

ENVIRONMENTAL STUDIES MCQ

1. Which of the following facts are incorrect?

1. Global warming is the rise in the average temperature of the earth's climate system
2. Eutrophication is observed in water bodies
3. The greenhouse effect is a natural phenomenon
4. Ozone is harmless to breathe

2. Areas that are under the influence of DDT may observe a decline in the population of birds. This is due to the fact that

1. Birds stopped laying eggs altogether
2. The eggs did not hatch
3. Predation of the eggs increased
4. None of the above.

3. Measuring BOD (biological oxygen demand) is primarily used for

1. Estimating the types of microbes
2. Determine the level of dissolved oxygen
3. Estimating the quantity of organic matter in sewage water
4. None of the above

4. Cosmic rays, such as gamma rays are a source of

1. Soil Pollution
2. Noise Pollution
3. Thermal Pollution
4. Radiation pollution

5. The primary agenda of the Kyoto protocol is

1. Regulation of hazardous wastes
2. Regulate the production of nuclear energy
3. Control anthropogenic sources of greenhouse gases
4. None of the above

6. The presence of _____ in a water body is an indicator of water pollution.

1. Zygosporangium
2. E.Coli
3. Deinococcus radiodurans
4. None of the above

7. Eggshells of birds become unusually thin when exposed to the pesticides in their environment. The protein that gets affected is _____

1. Calmodulin
2. Cysteine
3. Serine
4. None of the above

8. Lichens are good bioindicators for

1. Environmental radiation
2. Soil pollution
3. Water and air pollution
4. None of the above

9. A moth having a speckled wing, able to blend into its background due to its dark colouration is called

1. Industrial melanism
2. Adaptation
3. Predation
4. Evolution

10. Carbon dioxide is primarily called a greenhouse gas because

1. Traps heat
2. Traps light
3. Traps warm currents
4. None of the above

11. *Trichoderma harzianum* is a _____ that is predominantly used as a fungicide

1. Virus
2. Fungus
3. Bacteria
4. Protozoa

12. Greenhouse gases are those that absorb and emit infrared radiation. Examples include _____

1. Nitrogen
2. Ozone
3. Argon
4. None of the above

13. Depletion of the ozone layer is damaging to human health. Negative effects include

1. Skin cancers
2. Osteoporosis
3. Dyspepsia
4. None of the above

14. _____ is an organism used to gauge the quality of an ecosystem.

1. Decomposers
2. Predator
3. Bio-remediator
4. Bioindicator

15. _____ is a waste disposal method where solid organic wastes are converted to residue and gaseous products through combustion.

1. Incarnation
2. Incineration
3. Incarceration
4. Incubation

ANSWER KEYS

| Q. No. | Answer | Q. No. | Answer | Q. No. | Answer | Q. No. | Answer | Q. No. | Answer |
|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|
| 1 | 4 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 3 |
| 6 | 2 | 7 | 1 | 8 | 3 | 9 | 1 | 10 | 1 |
| 11 | 2 | 12 | 2 | 13 | 1 | 14 | 4 | 15 | 2 |

ENVIRONMENTAL STUDIES MCQ

1. When natural resources are changed into another product by people is known as

- (A) Secondary activities
- (B) Primary activities
- (C) Nutrient cycling
- (D) Tertiary activities

2. The conversion of forested areas to non-forest is

- (A) Farming
- (B) Afforestation
- (C) Deforestation
- (D) Reforestation

3. Carbon dioxide constitutes about 0.03 percentage of the atmosphere

- (A) By volume
- (B) By mass
- (C) By weight
- (D) None of these

4. The major cause for land degradation in our country is

- (A) Soil erosion
- (B) Water logging
- (C) Pollution of soil
- (D) None of these

5. Which of the following is responsible for desertification?

- (A) Deforestation
- (B) Mining
- (C) Overgrazing
- (D) All of the above

6. Deforestation generally decreases

- (A) Rain fall
- (B) Soil erosion
- (C) Draught
- (D) Global warming

7. Forest and wild life are

- (A) Non-renewable resources
- (B) Renewable resources
- (C) Inexhaustible resources

(D) None of these

8. Fossil fuel and metallic minerals are:

(A) Non-renewable resources

(B) Renewable resources

(C) Inexhaustible resources

(D) None of these

9. Which of the following statement about forest is not correct?

(A) Forest reduces soil erosion

(B) Provides recreational opportunities

(C) Provides economic development

(D) None of these

10. Which of the following is not a method for water conservation?

(A) Rainwater harvesting

(B) Ground water extraction

(C) Improving irrigation efficiency

(D) Avoiding water wastage

11. Primary source of water is

(A) Rivers

(B) Ground water

(C) Lakes

(D) Rain water

12. Energy we use to heat our home, drive our cars and run our computers comes from

(A) Non-renewable resources

(B) Renewable resources

(C) Natural Resources

(D) Artificial resources

13. To preserve resources for future, we have to

(A) Look for more

(B) Save them

(C) Consume more of them

(D) Use them more frequently

14. For travelling short distances, best way to conserve natural resources is

(A) By driving

(B) By flying

(C) By taking lift

(D) By cycling

15. Which of the following is a non-renewable resource?

- (A) Water
- (B) Coal
- (C) Soil
- (D) Wild life

16. Which of the following is an inorganic natural resource?

- (A) Water
- (B) Fossil fuels
- (C) Plants
- (D) Animals

17. Energy that is trapped in the form of organic matter is called

- (A) Conventional energy
- (B) Renewable energy
- (C) Biomass energy
- (D) Bioenergy

18. Which of the following is a renewable source of energy?

- (A) Petroleum
- (B) Trees
- (C) Nuclear fuel
- (D) Coal

19. Which of the following is considered as conventional, inexhaustible source of energy?

- (A) Thermal energy
- (B) Hydropower
- (C) Solar energy
- (D) Wild energy

20. Which of the following is not a conventional energy resource?

- (A) Petroleum
- (B) Tidal energy
- (C) Coal
- (D) Fresh water

ANSWER KEYS

| Q. No. | Answer | Q. No. | Answer | Q. No. | Answer | Q. No. | Answer | Q. No. | Answer |
|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|
| 1 | A | 2 | C | 3 | A | 4 | A | 5 | D |
| 6 | A | 7 | B | 8 | A | 9 | D | 10 | C |
| 11 | D | 12 | C | 13 | D | 14 | D | 15 | B |
| 16 | A | 17 | C | 18 | B | 19 | B | 20 | B |

Estimation & Cost Evaluation-II

6th Sem Civil

MCQ Practice Set

Q-1 → The unit of measurement of Earthwork in Excavation in slab culvert estimation is _____.

- a. m b. m^2 c. m^3 d. None of these

Ans. c

Q-2 → In estimation of slab culvert the quantity of earthwork excavation is calculated from _____.

- a. Abutment b. wing wall
c. parapet d. Both a & b

Ans. d

Q-3 → The unit weight of steel bars of different diameter 'd' is to be calculated from the formula

- a. $\frac{d}{100}$ b. $\frac{d}{162}$ c. $\frac{d^2}{162}$ d. $\frac{d^3}{165}$

Ans. c

Q-4 → The no. of wing walls constructed in a slab culvert is _____.

- a. 2 b. 4 c. 3 d. 6

Ans. b

Q-5 → If the RL of formation is more than the RL of ground, then the earthwork required is

- a. cutting b. Banking
c. Both cutting & banking d. None of these

Ans. b

Q-6 → At starting point the RL of formation is 107.0 & if there is a downward gradient of 1 in 200 then the RL of formation after 20 m will be

- a. 106.9 b. 107.1 c. 106.8 d. 107.2

Ans. a

Q-7 → In a earthwork estimate if RL of formation is 106.9 m & RL of ground is 105.2 m then the height of Bank required is

- a. 1.7 m b. 2.7 m c. 0.7 m d. 1.5 m

Ans. a

Q-8 → The length of a straight bar in a RCC slab with both side hooked if effective cover is d' & diameter of bar ' ϕ ' & length of slab L is

- a. $L - 2d' + 9\phi$
b. $L - 2d' + 2 \times 9\phi$
c. $L + 2d' - 2 \times 9\phi$
d. $L + 2d' + 2 \times 9\phi$

Ans. b

Q-9 → In a WBM road the metalled width is 4 m in which 50 mm stone is provided with a thickness of 10 cm, then the stone required for a 1 km road is

- a. 4000 cum b. 400 cum c. 40 cum d. 4 cum

Ans - b

Q-10 → In administrative structure the head of PWD is known as

- a. Chief Engineer
- b. Engineer-in-chief
- c. Executive Engineer
- d. Junior Engineer

Ans. b.

Q-11 → The construction of a new bridge for a newly constructed road will be classified as which type of work

- a. Original work
- b. Repair work
- c. Maintenance work
- d. None of the above

Ans. a

Q-12 → If the estimate of a work does not exceed 50,000 rupees then the work is known as

- a. Major work
- b. Minor work
- c. Petty work
- d. None of these

Ans. c

Q-13 → The repair work which is done in every fourth year to any structure is known as

- a. Annual Repair
- b. Quadrennial Repair
- c. Special Repair
- d. All of the above

Ans. b

Q-14 → An undertaking by a person or firm to do any work under certain terms & conditions is known as

- a. Tender
- b. Contract
- c. Work order
- d. contractor

Ans. b

Q-15 → An offer in writing to execute some work or to supply some material within a specified time with some terms & conditions is known as

- a. Tender
- b. Tender notice
- c. contract
- d. work order

Ans. a

Q-16 → On acceptance of tender, the contractor has to deposit certain percentage of tendered amount with the department is known as

- a. Earnest money
- b. Tender amount
- c. Advance amount
- d. Security deposit

Ans. d

Q-17 → A tender notice contains which of the following

- a. Name of the authority inviting tender
- b. Name of the work & estimated cost
- c. Time of completion & date, time & place of tender
- d. All of the above

Ans. d

Q-18 → The acceptance or sanction of the competent authority of the department to carry out the work for the department is known as

- a. Administrative approval
- b. Technical sanction
- c. work order
- d. None of these

Ans. a

Q-19 → The approval of detailed estimate, design calculation, drawings, rate & cost of work by the competent authority of engineering department is known as

- a. Administrative approval
- b. Technical sanction
- c. Estimate
- d. schedule of rate

Ans. b

Q-20 → When the work is executed by the department itself, the daily attendance of Labour deployed is recorded in particular format which is known as

- a. Labour report
- b. Labour attendance
- c. Muster Roll
- d. Acquittance

Ans. c

Q-21 → The contract in which the contractor undertakes to carry out the work on the item rate basis is known as

- a. Item rate contract
- b. Lump sum contract
- c. Cost contract
- d. None of the above

Ans. a

Q-22 → In a measurement book, the correct sequence of measurement is

- a. Depth, Breadth, Length
- b. Length, Breadth, Depth
- c. Length, Depth, Breadth
- d. Breadth, Length, Depth

Ans. b

Q-23 → Which of the following is not true about the measurement book.

- a. Over writing is not allowed in MB.
- b. Measurements should be recorded by ink.
- c. No page should left blank
- d. Contractor signature is not required in MB.

Ans. d

Q-24 → The duty & responsibility of a junior engineer is

- a. To supervise the day-to-day work
- b. To maintain accounts of material, labour, tools & plants etc.
- c. Both a & b
- d. None of these

Ans. c

Q-25 → Who is the head of each division in PWD.

- a. Junior Engineer
- b. Executive Engineer
- c. Superintending Engineer
- d. Chief Engineer

Ans. b

Q-26 → The payment made to a contractor for the work done by him but not measured due to some reason is known as

- a. final payment
- b. Advance payment
- c. Running account
- d. None of these.

Ans. b

Q-27 → The cost per unit fixed on the articles to be collected when the article is being used for any work is known as

- a. issue rate
- b. Supervision charge
- c. Sub-head
- d. Storage charge.

Ans. a

Q-28 → A record of receipt, issues & running balance of certain articles of stock kept in a particular format of store which is known as

- a. indent
- b. Bin card
- c. stock register
- d. stock account

Ans. b

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Control System

1. The Transfer function of a linear system is the

- (a) Ratio of the output, $V_o(t)$ & input $V_i(t)$.
- (b) Ratio of the derivatives of the output & the input.
- (c) Ratio of the Laplace transfer of the output & that of the input with all initial conditions zeros.
- (d) None of these.

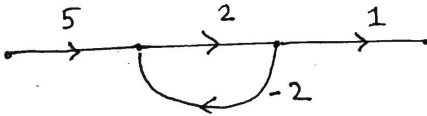
Ans - (c)

2. Signal flow graph is used to find

- (a) stability of the system.
- (b) controllability of the system.
- (c) Transfer function of the system.
- (d) poles of the system.

Ans - (c)

3. In the signal flow graph find transfer function.



- (a) 3
- (b) $5/2$
- (c) 2
- (d) None of the above

Ans - (c)

4. Consider a feedback control system with loop transfer function

$$G(s)H(s) = \frac{K(1+0.5s)}{s(1+s)(1+2s)}$$

The type of the control system is

- (a) 0
- (b) 1
- (c) 2
- (d) 3

Ans - (b)

5. If the characteristic equation of a closed loop system is $s^2 + 2s + 2 = 0$, then the system is

- (a) overdamped (b) critically damped (c) underdamped (d) undamped

Ans - (c)

6. Consider a characteristic equation given by

$$s^4 + 3s^3 + 5s^2 + 6s + k + 10 = 0. \text{ The condition for stability is}$$

- (a) $k > 5$ (b) $-10 < k$ (c) $k > -4$ (d) $-10 < k < -4$

Ans - (d)

7. The number of roots of $s^3 + 5s^2 + 7s + 3 = 0$ lie in the left half of the s-plane are

- (a) 0 (b) 1 (c) 2 (d) 3

Ans - (a)

8. The open loop transfer function of an unity feedback open loop system is $\frac{2s^2 + 6s + 5}{(s+1)^2(s+2)}$. The characteristic equation of the closed

loop system is

- (a) $2s^2 + 6s + 5 = 0$
(b) $(s+1)^2(s+2) = 0$
(c) $2s^2 + 6s + 5 + (s+1)^2(s+2) = 0$
(d) $2s^2 + 6s + 5 - (s+1)^2(s+2) = 0$

Ans - (c)

9. The open loop Transfer function of a feedback control system

is $G(s)H(s) = \frac{1}{(s+1)^3}$, the gain margin of the system is

- (a) 16 (b) 8 (c) 4 (d) 2

Ans - (b)

10. What is the value of damping ratio of an underdamped control system?

- (a) $\zeta = 0$ (b) $\zeta = 1$ (c) $0 < \zeta < 1$ (d) $\zeta > 1$

Ans - (c)

11. In a minimum phase system

- (a) All poles lie in the left half plane.
(b) All poles lie in the right half plane.
(c) All zeros lie in the left half plane.
(d) All except one pole or zero lie in the left half plane

Ans - (c)

12. The 1st column of a Routh array is

$$\begin{array}{l|l} s^5 & 1 \\ s^4 & 2 \\ s^3 & 1.5 \\ s^2 & -1/3 \\ s^1 & 10 \\ s^0 & 2 \end{array}$$

How many roots of the corresponding characteristic equation are in left half s-plane?

- (a) 2 (b) 3 (c) 4 (d) 5

Ans - (b)

13. A system has 12 poles & 2 zeros. Its high frequency asymptote in its Bode magnitude plot has a slope of

- (a) -200 dB/decade (b) -240 dB/decade (c) -280 dB/decade (d) -320 dB/decade

Ans - (a)

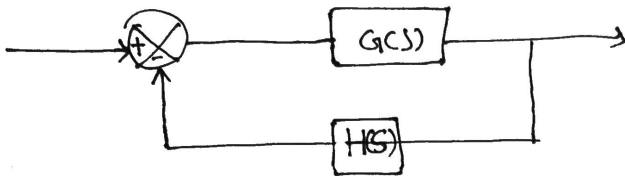
14. The open loop transfer function of a unity feedback system

is $G(s) = \frac{1}{(s+2)^2}$. The poles of closed loop system are

- (a) -2, -2 (b) -2, -1 (c) -2, $\pm j1$ (d) -2, 2

Ans - (c)

15. What is the transfer function of the following control system.



- (a) $G(s) \cdot H(s)$ (b) $\frac{G(s)}{H(s)}$ (c) $\frac{G(s)}{1 + G(s)H(s)}$ (d) $\frac{G(s)}{1 + H(s)}$

Ans - (c)

16. The gain margin of a stable system

- (a) has a positive decibel value
(b) has a negative decibel value
(c) has large negative decibel value
(d) None of the above.

Ans - (a)

17. The number of branches of root locus plot is equal to

- (a) The number of roots of characteristic equation
(b) Double the number of roots of characteristic equation
(c) The number of roots of characteristic equation minus one
(d) The number of roots of characteristic equation plus one

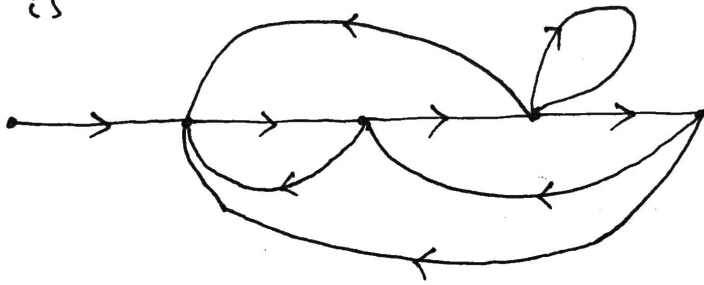
Ans - (a)

18. For a stable system

- (a) Both phase margin & gain margin are negative
- (b) Both phase & gain margin are positive
- (c) phase margin is positive but gain margin is negative
- (d) gain margin is positive but phase margin is negative

Ans - (b)

19. In the given figure, the combinations of two non touching loops is



- (a) 1
- (b) 2
- (c) 3
- (d) 4

Ans - (a)

20. What is the Laplace transform of a unit step function

- (a) 1
- (b) $\frac{1}{s}$
- (c) $\frac{1}{s^2}$
- (d) $\frac{1}{s^3}$

Ans - (b)

SGPD MCQ

Answers- 1D, 2D, 3D, 4B, 5A, 6D, 7D, 8C, 9C, 10A, 11C, 12A, 13C, 14B, 15D, 16A, 17C, 18D, 19D, 20C

1. What is switchgear?
 - a. An apparatus used for switching, controlling and protecting the electrical circuits and equipments.
 - b. It detects the faults only.
 - c. It corrects the faults only.
 - d. All of the above.

2. Current chopping mainly occurs in -----
 - a. SF6 Circuit Breaker
 - b. Vacuum Circuit Breaker
 - c. Oil Circuit Breaker
 - d. Air blast circuit Breaker

3. When the contacts of a circuit breaker are opened on the occurrence of a fault, an ----- is struck.
 - a. Water
 - b. Oil
 - c. Air
 - d. Arc

4. Circuit breakers usually operate under
 - a. Steady short circuit current
 - b. Sub transient state of short circuit current
 - c. Transient state of short circuit current
 - d. None of these

5. The function of the circuit breaker is
 - a. To safeguard the circuit
 - b. On and off the circuit
 - c. To save human life
 - d. None of these

6. What is the actuating quantity for the relays?
 - a. Magnitude
 - b. Frequency
 - c. Phase angle
 - d. All of these

7. Which among these are the main characteristics of a fuse element?
 - a. Low melting point
 - b. High conductivity
 - c. Least deterioration due to oxidation
 - d. All of the above

8. The main function of a fuse is to
 - a. Protect the line
 - b. Open the circuit
 - c. Prevent excessive currents
 - d. None of the above

9. SF₆ gas
 - a. Is yellow in color
 - b. Is lighter than air
 - c. Is nontoxic
 - d. Has pungent smell

10. The arcing contacts in a circuit breaker are made of
 - a. Copper tungsten alloy
 - b. Porcelain
 - c. Electrolytic copper
 - d. Aluminum alloy

11. Which of the following medium is employed for the extinction of arc in air circuit breaker?
- Water
 - Oil
 - Air
 - SF₆
12. Which of the following circuit breakers is used for the railway electrification?
- Air blast circuit breaker
 - SF₆ circuit breaker
 - Bulk oil circuit breaker
 - Minimum oil circuit breaker
13. What should be the value of fusing factor?
- Equal to zero
 - Equal to one
 - Less than one
 - More than one
14. What is the relation between the fusing current and the diameter of the wire?
- $I = k d^3$
 - $I = k d^{3/2}$
 - $I = k d^2$
 - $I = k d^{2/3}$
15. An efficient and well designed protective relaying should have
- Good selectivity and reliability
 - Economy and simplicity
 - High speed and selectivity
 - All of the above
16. Directional relays are based on the flow of
- Power
 - Current
 - Voltage Wave
 - None of the above
17. IDMT Relay stands for
- Inverse Divide Minimum Time
 - Inverse Define Minimum Time
 - Inverse Definite Minimum Time
 - Inverse Differentiate Minimum time
18. H.R.C. fuses provide the best protection against
- Overload
 - Reverse current
 - Open-circuits
 - Short-circuits
19. Which of the following circuit breaker is highly reliable and has a least maintenance?
- Oil circuit breakers
 - Air blast
 - Vacuum circuit breakers
 - SF₆ circuit breakers
20. What is the normal pressure at which the SF₆ gas is maintained in the closed position of the breaker?
- 2 kg / cm²
 - 2.5 kg /cm²
 - 2.8 kg / cm²
 - 3 kg / cm²

Answers- 1D, 2D, 3D, 4B, 5A, 6D, 7D, 8C, 9C, 10A, 11C, 12A, 13C, 14B, 15D, 16A, 17C, 18D, 19D, 20C

1. Steel is mainly an alloy of

- a) Iron and Carbon
- b) Sulphur and Zinc
- c) Zinc and tin
- d) Phosphorous and Tin

View Answer

Answer: a

Explanation: Steel is alloy of iron and carbon. Apart from carbon, a small percent of manganese, sulphur, phosphorous, chrome, nickel, and copper are added to give special properties to steel.

2. Which of the following is a disadvantage of Steel?

- a) High strength per unit mass
- b) High durability
- c) Fire and corrosion resistance
- d) Reusable

View Answer

Answer: c

Explanation: Steel has high strength per unit mass, highly durable, and is reusable. But steel is poor in fire and corrosion resistance, it needs to be protected.

3. Elastic Modulus of Steel is _____

- a) $1.5 \times 10^9 \text{ N/mm}^2$
- b) $2.0 \times 10^5 \text{ N/mm}^2$
- c) $2.0 \times 10^5 \text{ N/m}^2$
- d) $1.5 \times 10^9 \text{ N/m}^2$

View Answer

Answer: b

Explanation: Elastic modulus = Stress/Strain. As per IS 800-2007, elastic modulus of steel is $2.0 \times 10^5 \text{ N/mm}^2$.

4. Unit mass of Steel = _____

- a) 785 kg/m^3
- b) 450 kg/m^3

c) 450 kg/cm³

d) 7850 kg/m³

View Answer

Answer: d

Explanation: As per IS 800-2007, unit mass of steel is 7850 kg/m³. A steel member with small section which has little self-weight is able to resist heavy loads because steel members have high strength per unit weight.

5. Poisson's ratio of steel is _____

a) 0.1

b) 1.0

c) 0.3

d) 2.0

View Answer

Answer: c

Explanation: Poisson's ratio = transverse strain/axial strain. As per IS 800-2007, Poisson's ratio of steel is 0.3 in elastic range and it is 0.5 in plastic range.

6. Which of the following is added to steel to increase resistance to corrosion?

a) Carbon

b) Manganese

c) Sulphur

d) Copper

View Answer

Answer: d

Explanation: Addition of small quantity of copper increases resistance to corrosion. Even Chrome and Nickel are added to impart corrosion resistance property to steel.

7. What is serviceability?

a) It refers to condition when structure is not usable

b) It refers to services offered in the structure

c) It means that the structure should perform satisfactorily under different loads, without discomfort to user

d) It means that structure should be economically viable

[View Answer](#)

Answer: c

Explanation: Serviceability is related to utility of structure. The structure should perform satisfactorily under service loads, without discomfort to user due to excessive deflection, cracking, vibration, etc. Other considerations of serviceability are durability, impermeability, acoustic and thermal insulation etc.

8. Analysis is referred to _____

- a) determination of cost of structure
- b) determination of axial forces, bending moment, shear force etc.
- c) determination of factor of safety
- d) drafting architectural plans and drawings

[View Answer](#)

Answer: b

Explanation: Analysis refers to determination of axial forces, bending moment, shear force, torsional moments etc. acting on different members of structure due to applied loads and their combinations.

9. Which IS code is used for general construction of steel?

- a) IS 456
- b) IS 256
- c) IS 800
- d) IS 100

[View Answer](#)

Answer: c

Explanation: IS 800:2007 is the code of practice for general construction in steel. It is issued by Bureau of Indian Standards

10 What is the yield strength of bolt of class 4.6?

- a) 400 N/mm²
- b) 240 N/mm²
- c) 250 N/mm²
- d) 500 N/mm²

[View Answer](#)

Answer: b

Explanation: For class 4.6, ultimate strength = $4 \times 100 = 400 \text{ N/mm}^2$

yield strength / ultimate strength = 0.6

yield strength = $0.6 \times 400 = 240 \text{ N/mm}^2$.

11. Which of the following is correct?

- a) size of hole = nominal diameter of fastener – clearances
- b) size of hole = nominal diameter of fastener x clearances
- c) size of hole = nominal diameter of fastener / clearances
- d) size of hole = nominal diameter of fastener + clearances

View Answer

Answer: d

Explanation: Size of hole = nominal diameter of fastener + clearances

Clearance may be standard size, oversize, short slotted or long slotted.

12. High strength bolt is used for _____

- a) shear connection
- b) slip resistant connection only
- c) bearing type connection only
- d) both slip resistant and bearing type connection

View Answer

Answer: d

Explanation: High strength bolt may be used for slip resistant and bearing type connection. At serviceability, HSFG bolts do not slip and the joints are called slip resistant connections. At ultimate load, HSFG bolts do not slip and the joints behave like bearing type connections.

13. Which of the following is advantage of HSFG bolts over bearing type bolts?

- a) joints are not rigid
- b) bolts are subjected to shearing and bearing stresses
- c) high strength fatigue
- d) low static strength

View Answer

Answer: c

Explanation: The advantages of HSFG bolts over bearing type bolts are : (i) joints are rigid, (ii) bolts are not subjected to shearing and bearing stresses as load transfer is mainly due to friction, (iii) high static strength due to high frictional resistance, (iv) high strength fatigue since nuts are prevented from loosening, (v) smaller number of bolts results into smaller number of gusset plates.

14. Which of the following is correct for pitch of the bolts and gauge?

- a) pitch is measured along direction of load, gauge is measured perpendicular to direction of load
- b) pitch is measured perpendicular direction of load, gauge is measured along to direction of load
- c) pitch is measured along direction of load, gauge is measured along to direction of load
- d) pitch is measured perpendicular direction of load, gauge is measured perpendicular to direction of load

View Answer

15. What is the minimum pitch distance?

- a) 2.0 x nominal diameter of fastener
- b) 3.0 x nominal diameter of fastener
- c) 1.5 x nominal diameter of fastener
- d) 2.5 x nominal diameter of fastener

View Answer

Answer: d

Explanation: Pitch is centre to centre spacing of bolts in a row, measured along direction of load. Distance between centre to centre of fasteners shall not be more than 2.5 times nominal diameter of fasteners.

16. Maximum pitch distance = _____

- a) 16 x thickness of thinner plate
- b) 32 x thickness of thinner plate
- c) 40 x thickness of thinner plate
- d) 20 x thickness of thinner plate

View Answer

Answer: b

Explanation: Distance between centre of any two adjacent fasteners shall not exceed $32t$ or 300mm , whichever is less where t is thickness of thinner plate.

17. Pitch shall not be more than ____ in tension member and _____ in compression member.

- a) $12t$, $16t$, where t = thickness of thinner plate
- b) $20t$, $16t$, where t = thickness of thinner plate
- c) $16t$, $12t$, where t = thickness of thinner plate
- d) $16t$, $20t$, where t = thickness of thinner plate

[View Answer](#)

Answer: c

Explanation: Pitch shall not be more than $16t$ or 200mm , whichever is less in tension member where t is thickness of thinner plate. Pitch shall not be more than $12t$ or 200mm , whichever is less in compression member, where t is thickness of thinner plate.

18. The minimum size of fillet weld should _____

- a) not be less than 3mm
- b) be less than 3mm
- c) be less than 2mm
- d) greater than thickness of thinner part joined

[View Answer](#)

Answer: a

Explanation: The minimum size of fillet weld should not be less than 3mm and not more than thickness of thinner part joined.

19 The maximum size of fillet weld is obtained by _____

- a) adding 1.5mm to thickness of thinner member to be jointed
- b) adding 3mm to thickness of thinner member to be jointed
- c) subtracting 3mm from thickness of thinner member to be jointed
- d) subtracting 1.5mm from thickness of thinner member to be jointed

[View Answer](#)

Answer: d

Explanation: The maximum size of fillet weld is obtained by subtracting 1.5mm from thickness of thinner member to be jointed. The maximum size of weld should not be more than $3/4$ of the thickness of section at toe when welds are applied to round toe of steel sections.

20. What is the minimum specified length of fillet weld?

- a) two times the size of weld
- b) four times the size of weld
- c) six times the size of weld
- d) half the size of weld

View Answer

Answer: b

Explanation: As per IS code, the actual length of fillet weld should not be less than four times the size of weld. If this requirement is not met, the size of weld should be one fourth of the effective length.

21. Effective length of fillet weld is _____

- a) equal to overall length plus twice the weld size
- b) twice the overall length plus twice the weld size
- c) equal to overall length minus twice the weld size
- d) twice the overall length minus twice the weld size

View Answer

Answer: c

Explanation: Effective length of fillet weld is taken equal to overall length minus twice the weld size. The deduction is made to allow for craters to be formed at the ends of welded length.

22. For the calculation of net area of flat with staggered bolts, the area to be deducted from gross area is :

- a) nd
- b) $n'p^2t/8g$
- c) $ndt - n'p^2t/4g$
- d) $nd + n'p^2t/4g$

View Answer

Answer: c

Explanation: The net area of flat with staggered hole is given by : $A = (b - ndh + n'p^2/4g)t$, where b = width of plate, n = number of holes in zig-zag line, n' = number of staggered pitches, p = pitch distance, g = gauge distance, t = thickness of flat.

23. What is the net section area of steel plate 40cm wide and 10mm thick with one bolt if diameter of bolt hole is 18mm?

- a) 38.2 cm^2
- b) 20 cm^2
- c) 240 mm^2
- d) 480 mm^2

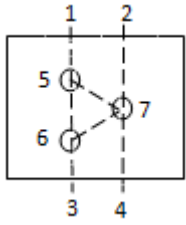
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Answer: a

Explanation: $b = 40\text{cm} = 400\text{mm}$, $t = 10\text{mm}$, $d_h = 18\text{mm}$

Net section area = $400 \times 10 - 16 \times 10 = 3820\text{mm}^2 = 38.2\text{ cm}^2$.

24. Which section to be considered in the design for the net area of flat?



a) 1-5-6-3

b) 2-7-4

c) 1-5-7-4

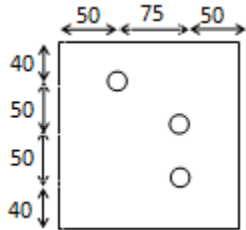
d) 1-5-7-6-3

View Answer

Answer: d

Explanation: The section giving minimum area of plate is considered for design. So, section 1-5-7-6-3 is used for net area of flat.

25. Calculate the minimum effective net area for the given section (300mm width, 10mm thick) connected to a 10 mm thick gusset plate by 18mm diameter bolts.



a) 2796mm²

b) 2681mm²

c) 2861mm²

d) 3055mm²

View Answer

Answer: b

Explanation: $B = 300\text{mm}$, $t = 10\text{mm}$, $d_h = 18 + 2 = 20\text{mm}$, $n = 3$, $n' = 1$, $p = 75\text{mm}$, $g = 50\text{mm}$

Effective net area = $(B - nd_h + n'p^2/4g)t = (300 - 3 \times 20 + 1 \times 75^2/4 \times 50) \times 10 = 2681.25\text{ mm}^2$.

26. What is compression member?

a) structural member subjected to tensile force

b) structural member subjected to compressive force

c) structural member subjected to bending moment

d) structural member subjected to torsion

View Answer

Answer: b

Explanation: Structural member which is subjected to compressive forces along its axis is called compression member. Compression members are subjected to loads that tend to decrease their lengths.

27. Which of the following is true about axially loaded column?

- a) member subjected to bending moment
- b) member subjected to axial force and bending moment
- c) net end moments are not zero
- d) net end moments are zero

[View Answer](#)

Answer: d

Explanation: if the net end moments are zero, the compression member is required to resist load acting concentric to original longitudinal axis of member and is called axially loaded column or simply column.

28. What is the maximum effective slenderness ratio for a tension member in which stress reversal occurs?

- a) 180
- b) 200
- c) 280
- d) 300

[View Answer](#)

Answer: a

Explanation: The maximum effective slenderness ratio for a tension member in which stress reversal occurs due to loads other than wind or seismic forces is 180.

29. What is the maximum effective slenderness ratio for a member subjected to compressive forces resulting only from combination of wind/earthquake actions?

- a) 180
- b) 200
- c) 340
- d) 250

[View Answer](#)

Answer: d

Explanation: The maximum effective slenderness ratio for a member subjected to compressive forces resulting only from combination of wind or earthquake actions, such that the deformation of such member does not

30. What is gross section yielding?

- a) considerable deformation of the member in longitudinal direction may take place before it fractures, making the structure unserviceable
- b) considerable deformation of the member in longitudinal direction may take place before it fractures, making

the structure serviceable

c) considerable deformation of the member in lateral direction may take place before it fractures, making the structure unserviceable

d) considerable deformation of the member in lateral direction may take place before it fractures, making the structure serviceable

View Answer

Answer: a

Explanation: Tension member without bolt holes can resist loads up to ultimate load without failure. But such a member will deform in longitudinal direction considerably (10-15% of its original length) before fracture and the structure becomes unserviceable.

31. What is block shear failure?

a) failure of fasteners occurs along path involving tension on one plane and shear on perpendicular plane along fasteners

b) failure of member occurs along path involving tension on one plane and shear on perpendicular plane along fasteners

c) failure of member occurs along path involving tension on one plane and shear on parallel plane along fasteners

d) failure of fasteners occurs along path involving tension on one plane and shear on parallel plane along fasteners

View Answer

Answer: b

Explanation: Failure of member occurs along path that involves (i) tension on one plane and (ii) shear on perpendicular plane along fasteners in block shear failure mode.

32. The possibility of block shear failure increases by

a) larger connection length

b) increasing the number of bolts per connection

c) with use of low strength bolts

d) with use of high bearing strength material

View Answer

Answer: d

Explanation: The block shear failure becomes a possible mode of failure when material bearing strength and bolt shear strength are higher. When high bearing strength of material and high strength bolts are used, only few bolts are required in connection. Decreasing number of bolts per connection results in smaller connection length, but the possibility of block shear failure increases.

33. The block shear strength at an end connection for shear fracture and tension yield is given by :

a) $(A_{vg}f_y/\sqrt{3} \gamma_{m0}) + (0.9A_{tn}f_u/\gamma_{m1})$

b) $(A_{tg}f_y/\gamma_{m0}) + (0.9A_{vn}f_u/\sqrt{3} \gamma_{m1})$

c) $(0.9A_{vg}f_y/\sqrt{3} \gamma_{m0}) + (A_{tn}f_u/\gamma_{m1})$

d) $(0.9A_{tg}f_y/\sqrt{3} \gamma_{m0}) + (A_{vn}f_u/\gamma_{m1})$

View Answer

Answer: b

Explanation: The block shear strength at an end connection for shear fracture and tension yield is given by $T_{db2} = (A_{tg}f_y/\gamma_{m0}) + (0.9A_{vn}f_u/\sqrt{3} \gamma_{m1})$, where A_{vn} = minimum net area in shear along line of action of force, A_{tg} = minimum

gross area in tension from hole to toe of angle or last row of bolts in plates perpendicular to line of force, f_y and f_u are yield and ultimate stress of material respectively, $\gamma_{m1} = 1.25$, $\gamma_{m0} = 1.10$.

34. The block shear strength of connection is _____

- a) block shear strength at an end connection for shear fracture and tension yield
- b) block shear strength at an end connection for shear yield and tension fracture
- c) larger of block shear strength at an end connection for (shear fracture, tension yield) and (shear yield, tension fracture)
- d) smaller of block shear strength at an end connection for (shear fracture, tension yield) and (shear yield, tension fracture)

View Answer

Answer: d

Explanation: The block shear strength of connection is smaller of block shear strength at an end connection for shear yield, tension fracture $T_{db1} = (A_{vg}f_y/\sqrt{3} \gamma_{m0}) + (0.9A_{tn}f_u/\gamma_{m1})$ and block shear strength at an end connection for shear fracture, tension yield $T_{db2} = (A_{tg}f_y/\gamma_{m0}) + (0.9A_{vn}f_u/\sqrt{3} \gamma_{m1})$.

35. The design tensile strength of tensile member is

- a) minimum of strength due to gross yielding, net section rupture, block shear
- b) maximum of strength due to gross yielding, net section rupture, block shear
- c) strength due to gross yielding
- d) strength due to block shear

View Answer

Answer: a

Explanation: The design tensile strength of tensile member is taken as the minimum of strength due to gross yielding ($T_{dg} = f_y A_g / 1.1$), net section rupture ($T_{dn} = 0.9 A_n f_y / \gamma_{m1}$), block shear ($T_{db1} = (A_{vg} f_y / \sqrt{3} \gamma_{m0}) + (0.9 A_{tn} f_u / \gamma_{m1})$, $T_{db2} = (A_{tg} f_y / \gamma_{m0}) + (0.9 A_{vn} f_u / \sqrt{3} \gamma_{m1})$).