Examination: **Ph.D. Civil Engineering**

Section 1 - Section 1

Question No.1 — 4.00

Bookmark

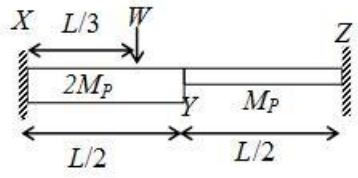
The maximum depth of neutral axis for a beam with d as the effective depth, in limit state method of design for Fe 415 steel is

- 0.46 d
- 0.50 d
- 0.48 d
- 0.53 d

Question No.2 — 4.00

Bookmark

A fixed end beam is subjected to a load, W at $1/3^{rd}$ span from the left support as shown in the figure. The collapse load of the beam is



- 16.5 M_P/L
- 15.5 M_P/L
- 15 M_P/L
- 16 M_P/L

Question No.3 — 4.00

Bookmark

Efflorescence in cement is caused due to the excess of

- Alkalies
- Silica
- Lime
- Iron Oxide

Question No.4 — 4.00

Bookmark

Secondary air pollutant is

- So_x
- O_3
- Hydro-carbons
- No_x

Question No.5 — 4.00

Bookmark

What is Darcy-Weisbach formula for heat loss due to friction? f = Darcy's coefficient of riction

- $hf = (4\ f\ L\ V^2) / (2\ g\ d)$
- $hf = (f\ L\ V^2) / (g\ d)$
- $hf = (16\ f\ L\ V^2) / (2\ g\ d)$
- $hf = (f\ L\ V^2) / (2\ g\ d)$

Question No.6 4.00

Bookmark

The ratio of limiting friction and normal reaction is known as

- Angle of friction
- Friction resistance
- Angle of repose
- Co-efficient of friction

Question No.7 4.00

Bookmark

Choose the correct meaning of the italicized idiom.
The party in power *came down* on the side of a flexible and early economic policy to help the weaker sections.

- Decide to support
- Decide to go to the corner
- Decide to speak secretly
- Decide to rebuke severely

Question No.8 4.00

Bookmark

Choose the correct meaning of the italicized idiom.
When Peter left he was extremely disappointed. I think he has *gone for good.*

- To seek good fortune
- To a good place
- Permanently
- To a foreign country

Question No.9 4.00

Bookmark

The important aspects of environmental impact assessment

- Risk assessment
- Environmental Management
- Past product management
- All of these

Question No.10 4.00

Bookmark

Particles of size around 1 micron are best removed by

- Plain Sedimentation
- Filtration
- Chemical coagulation
- Chemical precipitation

Question No.11 4.00

Bookmark

Study the following information carefully and answer the question below it

Lakshman passes through seven lanes to reach his school. He finds that 'Truth lane' is between his house and 'Lie lane'. The third lane from his school is 'Karma lane'. 'Dharma lane' is immediately before the 'Yog lane'. He passes 'Salvation lane' at the end, 'Lie lane' is between 'Truth lane' and 'Dharma lane', the sixth lane from his house is 'Devotion lane'.

How many lanes are there between 'Lie lane' and 'Devotion lane'?

- five
- two
- three
- four

Question No.12 4.00

Bookmark

According to equation of continuity

- $a_1 v_1 = a_2 v_2$
- $a_1 / v_1 = a_2 / v_2$
- $w_1 v_1 = w_2 v_2$
- $w_1 a_1 = w_2 a_2$

Question No.13 4.00

Bookmark

Psychologist : Neurosis

- Dermatologist: Sprain
- Oncologist: Measles
- Opthamologist : Catract
- Kids : Pediatrician

Question No.14 4.00

Bookmark

Complete through treatment should generally be given to sewage, before its disposal in a stream, if the dilution factor available is

- Less than 350
- Less than 250
- Less than 150
- None of these

Question No.15 4.00

Bookmark

Express the quantity of storm water (Q) according to Ryve's formula

- $Q = C.A^{3/4}$
- $Q = C.A^{1/4}$
- $Q = C.A^{2/3}$
- $Q = C.A^{1/3}$

Question No.16 4.00

Bookmark

According to Indian standard specifications, the normal curing temperature for concrete is

- $25^{o}c$
- $27^{o}c$
- $28^{o}c$
- $26^{o}c$

Question No.17 4.00

Bookmark

Choose the antonym of the italicized word.
The habit of *squandering* money should not be encouraged.

- hoarding
- collecting
- saving
- discarding

Question No.18 4.00

Bookmark

Two primary air pollutant are

- Nitrogen oxide and Co_2
- Sulphur and Co_2
- Sulphur oxide and hydro carbon
- Sulphur and O_3

Question No.19 4.00

Bookmark

The gas from sludge digestion tank is mainly composed of

- Nitrogen
- Carbon dioxide
- Methane
- Hydrogen sulphide

Question No.20 4.00

Bookmark

Bending equation

- $M/R = \sigma/y = E/I$
- $I/M = \sigma/y = E/R$
- $M/I = y/\sigma = E/R$
- $M/I = \sigma/y = E/R$

Question No.21 4.00

Bookmark

A cantilever beam is 2m long. The cross section of the beam is hollow square, with external sides 60 mm and internal side is such that I = 6 x 105 mm^4. If safe bending stress for the material is 100 N/mm^2, then safe concentrated load W at the free end would be

- W = 1000 N
- W = 1001 N
- W = 1002 N
- W = 2000 N

Question No.22 4.00

Bookmark

In case of chain riveting, the net sectional area for plate at one section is given by

Where, A_{net} = net cross – sectional area along the rivet chain; b = width of plate; t=thickness of plate; d= gross diameter of rivet holes; n= no of rivets at the section

- $A_{net} = t \times [b - nd]$
- $A_{net} = t \times [b + nd]$
- $A_{net} = t + [b - nd]$
- $A_{net} = t + [b + nd]$

Question No.23 4.00

Bookmark

The specific gravity of sewage is

- much greater that 1
- slightly lesser than 1
- equal to 1
- slightly greater than 1

Question No.24 4.00

Bookmark

Find the odd one out?

- Cover : Page
- Circle : Arc
- Flower : Petal
- Chair : Arm

Question No.25 4.00

Bookmark

Co-efficient (μ) of friction is expressed as

Where, F = Limiting friction; R_N = Normal Reaction

- $\mu = \left(\frac{F}{R_N}\right)$
- $\mu = F \times R_N$
- $\mu = F + R_N$
- $\mu = \left(\frac{R_N}{F}\right)$

Question No.26 4.00

Bookmark

The swelling behaviour of black cotton soil is due to

- Kaolinite
- Montmorillonite
- Illite
- Halloysite

Question No.27 4.00

Bookmark

Forces are called concurrent when their lines of action meet in

- Plane
- Three point
- One point
- Two point

Question No.28 4.00

Bookmark

Which one of the following expression is called Torricelli's theorem

- $V_{th} = 2\sqrt{gH}$
- $V_{th} = \sqrt{2gH}$
- $V_{th} = 2g\sqrt{H}$
- $V_{th} = 2\sqrt{2gH}$

Question No.29 4.00

Bookmark

Some of the non-toxic metals normally found in natural water are

- calcium, sodium, copper
- iron, manganese, magnesium
- iron, lime, copper
- arsenic, lead, mercury

Question No.30 4.00

Bookmark

Based on the information given answer the following question.
1. In a family of six persons, there are people from three generations. Each has separate professions and they like different colours. There are two couples.
2. Shyam is an Engineer and his wife is not a doctor and she does not like Red colour.
3. Chartered Accountant likes green colour and his wife is a teacher.
4. Manisha is the mother-in-law of Sunita and she likes orange colour.
5. Vimal is the grand father of Tarun and tarun is the Principal and likes black colour.
6. Nyna is the grand daughter of Manisha and she likes blue colour. Nyna's Mother likes white colour.

Who is the Chartered Accountant?

- Manisha
- Vimal
- Nyna
- None of these

Question No.31 4.00

Bookmark

Taylor's stability number curves are used for the analysis of stability of slopes. The angle of shearing resistance used in the chart is

- Apparent angle
- Effective angle
- Mobilised angle
- Weighted angle

Question No.32 4.00

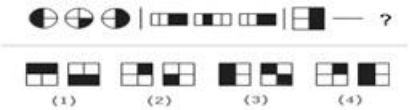
Bookmark

Crushing strength of a good building stone should be more than

- 50 MPa
- 150 MPa
- 100 MPa
- 75 MPa

Question No.33 4.00

Bookmark



- 3
- 2
- 1
- 4

Question No.34 4.00

Bookmark

Bending moment co-efficient for continuous RC slabs in IS 456-2000 code is based on

- Shear stress theory
- Thrust line theory
- Pressure line theory
- Yield-line theory

Question No.35 4.00

Bookmark

A value which is used to prevent water to flow back in the opposite direction.

- Blow off value
- Reflux value
- Safety value
- Relief value

Question No.36 4.00

Bookmark

Velocity of flow does not depend on

- Grade of sewer
- Hydraulic mean depth of sewer
- Roughness of sewer
- Length of sewer

Question No.37 4.00

Bookmark

Study the following information carefully and answer the question below it:

P, Q, R, S T went on a picnic. P is son of Q but Q is not the father of P. R is the son of S, who is the brother of P. T is the wife of S.

How many males are present in the group?

- 4
- 3
- 1
- 2

Question No.38 4.00

Bookmark

The correct relation between theoretical oxygen demand (TOD), Biochemical oxygen demand (BOD) and Chemical oxygen demand (COD) is given by

- BOD > COD > TOD
- TOD > COD > BOD
- TOD > BOD > COD
- COD > BOD > TOD

Question No.39 4.00

Bookmark

Problem of solid waste disposal can be reduced through

- Recycling
- population control
- more timber
- lesser pollution

Question No.40 4.00

Bookmark

If total hardness of water is greater than its total alkalinity, then carbonate harness will be equal to

- Total alkalinity
- Non-carbonate hardness
- Total hardness
- Total hardness- Total alkalinity

Question No.41 4.00

Bookmark

What kind of water distribution system normally adopted in a well-planned cities

- Ring system
- Radial system
- Dead end system
- Grid system

Question No.42 4.00

Bookmark

Select the Pair that best respresents the relationship that is given in the question:
Professor : Erudite

- Mason : Architecure
- Inventor : Imaginative
- Carpenter : Furniture
- Entrepreneur : Hardwork

Question No.43 4.00

Bookmark

What type of noise can be abated by providing lining on walls and ceiling with sound absorbing materials?

- Structural noise
- Reflection noise
- Source noise
- Direct air-borne noise

Question No.44 4.00

Bookmark

Statements: Stories are True, All true incidents are rumours.
Conclusion:
I. Stories are rumours.
II. Rumours are stories

- If neither I nor II follows
- If only conclusion I follows
- If only conclusion II follows
- If either I or II follows

Question No.45 4.00

Bookmark

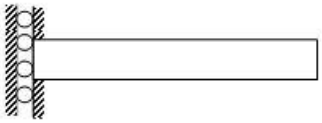
The presence of tri-calcium silicate in cement _____

- Hydrates the cement rapidly
- Generates less heat of hydration
- Offers high resistance to sulphate attack
- All of these

Question No.46 4.00

Bookmark

A guided support is represented by three springs (horizontal, vertical and rotational) with stiffness K_x, k_y & K_θ respectively. The limiting values of K_x, k_y & K_θ



- $\infty, 0, \infty$
- ∞, ∞, ∞
- $\infty, \infty, 0$
- $0, \infty, \infty$

Question No.47 4.00

Bookmark

The Euler formula is valid for

- Pedestal
- long column
- short column
- Intermidiate column

Question No.48 4.00

Bookmark

Dad often comes home late these days, _____?

- is it?
- isn't it?
- does he?
- doesn't he?

Question No.49 4.00

Bookmark

book : _____ : : comb : tooth

- Title
- Knowledge
- Page
- Cover

Question No.50 4.00

Bookmark

The process of grinding clay with water and making it plastic is known as

- Blending
- Pugging
- Weathering
- Digging

Question No.51 4.00

Bookmark

Statement: Opening a Library in Achupatti will be a wastage.
Assumptions:
I. Inhabitants of Achupatti are illiterate.
II. Inhabitants of Achupatti are not interested in reading

- If neither I nor II is implicit
- If only assumption I is implicit
- If both I and II are implicit
- If only assumption II is implicit

Question No.52 4.00

Bookmark

Metals are produced as waste in industries like

- electroplating
- skiing
- mining
- digging

Question No.53 4.00

Bookmark

A small discrete mass of solid or liquid matter is called

- Particle
- Fly ash
- Fog
- Mist

Question No.54 4.00

Bookmark

Effective size of sand particles used in slow sand filters is

- 0.35 to 0.60 mm
- 0.60 to 1.00 mm
- 0.25 to 0.35 mm
- 1.00 to 1.80 mm

Question No.55 4.00

Bookmark

In a steady, ideal flow of an incompressible fluid, total energy at any point of the fluid is always constant.
This theorem is known as

- Reynold's theorem
- Navier-stockes theorem
- Bernoulli's theorem
- Euler's theorem

Question No.56 4.00

Bookmark

Which of the following pollutants is responsible for depletion of ozone layer?

- Chlorofluoro carbons
- UV rays
- Oxides of nitrogen
- Unburnt hydrocarbon

Question No.57 4.00

Bookmark

In a Tee beam the maximum shear stress will be at the

- Top edge
- bottom of the flange and top of the web.
- bottom edge
- at the neutral axis

Question No.58 4.00

Bookmark

Which one of the following sections performs better on the ductility criterion?

- Balanced section
- Under reinforced section
- Non-prismatic section
- Over reinforced section

Question No.59 4.00

Bookmark

The maximum permissible shear stress $t_{c\ max}$ given in IS 456- 2000 is based on

- Flexural compression failure
- Diagonal compression failure
- Diagonal tension failure
- Flexural tension failure

Question No.60 4.00

Bookmark

Which of the following is a practice used to reduce and manage MSW?

- waste combustion
- source reduction
- recycling of materials
- all of the above

Question No.61 4.00

Bookmark

An underground pipe or conduit of circular section used for carrying sewage is called

- sludge
- scoop
- soak pit
- sewer

Question No.62 4.00

Bookmark

If any support sinks by an amount ' Δ ' with respect to other, then fixed end moment due to sinking of support is _____ at both the ends in the same magnitude.

- $\left(\frac{5EI\Delta}{L^2}\right)$
- $\left(\frac{6EI\Delta}{L^2}\right)$
- $\left(\frac{7EI\Delta}{L^2}\right)$
- $\left(\frac{4EI\Delta}{L^2}\right)$

Question No.63 4.00

Bookmark

Study the following information carefully and answer the question below it

The Director of an MBA college has decided that six guest lectures on the topics of Motivation, Decision Making, Quality Circle, Assessment Centre, Leadership and Group Discussion are to be organised on each day from Monday to Sunday.
(i) One day there will be no lecture (Saturday is not that day), just before that day Group Discussion will be organised.
(ii) Motivation should be organised immediately after Assessment Centre.
(iii) Quality Circle should be organised on Wednesday and should not be followed by Group Discussion
(iv) Decision Making should be organised on Friday and there should be a gap of two days between Leadership and Group Discussion

On which day there is no lecture?

- Sunday
- Monday
- Wednesday
- Tuesday

Question No.64 4.00

Bookmark

Hook's law holds good up to

- plastic point
- breaking point
- limit of proportionality
- yield point

Question No.65 4.00

Bookmark

It is important to realize that the ties that bind us together in common activity are so _____ that they can disappear at any moment.

- tenuous
- restrictive
- tentative
- tenacious

Question No.66 4.00

Bookmark

Type of cement recommended when the structure is exposed to the action of sea water

- Rapid hardening cement
- High alumina cement
- Sulphate resisting cement
- High steel cement

Question No.67 4.00

Bookmark

Using boundary layer theory, the energy thickness (δ**) can be mathematically arrived as

- $\int_0^{\delta} \frac{u}{U}\left(1-\frac{u}{U}\right) dy$
- $\int_0^{\delta} \left(1-\frac{u}{U}\right) dy$
- $\int_0^{\delta} \frac{u}{U}\left(1-\frac{u^3}{U^3}\right) dy$
- $\int_0^{\delta} \frac{u}{U}\left(1-\frac{u^2}{U^2}\right) dy$

Question No.68 4.00

Bookmark

As per IS 800- 2007 for laced built-up column, the lacing bars, whether in double or single systems, shall be inclined at an angle _____

- Not less than 50^o nor more than 80^o
- Not less than 30^o nor more than 60^o
- Not less than 40^o nor more than 70^o
- Not less than 60^o nor more than 90^o

Question No.69 4.00

Bookmark

Soil are arranged in face to face orientation. This type of soil structure is

- Cohesive matrix
- Dispersed
- Flocculent
- Honey comb

Question No.70 4.00

Bookmark

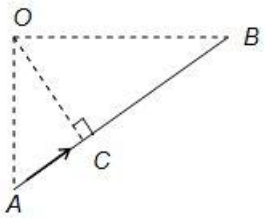
Sound pressure is related to

- Atmospheric pressure and barometric pressure
- Wave motion and sound intensity
- Absolute temperature and standard pressure
- Density of air and sound intensity

Question No.71 4.00

Bookmark

The moment of the force *P* about *O* as shown in figure is



- $P \times OA$
- $P \times OC$
- $P \times OB$
- $P \times AC$

Question No.72 4.00

Bookmark

Carbon monoxide in air effects

- Eye
- Skin
- Heart
- Hair

Question No.73 4.00

Bookmark

Concentration of ozone in clean air is

- 0.5 ppm
- 0.1 ppm
- 0.01 ppm
- 0.001 ppm

Question No.74 4.00

Bookmark

A coastal city produces municipal solid waste (MSW) with high moisture content high organic materials, low calorific value and low inorganic materials, the most effective and sustainable option for MSW management in that city is _____

- Composting
- Bursting
- Incineration
- Dumping in Sea

Question No.75 4.00

Bookmark

The failure of the concrete materials is

- ductile nature
- Tension
- brittle nature
- compression

Question No.76 4.00

Bookmark

D' Alembert's principle is used for

- Solving kinematic problems.
- Determining the stress in the members.
- Stability of safe structure.
- Reducing the problem of kinetics to equivalent static problem

Question No.77 4.00

Bookmark

Young's modulus of the concrete for M30 grade concrete is

- 22 GPa
- 23 GPa
- 30 GPa
- 27.386 GPa

Question No.78 4.00

Bookmark

One day, Ravi walked a distance of 75 metres towards the north. Then he turned left and walked for about 25 metres, he turned left again and walked 80 metres. Finally, he turned to the right at an angle of 45^{o}. In which direction was he moving finally?

- South-east
- South-west
- North-west
- North-east

Question No.79 4.00

Bookmark

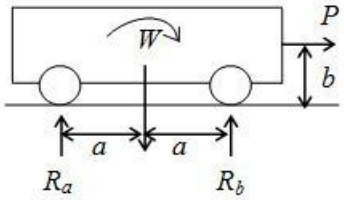
Data related to geophysical characteristics are called

- Personal Data
- Organizational Data
- Demographic Data
- Territorial Data

Question No.80 4.00

Bookmark

The self weight of W of the locomotive as shown in figure, has the reaction at the two point of support A & B will be equal to $W/2$, but when the locomotive is propelled horizontally (P) is just equal to the total friction at the points of contact A & B, the magnitude of the vertical reactions R_a & R_b at the contact points



- $R_a = \left(\frac{W.a - P.b}{2a}\right), \quad R_b = \left(\frac{W.a + P.b}{2a}\right)$
- $R_a = \left(\frac{Wa - P.b}{2a}\right), \quad R_b = \left(\frac{W.a - P.b}{2a}\right)$
- $R_a = \left(\frac{W.a + Pb}{2a}\right), \quad R_b = \left(\frac{Wa - Pb}{2a}\right)$
- $R_a = \left(\frac{Wa - Pb}{2a}\right), \quad R_b = \left(\frac{Wa - P.b}{2a}\right)$

Question No.81 4.00

Bookmark

Over burnt with irregular shaped bricks are called as

- Refractory bricks
- Jhama bricks
- Third class bricks
- squint bricks

Question No.82 4.00

Bookmark

According to IS: 456 -2000, maximum compressive stress in concrete for design purpose is 'taken as

- 0.416 f_{ck}
- 0.370 f_{ck}
- 0.446 f_{ck}
- 0.670 f_c

Question No.83 4.00

Bookmark

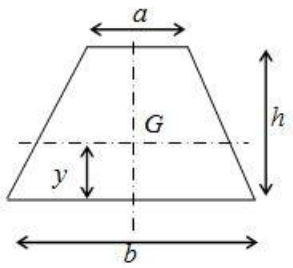
What is the ratio of maximum velocity to average velocity, when the fluid is passing through two parallel plates and flow is laminar?

- 4/3
- 2/3
- 3/4
- 3/2

Question No.84 4.00

Bookmark

The centre of gravity of a trapezium with parallel sides 'a' and 'b' lies at a distance of 'y' from the base 'b' as shown in figure. Then the value of 'y' is



- $\frac{h}{2}\left(\frac{2a+b}{a+b}\right)$
- $\frac{h}{3}\left(\frac{a+b}{2a+b}\right)$
- $\frac{h}{3}\left(\frac{2a+b}{a+b}\right)$
- $h\left(\frac{2a+b}{a+b}\right)$

Question No.85 4.00

Bookmark

Specific weight of water (γ) as per SI

- $9.810\ N/m^3$
- $9810\ N/m^2$
- $9810\ N/m$
- $9810\ N/m^3$

Question No.86 4.00

Bookmark

According to Archimede's principle, if a body is immersed partially or fully in a fluid then the buoyancy force is _____ the weight of fluid displaced by the body.

- equal to
- less than
- more than
- unpredictable

Question No.87 4.00

Bookmark

The static indeterminacy of the two-span continuous beam with an internal hinge, as shown in figure below is

- 3
- 2
- 0
- 1

Question No.88 4.00

Bookmark

The quantity of liquid waste which flows in sewers during rainy season is called

- Storm sewage
- sanitary sewage
- Liquid waste
- Semi-liquid water

Question No.89 4.00

Bookmark

Flexibility coefficient for shaft of length L and torsional rigidity GJ under torsion at mid point will be

- $L^3/6GJ$
- L/2GJ
- L/3GJ
- L/GJ

Question No.90 4.00

Bookmark

Choose the best synonym of the italicized word.
Nobody knew that Sunil had a *sinister* design in marrying her.

- selfish
- evil
- murderous
- sinful

Question No.91 4.00

Bookmark

A propped cantilever beam of span “L ” carries a uniformly distributed load of w per unit run over its entire span . The value of prop reaction to keep the beam horizontal is

- 3WL/8
- WL/3
- WL/2
- 5WL/8

Question No.92 4.00

Bookmark

Choose the correct meaning of the italicized idiom.
Raju has a very nice manner, but you would better take what he says *with a grain of salt.*

- To complement
- To talk sensibly
- To criticize
- To listen to something with considerable doubt

Question No.93 4.00

Bookmark

The minimum dissolved oxygen which should always be present in water in order to save the aquatic life is

- 4 ppm
- 10 ppm
- 40 ppm
- 1 ppm

Question No.94 4.00

Bookmark

Acid rain are caused by

- SO_2 and NO_x
- CO and SO_2
- SO_2 and O_3
- NO_x and O_3

Question No.95 4.00

Bookmark

In an RCC beam, as per IS456-2000, the side face reinforcement is provided if the depth of the rib exceeds

- 550 mm
- 650 mm
- 850 mm
- 750 mm

Question No.96 4.00

Bookmark

_____ she had been lied to, Sally got really angry.

- If Sally discovered
- Sally when discovered
- Having discovered
- Sally discovered

Question No.97 4.00

Bookmark

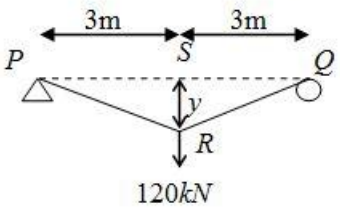
When chlorine is added in excess of that required for adequate bacterial purification of water is called

- Break point chlorination
- Double chlorination
- Post chlorination
- Super chlorination

Question No.98 4.00

Bookmark

The tension (in kN) in a 10 m long cable, as shown in figure, neglecting its self weight is



- 120
- 48
- 45
- 60

Question No.99 4.00

Bookmark

A good building stone should not absorb water more than

- 15
- 10%
- 20
- 5%

Question No.100 4.00

Bookmark

If in a soil sample piping phenomenon occurs, what is the most prominent condition to be satisfied?

- Specific gravity of soil solids is more than 2.8
- Void ratio is more than 2.0
- Soil is fine grained
- Hydraulic gradient is close to unity