is called a -------.which is measure of ------
A	Accelerometer, accelerogram, ground displacement
B	Seismograph, seismogram, ground velocity
C	Seismograph, seismogram, ground acceleration
D	Seismograph, seismogram, ground displacement
Answer	
Marks	1.5
Unit	1

Id	**37**
Question	The record obtained from a -------- is called a -------.which is measure of ------
A	Accelerometer, accelerogram, ground acceleration
B	Seismograph, seismogram, ground velocity
C	Seismograph, seismogram, earthquake acceleration
D	Seismograph, seismogram, ground acceleration
Answer	
Marks	1.5
Unit	1

Id	**38**
Question	The distance from hypocenter to observation point is given by ----- where, T=difference in time of arrival of P and S waves at an observation point; S= distance from hypocenter to observation point; and Vp and Vs are the velocity of P and S waves, respectively.
A	$S=\frac{T}{Vs - Vp}$
B	$S=\frac{T}{\frac{1}{Vs} - \frac{1}{Vp}}$
C	$S=\frac{\frac{1}{Vs} - \frac{1}{Vp}}{T}$
D	$S=T\left(\frac{1}{Vs} - \frac{1}{Vp}\right)$
Answer	
Marks	1.5
Unit	1

Id	**39**
Question	The least dense rocks are found in ------
A	Continental crust.
B	Oceanic crust.
C	The mantle.
D	the core
Answer	
Marks	1.5
Unit	1

Id	**40**
Question	Most earthquakes of engineering significance are of ----- and are caused by ---- along geological ------
A	Continental drift origin, slip, faults
B	Elastic rebound origin, slip, faults
C	tectonic origin, slip, faults
D	All of above
Answer	
Marks	1.5
Unit	1

Id	**41**
Question	The Richter magnitudes are based on a -------
A	Linear scale
B	exponential scale
C	logarithmic scale (base e)
D	logarithmic scale (base 10)
Answer	
Marks	1.5
Unit	1

Id	**42**
Question	A fault is -------- between two blocks of rock. Faults allow the blocks to move-------. Faults may be -------- in length
A	a zone of fractures, relative to each other, few meters
B	a zone of fractures, relative to each other, thousands of kilometers
C	a zone of cleavage, towards each other, few meters
D	a zone of cleavage, towards each other, thousands of kilometers
Answer	
Marks	1.5
Unit	1

Id	**43**
Question	Of the two ways to measure earthquake size, ------- is based on instrumental readings hence called as -------, and ------- is based on qualitative effects of earthquakes.
A	Magnitude, quantitative, intensity
B	Magnitude, qualitative, intensity
C	intensity, qualitative, Magnitude
D	intensity, quantitative, Magnitude
Answer	
Marks	1.5
Unit	1

Id	**44**
Question	Strong motion records are graph plotted in form of time along x axis and ----- along y axis
A	Displacement
B	Velocity
C	Acceleration
D	Displacement / velocity / acceleration, anyone taken at a time
Answer	
Marks	1.5
Unit	1

Id	**45**
Question	The maximum temperature in the core is estimated to be about--------.
A	100 degree Celsius
B	300 degree Celsius
C	3000 degree Celsius
D	0 degree Celsius
Answer	
Marks	1.5
Unit	1

Id	**46**
Question	Earthquake can cause damage not only on account of ------ which results from them but also due to ---------
A	the shaking; other chain effects like landslides, floods, fires
B	other chain effects like landslides, floods, fires; the shaking
C	the shaking; heavy rainfall
D	the shaking; heavy cyclone
Answer	
Marks	1.5
Unit	1

Id	**47**
Question	The intensity of shock due to an earthquake could vary locally at anyplace due to ------.
A	variation in construction quality
B	variation in foundation conditions
C	variation in soil conditions
D	All of above
Answer	
Marks	1.5
Unit	1

Id	**48**
Question	The originating earthquake source of the elastic waves inside the earth which cause shaking of ground due to earthquake is called ------
A	Epicenter
B	Center of earthquake
C	Focus
D	Core
Answer	
Marks	1.5
Unit	1

Id	**49**
Question	------of earthquake is a logarithm number to the base 10 of the maximum trace amplitude, which is a measure of energy released in an earthquake.
A	Intensity
B	Frequency
C	Magnitude
D	Period
Answer	
Marks	1.5
Unit	1

Id	**50**
Question	Maximum Considered Earthquake (MCE) as per IS 1893 is ------
A	The most severe earthquake effects considered by this standard
B	The average earthquake effects considered by this standard
C	The most severe earthquake effects considered in the world
D	The most severe earthquake effects considered in America
Answer	
Marks	1.5
Unit	1

Id	**51**
Question	------- means the nature of geological formation of the bedrock in the earth’s crust revealing regions characterized by structural features, such as dislocation, distortion, faults, folding, thrusts, volcanoes with their age of formation, which are directly involved in the earth movement or quake resulting in the above consequences.
A	Earths History
B	Rock History
C	Lithological Features
D	Tectonic Features
Answer	
Marks	1.5
Unit	1

Id	**52**
Question	As per IS 1893, soil-structure interaction refers to the --------
A	effects of the supporting foundation medium on the motion of structure.
B	effects of the soil filled in foundations and plinth on the motion of structure.
C	effects of the surrounding soil medium on the motion of structure.
D	effects of the sloping foundation medium (if present) on the motion of structure.
Answer	
Marks	1.5
Unit	1

Id	**53**
Question	As per IS 1893, the soil-structure interaction may not be considered in the seismic analysis for structures ------
A	supported on pile foundations
B	supported on raft foundations
C	supported on rock or rock-like material
D	supported on soft soil strata
Answer	
Marks	1.5
Unit	1

Id	**54**
Question	Continental drift theory is based on ---------
A	the hypothesis that the continents had once formed a single landmass before breaking apart and drifting to their present locations
B	the hypothesis that the continents are continuously in drifting mode
C	the hypothesis that the continents keep drifting and colloiding
D	None of these
Answer	
Marks	1.5
Unit	1

Id	**55**
Question	The widely accepted explanation for theory of Plate tectonics -------
A	is the pseudo forces due to planetary motion
B	is based on the force offered by convection currents created by thermo-mechanical behavior of the earth’s subsurface
C	Forces exerted due to thrusting of tectonic plates
D	All of these
Answer	
Marks	1.5
Unit	1

Id	**56**
Question	The earthquake that occurs at a plate boundary is known as ------- earthquake. Not all earthquakes occur at plate boundaries. Though, interior portion of a plate is usually----------, earthquakes also occur far from plate boundaries which are known as ---------- earthquakes
A	intra-plate, tectonically quiet, inter-plate
B	intra-plate, tectonically very active, inter-plate
C	inter-plate, tectonically very active, intra-plate
D	inter-plate, tectonically quiet, intra-plate
Answer	
Marks	1.5
Unit	1

Id	**57**
Question	Primary (P) waves, are also known as -------
A	push-pull waves
B	longitudinal waves,
C	compressional waves,
D	All of these
Answer	
Marks	1.5
Unit	1

Id	**58**
Question	--------- specifies design forces for structures standing on rocks or soils which do not settle, liquefy or slide due to loss of strength during --------
A	IS 1893, ground vibrations
B	IS 456, ground vibrations
C	IS 13920, ground vibrations
D	IS 875, ground vibrations
Answer	
Marks	1.5
Unit	1

Id	**59**
Question	Seismic hazard analysis is the process by --------
A	Estimation of damage due to earthquake
B	Estimation of size of earthquake for a region
C	which the site specific design basis ground motion (DBGM) parameters are arrived at.
D	None of these
Answer	
Marks	1.5
Unit	1

Id	**60**
Question	As per IS 1893, Design Basis Earthquake (DBE) is -----
A	the earthquake which can reasonably be expected to occur at least once during the design life of the structure.
B	the most severe earthquake which can reasonably be expected to occur at least once during the design life of the structure.
C	the earthquake which can frequently be expected to occur
D	the earthquake of smallest size which can be expected to occur at least once during the design life of the structure.
Answer	
Marks	1.5
Unit	1

Id	**61**
Question	Undamped Vibration of a SDOF system, consisting of mass m and spring stiffness k, is described by equation of motion as ----
A	$m\ddot{v}(t) + k\,v(t) = 0$
B	$m\ddot{v}(t) - k\,v(t) = 0$
C	$m\ddot{v}(t) + k\,v(t) = f(t)$
D	$m\ddot{v}(t) + c\,\dot{v}(t) + k\,v(t) = f(t)$
Answer	
Marks	1.5
Unit	2

Id	**62**
Question	Damped free Vibration of a SDOF system, consisting of mass m, damping c and spring stiffness k, is described by equation of motion as ----
A	$m\ddot{v}(t) + k\,v(t) = 0$
B	$m\ddot{v}(t) - k\,v(t) = 0$
C	$m\ddot{v}(t) + k\,v(t) = f(t)$
D	$m\ddot{v}(t) + c\,\dot{v}(t) + k\,v(t) = 0$
Answer	
Marks	1.5
Unit	2

Id	**63**
Question	Damping in concrete buildings is ---- and for steel buildings is ---- of the critical damping
A	5 %, 2 %
B	2 % , 5 %
C	10 %, 4 %
D	additional data is required for calculations.
Answer	
Marks	1.5
Unit	2

Id	**64**
Question	For a vibration of un-damped SDOF system, consisting of mass m, stiffness k and constant force Po
A	$v(t) = \frac{\dot{x}_0}{\omega}\cos\omega t + v_0 \sin\omega t$
B	$v(t) = C_1 \cos\omega t + C_2 \sin\omega t$
C	$v(t) = C_1 \cos\omega t + C_2 \sin\omega t + Po/k$
D	All of these
Answer	
Marks	1.5
Unit	2

Id	**65**
Question	Seismic mass is -----
A	Seismic force
B	Seismic weight /acceleration due to gravity
C	Dead load + imposed load
D	Mass of foundation
Answer	
Marks	1.5
Unit	2

Id	**66**
Question	Displacement of Spring, mass and damper are -------
A	Unidirectional
B	Unidirectional and in same direction
C	Collinear but may be oppositely directed
D	None of these
Answer	
Marks	1.5
Unit	2

Id	**67**
Question	SDOF possess freedom of vibration in ---
A	all directions
B	vertical and lateral directions
C	only lateral direction
D	none of these
Answer	
Marks	1.5
Unit	2

Id	**68**
Question	Redundancy, Ductility and over-strength are used to
A	allow increase in bearing pressure of soils
B	allow reduction in permissible stresses in material
C	allow increase in permissible stresses in material
D	allow reduction of earthquake forces
Answer	
Marks	1.5
Unit	2

Id	**69**
Question	Storey Stiffness is mainly contributed by _____
A	columns and beams
B	columns and/or walls
C	beams only
D	Columns, and slabs
Answer	
Marks	1.5
Unit	2

Id	**70**
Question	Damping stands for ____
A	shock absorption
B	amplification of vibration energy
C	Transmission of vibration energy
D	effect of internal friction, imperfect elasticity of material, slipping, sliding, etc in reducing the amplitude of vibration
Answer	
Marks	1.5
Unit	2

Id	**71**
Question	In viscous damping, damping force is proportional to -------- of motion
A	viscosity
B	acceleration
C	displacement
D	velocity
Answer	
Marks	1.5
Unit	2

Id	**72**
Question	In equation of motion for SDOF, inertial force is proportional to -------- of motion
A	viscosity
B	acceleration
C	displacement
D	velocity
Answer	
Marks	1.5
Unit	2

Id	**73**
Question	In equation of motion for SDOF, spring force is proportional to -------- of motion
A	viscosity
B	acceleration
C	displacement
D	velocity
Answer	
Marks	1.5
Unit	2

Id	**74**
Question	In equation of motion for undamped free vibration of SDOF, damping force is --------
A	proportional to viscosity
B	proportional to acceleration
C	proportional to displacement
D	absent
Answer	
Marks	1.5
Unit	2

Id	**75**
Question	In equation of motion for undamped free vibration of SDOF, RHS of equation is --------
A	formed by forcing function
B	zero
C	Constant term
D	additional data required
Answer	
Marks	1.5
Unit	2

Id	**76**
Question	As per IS 1893, centre of stiffness is ____
A	volumetric centroid of building
B	centroid of a plane frame
C	point through which resultant of earthquake forces acts
D	point through which resultant of resisting forces acts
Answer	
Marks	1.5
Unit	2

Id	**77**
Question	Ductility manifestation _____
A	decreases from material to component and component to system level
B	increase from material to component and component to system level
C	allow increase in permissible stresses in material
D	decreases from material to component and then increase from component to system level
Answer	
Marks	1.5
Unit	2

Id	**78**
Question	As per IS 1893, lateral forces are distributed along height of building in a -----
A	linear or triangular shape
B	constant proportion
C	parabolic shape
D	manner that can vary with every case
Answer	
Marks	1.5
Unit	2

Id	**79**
Question	Fundamental time period of vibration is ____
A	computed from base width of building
B	computed from plan dimensions of building
C	the first (longest) modal time period of vibration
D	a fixed value
Answer	
Marks	1.5
Unit	2

Id	**80**
Question	Natural Period is -----
A	obtained from forced vibration studies
B	a time period obtained from undamped free vibration studies
C	dependant only on property of material of construction
D	naturally occurring reciprocal of frequency
Answer	
Marks	1.5
Unit	2

Id	**81**
Question	Modal Natural Period (T_k) is ----
A	Sum of all modal time periods
B	multiplication of all modal time periods
C	Time period from modal analysis
D	the modal natural period of mode k is the time period of vibration in mode k.
Answer	
Marks	1.5
Unit	2

Id	**82**
Question	Normal Mode of a system is ----
A	two adjacent modes are orthogonal
B	When smallest of its masses attain maximum values of displacements and rotations
C	When all its masses attain maximum values of displacements, rotations simultaneously, and pass through equilibrium positions simultaneously.
D	When maximum of its masses attain maximum values of displacements and rotations
Answer	
Marks	1.5
Unit	2

Id	**83**
Question	Response Spectrum means -----
A	representation of the maximum response of idealized SDOF with certain period and damping, during earthquake ground motion.
B	Spectrum of displacements
C	Spectrum of accelerations
D	Spectrum of ground velocity
Answer	
Marks	1.5
Unit	2

Id	**84**
Question	Response Spectrum is -----
A	a plot against undamped natural period and for various damping values, and can be expressed in terms of maximum absolute acceleration, maximum relative velocity, or maximum relative displacement.
B	Spectrum of displacements
C	Spectrum of accelerations
D	Spectrum of ground velocity
Answer	
Marks	1.5
Unit	2

Id	**85**
Question	Seismic Weight (W) is -----
A	weight taking part in vibration
B	total weight getting excited due to ground vibration
C	total mass of system multiplied with acceleration due to gravity
D	the total dead load plus appropriate amounts of specified imposed load.
Answer	
Marks	1.5
Unit	2

Id	**86**
Question	Damping in structural systems can be arranged in increasing order for sets as____
A	glass, steel, concrete, masonry, wood
B	wood, steel, masonry, glass, concrete
C	glass, steel, concrete, masonry, wood
D	any sequence is similar
Answer	
Marks	1.5
Unit	2

Id	**87**
Question	MDOF possess freedom of vibration in ------
A	all directions
B	vertical and lateral directions
C	only lateral direction
D	only vertical direction
Answer	
Marks	1.5
Unit	2

Id	**88**
Question	Forced Vibration of a SDOF system, consisting of mass m and stiffness k, is described by equation of motion as
A	$m\ddot{v}(t) + k\,v(t) = 0$
B	$m\ddot{v}(t) - k\,v(t) = 0$
C	$m\ddot{v}(t) + k\,v(t) = f(t)$
D	None of these
Answer	
Marks	1.5
Unit	2

Id	**89**
Question	For springs in parallel effective stiffness is ____while for springs in series, it is ____ of system spring stiffnesses
A	linearly added, added after inverse
B	product, division
C	added after inverse, linearly added
D	division, product
Answer	
Marks	1.5
Unit	2

Id	**90**
Question	Ductility of a member helps to _____
A	undergo larger plastic deformations
B	absorb energy of vibrations
C	economize the seismic design
D	all of these
Answer	
Marks	1.5
Unit	2

Id	**91**
Question	General case of forced Vibration of a SDOF system is described by equation of motion as
A	$m\ddot{v}(t) + c\dot{v}(t) + k\,v(t) = f(t)$
B	$m\ddot{v}(t) - k\,v(t) = 0$
C	$m\ddot{v}(t) + k\,v(t) = f(t)$
D	$m\ddot{v}(t) + c\dot{v}(t) = f(t)$
Answer	
Marks	1.5
Unit	2

Id	**92**
Question	As per IS 1893 for MCE, the design horizontal seismic coefficient is given by
A	$A_h = \frac{Z\ I\ Sa}{R\ g}$
B	$A_h = \frac{Z\ I\ Sa}{2\ R\ g}$
C	Both of above
D	None of above
Answer	
Marks	1.5
Unit	2

Id	**93**
Question	As per IS 1893 for DBE, the design horizontal seismic coefficient is given by
A	$A_h = \frac{Z\ I\ Sa}{R\ g}$
B	$A_h = \frac{Z\ I\ Sa}{2\ R\ g}$
C	Both of above
D	None of above
Answer	
Marks	1.5
Unit	2

Id	**94**
Question	As per IS 1893, whether effect of resonance is ----------
A	necessary to be considered in every case
B	generally not necessary to be considered in every case but may be taken in to account for specific conditions
C	ignored for all cases
D	No guideline available
Answer	
Marks	1.5
Unit	2

Id	**95**
Question	Earthquake is ------ to occur simultaneously with ----------
A	not likely, wind or maximum flood
B	likely, wind or maximum flood
C	guaranteed, wind or maximum flood
D	None of the above
Answer	
Marks	1.5
Unit	2

Id	**96**
Question	Square root of the sum of the square (SRSS) used for combining responses stands for ---
A	$E_{\mathrm{L}} = \sqrt{(E_{Lx})^2} + \sqrt{(E_{Ly})^2} + \sqrt{(E_{Lz})^2}$
B	$E_{\mathrm{L}} = \sqrt{[(E_{Lx})^2 + (E_{Ly})^2 + (E_{Lz})^2]}$
C	$E_{\mathrm{L}} = \sqrt{[(E_{Lx})^2 + (E_{Ly})^2 + (E_{Lz})^2]^{0.5}}$
D	$E_{\mathrm{L}} = \sqrt{[(E_{Lx})^2 + (E_{Ly})^2 + (E_{Lz})^2]^2}$
Answer	
Marks	1.5
Unit	2

Id	**97**
Question	For Soft soil category, 5 % damping and Time Period of 0.4 sec., value of (Sa/g) works out to be ___
A	2.0
B	1.67
C	2.5
D	1.5
Answer	
Marks	1.5
Unit	2

Id	**98**
Question	For Hard soil category, 5 % damping and Time Period of 0.4 sec., value of (Sa/g) works out to be ___
A	2.0
B	1.67
C	2.5
D	1.5
Answer	
Marks	1.5
Unit	2

Id	**99**
Question	For medium soil category, 5 % damping and Time Period of 0.4 sec., value of (Sa/g) works out to be ___
A	2.0
B	1.67
C	2.5
D	1.5
Answer	
Marks	1.5
Unit	2

Id	**100**
Question	As per IS 1893, Zero Period Acceleration (ZPA) is -------
A	the value of acceleration response spectrum for period below 0.03 s (frequencies >33 Hz)
B	the value of acceleration response spectrum for period at 0 s
C	the value of acceleration response spectrum for period below 1 s
D	Related to structures with zero time period
Answer	
Marks	1.5
Unit	2

Id	**101**
Question	As per IS 1893, Base of structure means ----
A	level at which earthquake vibrations are felt by structure
B	level at which inertia forces generated in the structure are transferred to the foundation, which then transfers these forces to the ground
C	Plinth of the building
D	Ground level perimeter of the building
Answer	
Marks	1.5
Unit	2

Id	**102**
Question	As per IS 1893, Centre of Mass means -----
A	Center of geometry
B	Vertical Center of height
C	Location of heaviest mass in system
D	The point through which the resultant of the masses of a system acts. This point corresponds to the centre of gravity of masses of system
Answer	
Marks	1.5
Unit	2

Id	**103**
Question	As per IS 1893, Static Eccentricity is -------
A	the distance between centre of mass and centre of rigidity of floor
B	the distance between centre of mass and centre of stiffness
C	the distance between centre of mass and centre of resistance
D	All of above
Answer	
Marks	1.5
Unit	2

Id	**104**
Question	IS 1893 state that actual forces that appear on structures during earthquakes ------- the ------ specified in this standard.
A	are much greater than, design forces
B	are much lower than, design forces
C	are same as, design forces
D	Cause little damage to, structures
Answer	
Marks	1.5
Unit	2

Id	**105**
Question	Fourier Spectrum is ----
A	the plot of Fourier amplitude of input time history vs time period or frequency
B	the plot of Fourier amplitude of input time history vs duration of earthquake
C	Spectrum of earthquake frequencies
D	None of these
Answer	
Marks	1.5
Unit	2

Id	**106**
Question	IS 1893 state that: Vertical cantilever projections attached to buildings and projecting above the roof, shall be designed and checked for stability for ----- the design horizontal seismic coefficient A_h specified in this standard
A	0.0 times
B	0.05 times
C	5 times
D	5000 times
Answer	
Marks	1.5
Unit	3

Id	**107**
Question	As per IS 1893, Modal Participation Factor P_k of k^{th} mode is defined as -----
A	$P_k = \frac{\sum_{i=1}^{n} W_i \phi_{ik}}{\sum_{i=1}^{n} W_i \phi_{ik}}$
B	$P_k = \frac{\sum_{i=1}^{n} W_i (\phi_{ik})^2}{\sum_{i=1}^{n} W_i (\phi_{ik})^2}$
C	$P_k = \frac{\sum_{i=1}^{n} W_i (\phi_{ik})^2}{\sum_{i=1}^{n} W_i (\phi_{ik})}$
D	$P_k = \frac{\sum_{i=1}^{n} W_i \phi_{ik}}{\sum_{i=1}^{n} W_i (\phi_{ik})^2}$
Answer	
Marks	1.5
Unit	2

Id	**108**
Question	The equation of motion for a linear, viscously damped SDOF system is ------
A	Third order differential equation with constant coefficients
B	second order differential equation without constant coefficients
C	second order differential equation with constant coefficients
D	first order differential equation with constant coefficients
Answer	
Marks	1.5
Unit	2

Id	**109**
Question	For a SDOF with mass m, stiffness k, damping c, natural frequency ω_0 and damped natural frequency $\omega_{d,}$ proper relations are
A	$\omega_0 = \sqrt{\frac{k}{m}}, \quad \xi = \frac{c}{2\,m\,\omega_0}, \; \omega_d = \omega_0\sqrt{(1-\xi^2)}$
B	$\omega_0 = \sqrt{\frac{m}{k}}, \quad \xi = \frac{c}{2\,m\,\omega_0}, \; \omega_d = \omega_0\sqrt{(1-\xi^2)}$
C	$\omega_0 = \frac{k}{m} \quad \xi = \frac{c}{2\,m\,\omega_0}, \; \omega_d = \omega_0\sqrt{(1-\xi^2)}$
D	$\omega_0 = \frac{m}{k}, \quad \xi = \frac{c}{2\,m\,\omega_0}, \; \omega_d = \omega_0\sqrt{(1-\xi^2)}$
Answer	
Marks	1.5
Unit	2

Id	**110**
Question	Numerical solution of initial boundary value problems in seismic Analysis of SDOF System is very often carried out by ------
A	Newmark’s Beta method (Linear acceleration method) and Runge-Kutta method
B	Trapezoidal Rule
C	Simpsons 1/3 rule
D	Finite element method
Answer	
Marks	1.5
Unit	2

Id	**111**
Question	------ is used for obtaining response of linear systems subjected to irregular excitations such as earthquake forces and it requires knowledge of complex frequency response function for its proper application.
A	Frequency Domain Analysis
B	Finite Element method
C	Numerical differentiation
D	None of these
Answer	
Marks	1.5
Unit	2

Id	**112**
Question	Response spectral values depends upon the ------
A	Richter magnitude , Energy release mechanism, Epicentral distance, Focal depth
B	Soil condition, Damping in the system
C	Time period of the system
D	All of these
Answer	
Marks	1.5
Unit	2

Id	**113**
Question	For a SDOF with mass m = 2000 kg, stiffness k = 60 kN/m, damping c = 0.44 kN.sec/m., compute natural frequency ω_0 and damped natural frequency ω_d which are represented by $\omega_0 = \sqrt{\frac{k}{m}}, \quad \xi = \frac{c}{2\, m\, \omega_0}, \; \omega_d = \omega_0 \sqrt{(1-\xi^2)}$
A	5.477 rad/sec, 5.4762 rad /sec
B	5.0 rad/sec, 5.4762 rad /sec
C	5.48 rad/sec, 5.48 rad /sec
D	5.48 rad/sec, 6.0 rad /sec
Answer	
Marks	1.5
Unit	2

Id	**114**
Question	For a SDOF with mass m = 4000 kg, stiffness k = 60 kN/m, damping c = 0.44 kN.sec/m., compute natural frequency ω_0 and damped natural frequency ω_d which are represented by $\omega_0 = \sqrt{\frac{k}{m}}, \quad \xi = \frac{c}{2\, m\, \omega_0}, \; \omega_d = \omega_0 \sqrt{(1-\xi^2)}$
A	3.873 rad/sec, 3.8722 rad /sec
B	3.0 rad/sec, 3.722 rad /sec
C	3.87 rad/sec, 3.87 rad /sec
D	3.87 rad/sec, 6.0 rad /sec
Answer	
Marks	1.5
Unit	2

Id	**115**
Question	For a SDOF with mass m = 4000 kg, stiffness k = 120 kN/m, damping c = 0.44 kN.sec/m., compute natural frequency ω_0 and damped natural frequency ω_d which are represented by $\omega_0=\sqrt{\frac{k}{m}}, \quad \xi=\frac{c}{2\,m\,\omega_0}, \; \omega_d=\omega_0\sqrt{(1-\xi^2)}$
A	5.477 rad/sec, 5.4762 rad /sec
B	5.0 rad/sec, 5.4762 rad /sec
C	5.48 rad/sec, 5.48 rad /sec
D	5.48 rad/sec, 6.0 rad /sec
Answer	
Marks	1.5
Unit	2

Id	**116**
Question	For a SDOF with mass m = 4000 kg, stiffness k = 120 kN/m, damping c = 5 kN.sec/m., compute natural frequency ω_0 and damped natural frequency ω_d which are represented by $\omega_0 = \sqrt{\frac{k}{m}}, \quad \xi = \frac{c}{2\, m\, \omega_0}, \; \omega_d = \omega_0 \sqrt{(1-\xi^2)}$
A	5.477 rad/sec, 5.441 rad /sec
B	5.0 rad/sec, 5.4762 rad /sec
C	5.477 rad/sec, 5.477 rad /sec
D	5.48 rad/sec, 6.0 rad /sec
Answer	
Marks	1.5
Unit	2

Id	**117**
Question	A cantilever beam carries mass of 10000 kg at tip, if stiffness is 1000 kN/m, the natural frequency of vibration would be ----
A	1 rad/sec
B	10 rad/sec
C	100 rad/sec
D	1000 rad/sec
Answer	
Marks	1.5
Unit	2

Id	**118**
Question	A simple portal carries mass of 10000 kg at top, if stiffness of both columns together is 1000 kN/m, the natural frequency of vibration would be ---- (beam may be considered axially and flexural rigid, vibration due to sway action to be taken in to account)
A	1 rad/sec
B	10 rad/sec
C	100 rad/sec
D	1000 rad/sec
Answer	
Marks	1.5
Unit	2

Id	**119**
Question	Except for special structures, for all other cases when structure is struck with severe earthquake ground motion, it undergoes ---------- because such structures are designed for forces ----------
A	inelastic deformations, which are much less than the actual earthquake forces
B	elastic deformations, which are much less than the actual earthquake forces
C	inelastic deformations, which are much higher than the actual earthquake forces
D	elastic deformations, which are much higher than the actual earthquake forces
Answer	
Marks	1.5
Unit	2

Id	**120**
Question	Closely-Spaced Modes of structure are those of its natural modes of vibration whose natural frequencies differ from each other by ------ of the lower frequency.
A	10 percent or less
B	50 percent or less
C	50 percent or more
D	10 percent or more
Answer	
Marks	1.5
Unit	2

Id	**121**
Question	Buildings with ‘T’ or ‘L’ or ‘⅂’ or ‘＜’ shapes in plan are considered under _____ and are found to behave ____.
A	Vertical Irregularity, acceptably
B	Plan Irregularity, Objectionably
C	mass irregularity, acceptably
D	Plan Irregularity, acceptably
Answer	
Marks	1.5
Unit	3

Id	**122**
Question	Buildings with non uniform mass distribution or heavy mass at intermediate floors are classified under ------ and found to behave -------
A	Vertical Irregularity, acceptably
B	Plan Irregularity, Objectionably
C	mass irregularity, Objectionably
D	Plan Irregularity, acceptably
Answer	
Marks	1.5
Unit	3

Id	**123**
Question	Buildings with T = 0.1 Sec and resting on Type 1 soil, Sa/g works out to be ----
A	0.5
B	1.0
C	1.5
D	2.5
Answer	
Marks	1.5
Unit	3

Id	**124**
Question	Buildings with T = 0.1 Sec and resting on Type II soil, Sa/g works out to be ----
A	0.5
B	1.0
C	1.5
D	2.5
Answer	
Marks	1.5
Unit	3

Id	**125**
Question	Buildings with T = 0.1 Sec and resting on Type III soil, Sa/g works out to be ----
A	0.5
B	1.0
C	1.5
D	2.5
Answer	
Marks	1.5
Unit	3

Id	**126**
Question	If Imposed Load is 3 kN/m^2, percentage of this load in seismic design is _____
A	25%
B	50%
C	75%
D	100%
Answer	
Marks	1.5
Unit	3

Id	**127**
Question	Out-of-plane failure of masonry walls results from _____
A	inadequate connection with roofing
B	inadequate connection with cross-walls
C	flexural failure of long walls
D	all of these
Answer	
Marks	1.5
Unit	3

Id	**128**
Question	Pounding behavior stands for
A	collision like action between two adjacent buildings due to foundation failure
B	collision like action between two adjacent buildings due to in-plane vibrations
C	skidding and hitting each other of two adjacent buildings
D	All of these
Answer	
Marks	1.5
Unit	3

Id	**129**
Question	In-plane failure of masonry walls results from _____
A	Excessive shear stress or principal stresses
B	bending action
C	inadequate compressive strength
D	Both (a) and (c)
Answer	
Marks	1.5
Unit	3

Id	**130**
Question	Soft Storey stands for -----
A	Stories analyzed by softwares
B	Condition based on stiffness comparison
C	Stories constructed in softer material like wood
D	All of these
Answer	
Marks	1.5
Unit	3

Id	**131**
Question	Weak Storey stands for _____
A	Stories analyzed by softwares
B	Condition based on strength comparison
C	Stories constructed in weaker material like mud mortar
D	All of above
Answer	
Marks	1.5
Unit	3

Id	**132**
Question	Plinth Bands, Lintel Bands, Floor Bands are provided in
A	Load Bearing Masonry Wall Buildings
B	framed RCC Buildings
C	Framed Steel Buildings
D	RC Shear walled buildings
Answer	
Marks	1.5
Unit	3

Id	**133**
Question	Plastic hinge formation in beams is ensured if _____
A	beams are stronger than columns
B	beams and columns are equally strong
C	Beams are considered as simply supported on columns
D	columns are stronger than beams
Answer	
Marks	1.5
Unit	3

Id	**134**
Question	Shear Wall is _____
A	a wall running from base to top and designed to resist lateral forces by cantilever action
B	a wall running from base to top in RCC framed construction
C	Always a masonry wall
D	always a RCC wall
Answer	
Marks	1.5
Unit	3

Id	**135**
Question	$P-\Delta$ effect stands for ----
A	secondary effect due to combination of vertical and lateral loads on shears and moments in flexural members
B	Primary effect due to combination of vertical and lateral loads on shears and moments in flexural members
C	Load v/s deflection plot
D	Moment v/s rotation plot
Answer	
Marks	1.5
Unit	3

Id	**136**
Question	Storey Shear is _____
A	sum of vertical forces at all levels above the storey under consideration
B	sum of design lateral forces at all levels above the storey under consideration
C	product of design lateral forces at all levels above the storey under consideration
D	difference of design lateral forces at level above the storey under consideration
Answer	
Marks	1.5
Unit	3

Id	**137**
Question	Base Isolation stands for
A	separating the superstructure from substructure
B	isolation of ground storey columns
C	isolation of building from surrounding buildings
D	separation of building foundation from supporting strata
Answer	
Marks	1.5
Unit	3

Id	**138**
Question	Shear walls --------- in ----------____
A	are mainly designed to resist lateral force, its own plane
B	are designed to resist gravity force, its own plane
C	are designed to resist lateral force, plane other than its own plane
D	none of these
Answer	
Marks	1.5
Unit	3

Id	**139**
Question	Liquefaction stands for ---------- of soils due to ----------
A	loss of effective compressive strength, compaction
B	loss of effective tensile strength, consolidation
C	loss of effective shear strength, vibration
D	loss of effective shear strength, damping
Answer	
Marks	1.5
Unit	3

Id	**140**
Question	Response Reduction Factor for Steel Frames with eccentric bracing is -------, while that for SMRF is ----------_
A	5.5, 3.5
B	3.5, 5.5
C	5, 5
D	4.5, 6.5
Answer	
Marks	1.5
Unit	3

Id	**141**
Question	Design Seismic Base Shear is _____
A	sum of vertical forces at all levels above the storey under consideration
B	sum of storey shears
C	product of seismic weight and design horizontal acceleration spectrum value based up on fundamental natural period.
D	all of these
Answer	
Marks	1.5
Unit	3

Id	**142**
Question	Vibration of unsymmetrical or irregular building geometries lead to -----forces such as ---- in -----
A	desirable, compression, beams
B	undesirable, torsion, columns
C	desirable, tension, beams
D	desirable, shear, columns
Answer	
Marks	1.5
Unit	3

Id	**143**
Question	Base isolation systems are found useful for short period structures, ------- including soil-structure interaction.
A	say less than 0.7 s
B	say more than 0.7 s
C	say less than 2.0 s
D	say more than 2.5 s
Answer	
Marks	1.5
Unit	3

Id	**144**
Question	Ordinary Moment-Resisting Frame is defined in IS 1893 as ---------
A	a moment-resisting frame not meeting special detailing requirements for ductile behavior.
B	a moment-resisting frame meeting special detailing requirements for ductile behavior.
C	a moment-resisting frame not meeting requirements of IS 456.
D	A frame not designed by earthquake engineer
Answer	
Marks	1.5
Unit	3

Id	**145**
Question	Special Moment-Resisting Frame is defined in IS 1893 as -----
A	A moment-resisting frame not specially detailed to provide ductile behavior and comply with the requirements given in IS 4326 or IS 13920 or SP6(6).
B	A moment-resisting frame specially detailed to provide ductile behavior and comply with the requirements given in IS 456
C	A moment-resisting frame specially detailed to provide ductile behavior and comply with the requirements given in IS 4326 or IS 13920 or SP6(6).
D	None of the above
Answer	
Marks	1.5
Unit	3

Id	**146**
Question	As per IS 1893, Dual system means ---
A	Combination of moment resisting frame and shear walls
B	Combination of shear walls or braced frames and moment resisting frame
C	Combination of any two systems
D	All of above
Answer	
Marks	1.5
Unit	3

Id	**147**
Question	As per IS 1893, Storey Drift is -----
A	displacement due to gravity loads of one level relative to the other level above or below
B	displacement due to lateral loads of one level relative to the other level above or below
C	displacement due to twisting loads of one level relative to the other level above or below
D	None of these
Answer	
Marks	1.5
Unit	3

Id	**148**
Question	As per IS 1893, Design Base Shear is distributed along the height as -----
A	$Q_i = V_B \frac{h_i W_i^2}{\sum_{j=1}^{n} h_j W_j^2}$
B	$Q_i = V_B \frac{W_i h_i^2}{\sum_{j=1}^{n} W_j h_j^2}$
C	$Q_i = V_B \frac{W_i h_i}{\sum_{j=1}^{n} W_j h_j}$
D	$Q_i = V_B \frac{W_i h_i}{\sum_{j=1}^{n} W_j h_j^2}$
Answer	
Marks	1.5
Unit	3

Id	**149**
Question	Approximate fundamental natural time period Ta is specified as -------- in IS 1893
A	T_a =0.075 $h^{0.75}$ for RC Frames T_a =0.085 $h^{0.75}$ for Steel Frames
B	T_a =0.075 $h^{0.75}$ for RC Frames T_a =0.085 $h^{0.85}$ for Steel Frames
C	T_a =0.075 h for RC Frames T_a =0.085 h for Steel Frames
D	None of these
Answer	
Marks	1.5
Unit	3

Id	**150**
Question	IS 1893 state that: the columns and beams of the soft storey are to be designed for ------ the storey shears and moments calculated under seismic loads
A	0.0 times
B	0.05 times
C	2.5 times
D	5000 times
Answer	
Marks	1.5
Unit	3