ONGC GT Civil Engineering

1. Which one of the following tests is performed in the laboratory to determine the extent of weathering of aggregates for road works?

(a) Soundness test

(b) Crushing test

(c) Impact test

(d) Abrasion test

Ans. (a)

2. Which one of the following geometric features requires the magnitudes of weaving angle and weaving distance for its design?

(a) Rotary design

(b) Right-angle intersection

(c) Roundabout

(d) Grade-separated junction

Ans. (a)

3. Which one of the following methods is used in the design of rigid pavements?

(a) CBR method

(b) Group index method

(c) Westergaard's method

(d) McLeod's method

Ans. (c)

4. In which one of the following yards, are reception, sorting and dispatch of railway wagons done?

(a) Loco yard

(b) Marashalling yard

(c) Goods yard

(d) Passenger yard

Ans. (b)

5. Which one of the following is not a desirable property of the subgrade soil as a highway meterial?

(a) Stability

(b) Ease of compaction

(c) Good drainage

(d) Bitumen adhesion

Ans. (d)

6. Consider the following statements:

In surverying operations, the word 'reciprocal' can be associated with

1. ranging

2. levelling

3. contouring

Which of the above statements is/are correct?

(a) 1 only

(b) 1 and 2 only

(c) 2 and 3 only

(d) 1, 2 and 3

Ans. (b)

7. How many- sidereal days are there in a solar year?

(a) 365.2840

(b) 366.2422

(c) 360.2500

(d) 365.0000

Ans. (b)

8. Consider the following statements

A sidereal year can be defined as the time interval:

1. between two successive transits .of the sun through the meridian of any of the fixed stars

2. between two successive passages of the sun through perigee

Which of the above statements is/are correct?

(a) 3 only

(b) 1and 2

(c) 2 and 3

(d) 1 only

Ans. (b)

9. Which one of the following methods of computing area assumes that the short, lengths of the boundary between the ordinates

are parabolic ares?

(a) Average ordinate rule

(b) Middle ordinate rule

(c) Simpson's rule

(d) Trapezoidal rule

Ans. (c)

10. Which one the following errors is more severe in plane-table surveying?

(a) Defective sighting

(b) Defective orientation

(c) Movement of board between sights

(d) Non-horizontality of board when points sighted are at large differences of their elevation .

Ans. (b)

11. Which one of the following sets of factors is related to design of thickness rigid pavement by Westergaard method?

(a) CBR value and stiffness index of soil

(b) Deflection factor and traffic index

(c) Swelling index and bulk modulus

(d) Radius of relative stiffness and modulus of subgrade reaction

Ans. (d)

12. Consider the following in relation to group index of soil:

1. Liquid limit

2. Sandy loam

3. Plasticity index

4. Per cent passing 75 microns sieve

Which of the above is/are used for estimating the group index?

(a) 1 only

(b) 1and 2

(c) 2 and 3

(d) 1, 3 and 4

Ans. (d)

13. Which set of traffic functional design as well as for 'highway capacity' design?

(a) Origin and destination studies

(b) Parking and accident studies

(c) Speed and volume studies

(d) Axle load studies

Ans. (a)

14. Which one of the following traffic survey schemes is most relevant when deciding on locating major 'routes' in a city?

(a) Traffic volume survey

(b) Origin and destination survey

(c) Speed survey

(d) Traffic capacity survey

Ans. (b)

15. Which one of the following equipments is useful in determining spot speed in traffic engineering?

(a) Endoscope

(b) Periscope

(c) Radar

(d) Tachometer

Ans. (c)

16. Hot bitumen is sprayed over freshly constructed bituminous surface followed by spreading of 6.3 mm coarse aggregates

and rolled. Which one of the following is indicated by this type of construction?

(a) Surface dressing

(b) Gravel-bitumen mix

(c) Liquid seal coat

(d) Seal coat

Ans. (a)

17. Radius of relative stiffness of cement concrete pavement does not depend upon which one of the following?

(a) Modulus of subgrade reaction

(b) Wheel load

(c) Modulus of elasticity of cement concrete

(d) Poisson's ratio of concrete

Ans. (b)

18. For conditions obtaining in India, at which location in a cement concrete payement will the combined stresses due to traffic

wheel studies is needed for well as for 'highway load and temperature have to be critically checked during design?

(a) Corner

(b) Corner and interior

(c) Corner and edge

(d) Corner, edge and interior

Ans. (d)

19. Consider the following factors:

1. The change in the shape and size of the channel cross-section

2. The change in the slope of the channel

3. The presence of obstruction

4. The change in the frictional forces at the boundaries

Which of the above factors would cause a gradually varied flow?

(a) 1, 2, 3 and 4

(b) 1, 2 and 3 only

(c) 2 and 4 only

(d) 3 and 4 only

Ans. (a)

20. Under which one of the following categories is the river Ganga classified in the reach through UP and Bihar?

(a) Straight river

(b) Meandering river

(c) Braided river

(d) Deltaic river

Ans. (b)

21. Which of the following categories best describes the Hirakud reservoir?

(a) Reservoir for irrigation and power

(b) Reservoir for flood control, power and irrigation

(c) Reservoir for irrigation and water supply

(d) Reservoir for recreation and fishery

Ans. (b)

22.. During a particular stage of the growth of a crop, consumptive use of water is 2.8 mm/day. If the amount of water available

in the soil is 25% of 80 mm depth of water what is the frequency of irrigation?

(a) 9 days

(b) 13 days

(c) 21 days

(d) 25 days

Ans. (c)

23.. Consider the following statements:

Irrigation water has to be supplied to the crops when the moisture level falls

1. below field capacity

2. to wilting point

3. below wilting point

Which of the above statement is/are correct?

(a) 1 only

(b) 2 only

(c) 3 only

(d) 2 and 3

Ans. (a)

24.. A groundwater basin consists of 10 km2 area of plains. The maximum groundwater table fluctuation has been observed

to be 1.5 m. Consider specific yield of the basin as 10%. What is the available groundwater storage in million cubic metres?

(a) 1.0

(b) 1.5

(c) 2.5

(d) 2.0

Ans. (b)

25. Consider the following chemical emulsions:

1. Methyl alcohol

2. Cetyl alcohol

3. Stearyl alcohol

4. Kerosene

Which of the above chemical emulsions is/are used to minimize the loss of water through the process of evaporation?

(a) 1 only

(b) 1 and 4

(c) 2 and 4

(d) 2 and 3

Ans. (d)

26. A catchment area of 60 ha has a runoff coefficient of 0.40. If a storm of intensity 3cm h and duration longer than the time

of concentration occurs in the catchment, then what is the peak discharge?

(a) 2.0 m3/s

(b) 3.5 m3/s

(c) 4.5 m3/s

(d) 2.5 m3/s

Ans. (a)

27. Which combination of surface water quality parameters will indicate sweep coagulation as the preferred mechanism of coagulation?.

(a) High turbidity — low alkalinity

(b) High turbidity — high alkalinity

(c) Low turbidity — high alkalinity

(d) Low turbidity — low alkalinity

Ans. (b)

28. In a canal irrigation project, 76% of the culturable command area (CCA) remained without water during Kharif season; and

58% of CCA remained without water during Rabi season in a particular year. Rest of the areas got irrigated in each crop

respectively. What is the intensity of irrigation for the project in that year?

(a) 134%

(b) 76%

(c) 66%

(d) 58%

Ans. (b)

29. What is the critical combination of vertical and horizontal earthquake accelerations to be considered for checking the stability

of a gravity dam in reservoir full condition?

(a) Vertically upward and horizontally downstream

(b) Vertically upward and horizontally upstream

(c) Vertically downward and horizontally upstream

(d) Vertically downward and horizontally downstream

Ans. (d)

30. What is the height of wave which is likely to be generated by a wind of 80 km/hr in a reservoir having a fetch of 50 km:

(a) 0.5m

(b) 1.0 m

(c) 2.0 m

(d) 3.0 m

Ans. (c)

31. Consider the following statements:

1. Giving equal weightings to horizontal and vertical creeps for design of weir foundations is one of the drawbacks of Kennedy's theory.

2. Khosla's theory of design of foundations for weirs is based on potential theory.

3. Piping problem can be reduced by increasing the length of floor.

4. In Lane's weighted creep theory, horizontal creep is given less weightage compared to vertical creep.

Which of the above statements is/are correct?

(a) 1

(b) 2, 3 and 4

(c) 2 and 4 only

(d) 3 and 4 only

Ans. (b)

32. The power transmitted through a pipeline is maximum when the head lost due to friction in the pipe is equal to:

(a) the total supply head

(b) half of the total supply head

(c) one-third of the total supply head

(d) one-fourth of the total supply head

Ans. (c)

33. Consider the following with respect to the application of the Navier-Stokes equations:

1. Laminar flown in circular pipes

2. Laminar flow between concentric rotating cylinders

3. Laminar unidirectional flow between stationary parallel plates

4. Laminary unit directional flow between parallel plates having relative motion

Which of the above is/are correct?

(a) 1 only

(b) 2 and 3 only.

(c) 3 and 4 only

(d) 1, 2, 3 and 4

Ans. (c)

34. In a siphon system employed for carrying water from a reservoir A at a higher elevation to another reservoir B at lower elevation, both

being separated by a higher hill, what will be the pressure at the 'Summit' (S)?

(a) Equal to the pressure at the water surface of reservoir A

(b) Higher than the pressure at the water surface of reservoir A

(c) Equal to the pressure at the water surface of reservoir B

(d) Less than the pressure at both A and B above

Ans. (d)

35. Match List-I with List-II and select the correct answer using the code given below the Lists:

List-I   **List-II**

A. Rehbock formula   1. Sutro weir

B. Francis formula   2. Rectangular suppressed weir

C. A special trapezoidal weir   3. Rectangular side- contracted weir

D. Linear proportional weir   4. Cippolletti weir

Code:

	A	B	C	D
(a)	1	3	4	2
(b)	2	4	3	1
(c)	1	4	3	2
(d)	2	3	4	1

Ans. (d)

36. Consider the following statements related to undersluices provided in diversion weirs on permeable foundations:

I. They are fully gate-controlled and have crest at the same level as the weir crest when no silt excluders are provided.

2. They scour the silt deposited on the river bed in the pockets upstream of the canal head regulator.

3. It is not necessary to provide end pile line on the downstream end of the undersluice floor.

4. The discharge capacity of the undersluice is 10-15% of the maximum flood or two times the maximum discharge of the offtaking canal or

maximum winter discharge, whichever is the highest.

Which of the above statements is/are correct?

(a) 1

(b) 2 and 4 only

(c) 2, 3 and 4

(d) 3 and 4 only

Ans. (b)

37. What is the theoretical oxygen demand of 300 mg/L glucose solution?

(a) 300 mg/L

(b) 320 mg/L

(c) 350 mg/L

(d) 400 mg/L

Ans. (b)

38. Consider the following:

1. Force on pipe bends and transitions

2. Jet propulsion

3. Flow velocities in open channel

4. Vortex flow

Which of the above admit employing the moment of momentum equation?

(a) 1 and 2 only

(b) 1, 2 and 3

(c) 1 and 3 only

(d) 2, 3 and 4

Ans. (d)

39. Consider the following statements:

1. Shear stress is maximum at the centre line.

2. Maximum velocity is 3\2 times the average velocity

3. Discharge varies inversely with the coefficient of viscosity.

4. Slope of hydraulic gradient line increases linearly with the velocity of flow.

Which of the above statements are correct in connection with a steady laminar flow through a circular pipe?

(a) 1, 3 and 4

(b) 3 and 4 only

(c) 1 and 3 only

(d) 2 and 4

Ans. (b)

40. Consider the following statements:

Cavitation generally results from a combination of several influences

1. by reduction of pressure intensity below a limiting value

2. by increase in either elevation or the velocity of flow

3. by reduction of pressure load in the system

4. by decrease in the velocity of flow

Which of the above statements are correct?

(a) 1, 2 and 3

(b) 1 and 2 only

(c) 2 and 3 only

(d) 3 and 4

Ans. (b)

41. What is *Hydrological Cycle?*

(a) Processes involved in the transfer of moisture from sea to land

(b) Processes involved in the transfer of moisture from sea back again

(c) Processes involved in the transfer of water from snowmelt in mountains

(d) Processes involved in the transfer of moisture from sea to land and back to sea again

Ans. (d)

42. Consider the following with respect to a double-mass curve:

I. Plot of accumulated rainfall with respect to two chronological orders

2. Plot for estimating multiple missing rainfall data

3. Plot for checking the consistency of the rainfall data

4. Plot of accumulated annual rainfall of a station vs. accumulated rainfall of a group of stations

Which of the above are correct?

(a) 1 and 3

(b) 2 and 3

(c) 3 and 4

(d) 1 and 4

Ans. (c)

43. Generally to estimate PMP, $P_m = 42. 16D0.475$ is used (P_m is maximum depth of precipitation, D = duration). What are the units of P_m and D in the equation?

(a) mm, sec

(b) cm, sec

(ë) mm, hr

(d) cm, hr

Ans. (d)

44. A triangular direct runoff hydrograph due to a storm has a time base of 60 hr and a peak flow of 30m3/s occurring at 20 hr

from the start. If the catchment area is 300 km2, what is the rainfall excess in the storm?

(a) 50 mm

(b) 20 mm

(c) 10.8 mm

(d) 8.3 mm

Ans. (c)

45. A 3 hr unit hydrograph U_1 of a catchment of area 235 km2 is in the form of a triangle with peak discharge 30 m3/s. Another

3 hr unit hydrograph U_2 is also triangular in shape and has the same base width as U_1, but has a peak flow of 90 m3/s. What

is the catchment area of U_2?

(a) 117.5 km2

(b) 235 km2

(c) 470 km2

(d) 705 km2

Ans. (d)

46. While selecting a centrifugal pump for your requirement of head and discharge on the basis of its performance characteristics,

which one of the following criteria is to be adopted?

(a) Head, discharge and efficiency

(b) Head and discharge only

(c) Discharge only

(d) Head only

Ans. (a)

47. Consider the following statements:

The function of the impeller in a centrifugal pump is to:

1. Convert the pressure energy into hydraulic energy

2. Convert the hydraulic energy into mechanical energy

3. Convert the mechanical energy into hydraulic energy

4. transform most of the kinetic energies to pressure energy

Which of the above statements is/are correct?

(a) 1 only

(b) 3 only

(c) 1, 2 and 3

(d) 2, 3 and 4

Ans. (b)

48. A centrifugal pump gives maximum efficiency when its impeller blades are

(a) bent forward

(b) bent backward

(c) straight

(d) wave-shaped

Ans. (b)

49. Match List-I with List-II and select the correct answer using the the the code given below the

Lists-I   **List-II**

A. Spiral casing   1. To allow flow of water through it to produce a torque

for the rotation of the runner

B. Stay ring	2. To direct the water on the runner at an appropriate angle
C. Guide vane	3. To distribute the flow over the periphery of the runner
D. Runner	4. To act as column helping to support the electrical generator above the turbine

Code:

	A	B	C	D
(a)	3	2	4	1
(b)	1	2	4	3
(c)	3	4	2	1
(d)	1	4	2	3

Ans. (c)

50. By which one of the following, a small quantity of water may be lifted to a great height?

(a) Hydraulic ram

(b) Hydraulic crane

(c) Hydraulic lift

(d) Hydraulic coupling

Ans. (a)

1. A 1.6 m3 capacity tractor loaded works at a site with an effective per-round-trip time of 64 seconds. Effective delivery of

excavated material is 90%. If utilization is 50 minutes per hour working, what will be the productivity in a 4-hour shift?

(a) 253 m3

(b) 262 m3

(c) 270 m3

(d) 282 m3

Ans. (c)

2. Match List-I with List-II and select the correct answer using the code given below the lists:

List-I List-II

(Equipment) (Category)

A. Derrick crane 1. Excavating equipment

B.Hoe 2. Hauling equipment

C. Clamshell 3. Hoisting 'equipment

D. Dumper Truck 4. Vertical lifting equipment

Code:

A B C D

(a) 2 1 4 3

(b) 3 1 4 2

(c) 2 4 1 3

(d) 3 4 1 2

Ans. (b)

3. A 1.75 m3 capacity tractor loader has forward loaded speed of 240 m/min, returning unloaded speed of 300 m/min and operates at

80% of the specified speed. It hauls earth over a distance of 60 m with fixed time per trip being 25 seconds. What is its effective

cycle time?

(a) 54.25 seconds

(b) 55.50 seconds

(c) 56.75 seconds

(d) 58.75 seconds

Ans. (d)

4. Which one of the following relates to determination of critical path in PERT?

(a) Event oriented slack

(b) Activity oriented float

(c) Event oriented float

(d) Activity oriented slack

Ans. (a)

5. In order to achieve a safe compressive strength of 20 kg/cm2 in a brick masonary, what should be the suitable range of crushing

strength of bricks?

(a) 35kg/cm2 to 70 kg/cm2

(b) 70 kg/cm2 to 105 kg/cm2

(c) 105 kg/cm2 to 125 kg/cm2

(d) More than 125 kg/cm2

Ans. (b)

6. What is the requirement of water (expressed as % of cement w/w) for the completion of chemical reactions in the process of

hydration of OPC?

(a) 10 to 15%

(b) 15 to 20%

(c) 20 to 25%

(d) 25 to 30%

Ans. (c)

7. Which factors comprise maturity of concrete?

(a) Compressive strength and. flexural strength of concrete /

(b) Cement content per cubic metre and compressive strength of concrete

(c) Curing age and curing temperature of concrete

(d) Age and aggregate content per cubic metre of concrete

Ans. (c)

8. What is the minimum value of individual tests results (in N/mm2) for compressive strength compliance requirement for concrete

M20 as per codal provision?

(a) fck 1

(b) fck 3

(c) fck 4

(d) fck 5

Ans. (c)

9. For what reason is it taken that the nominal maximum size of aggregate may be as large as possible?

(a) Larger the maximum size of aggregate, more the cement required and so higher the strength.

(b) Larger the maximum size of aggregate, smaller is the cement requirement for particular water cement ratio and so more

economical the mix.

(c) Larger the maximum size of aggregate, lesser are the voids in the mix and hence also lesser the cement required.

(d) Larger the maximum size of aggregate, more the surface area and better the bond between aggregates and cement, and so higher

the strength.

Ans. (d)

10. What is the modulus of elasticity of standard timber (Group B) in (MN/cm2)?

(a) 0.5 to 1.0

(b) 1.0 to 1.25

(c) 1.25 to 1.5

(d) 1.5 to 1.75

Ans. (b)

11. What is the treatment for making timber fire- resistant?

(a) ASCU treatment

(b) Abel's process

(c) Creosoting

(d) Tarring

Ans. (b)

12. How is the process of treatment of wood using a preservative solution and forcing air in at pressure designated?

(a) Ruping process

(b) Lawri process

(c) Full cell process

(d) Empty cell process

Ans. (d)

13. Modular bricks are of nominal size 20 × 10 × 10cm and 20% of the volume is lost in mortar between joints. Then what is the

number of modular bricks required per cubic meter of brick work?

(a) 520

(b) 500

(c) 485

(d) 470

Ans. (d)

14. A solid metal of uniform sectional area throughout its length hangs vertically from its upper end. Devails of the bar are:

length = 6m, material density = 8 × 10-5 N/mm3 and B =2 × 1o5 N/mm2. What will be the total elongation of the bar in mm?

(a) 288/104

(b) 48/104

(c) 144/104

(d) 72/104

Ans. (d)

15. What is the representative geometric mean size of an aggregate sample if its fineness modulus is 3.0?

(a) 150 µm

(b) 300 µm

(c) 600 µm

(d) 12 µm

Ans. (c)

16. A square steel bar of 50 mm side and 5m long is subjected to a load where upon it absorbs a strain energy of 100 J. What is

its modulus of resilience?

(a) 1/125 Nmm/ mm3

(b) 125 mm3/Nmm

(c) 1/125 Nmm/ mm3

(d) 100 mm3/Nmm

Ans. (a)

17. What is the ratio of flexural strength (fcr) to the characteristic compressive strength of concrete (fck) for M25 grade concrete?

(a) 0.08

(b) 0.11

(c) 0.14

(d) 0.17

Ans. (c)

18. Which of the following tests compares the dynamic modulus of elasticity of samples of concrete?

(a) Compression test

(b) Ultrasonic pulse velocity test

(c) Split test

(d) Tension test

Ans. (b)

19. Which one of the following is correct regarding the most effective requirements of durability in concrete?

(a) Providing reinforcement near the exposed concrete surface

(b) Applying a protective coating to the exposed concrete surface

(c) Restricting the minimum cement content and the maximum water cement ratio and the type of cement

(d) Compacting the concrete to a greater degree.

Ans. (c)

20. What is the radius of Mohr's circle in case of bi-axial state of stress?

(a) Half the sum of the two principal stresses

(b) Half the difference of the two principal stresses

(c) Difference of the two principal stresses

(d) Sum of the two principal stresses

Ans. (b)

21. A square beam laid flat is then rotated in such a way that one of its diagonal becomes horizontal. How is its moment capacity

affected?

(a) Increases by 41.4%

(b) Increases by 29.27%

(c) Decreases by 29.27%

(d) Decreases by 41.4%

Ans. (d)

22. A timber beam is 100 mm wide and 150 mm deep. The beam is simply supported and carries a central concentrated load W. If the

maximum stress in shear is 2 N/mm2, what would be the corresponding load W on the beam?

(a) 20 kN

(b) 30 kN

(c) 40 kN

(d) 25 kN

Ans. (c)

23. A 40 mm diameter shaft is subjected to a twisting moment M2. If shear stress developed in shaft is 5 N/mm2,.What is the value of

the twisting moment?

(a) 628.8 Nm

(b) 328.4 Nm

(c) 62.8 Nm

(d) 30.4 Nm

Ans. (c)

24. A fixed end beam of uniform cross-section is loaded uniformly throughout the span. What is the proportion of the bending

moment at the centre to the end moment considering only elastic conditions?

(a) 1 : 1

(b) 1 : 2

(c) 1 : 4

(d) 2 : 3

Ans. (b)

25. Steel of yield strength 400 MPa has been used in a structure. What is the value of the maximum allowable tensile strength?

(a) 240 MPa

(b) 200 MPa

(c) 120 MPa

(d) 96 MPa

Ans. (a)