THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA, VADODARA

Ph. D. ENTRANCE TEST (PET) 2025

Signature of Invigilator

Roll. No.

Paper - II
Civil Engineering/WREMI

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Maximum Marks: 50   **No. Of Printed Pages: 8**

Instruction for the Candidate:

1. This paper consists of **FIFTY (50)** multiple choice type questions. Each Question carries **ONE (1)** mark.
2. There is no Negative Marking for Wrong Answer.
3. A separate OMR Answer Sheet has been provided to answer questions. Your answers will be evaluated based on your response in the OMR Sheet only. No credit will be given for any answering made in question booklet.
4. Defective question booklet or OMR if noticed may immediately replace by the concerned invigilator.
5. Write roll number, subject code, booklet type, category and other information correctly in the OMR Sheet else your OMR Sheet will not be evaluated by machine.
6. Select most appropriate answer to the question and darken appropriate oval on the OMR answer sheet, with black / blue ball pen only. DO NOT USE PENCIL for darkening. In case of over writing on any answer, the same will be treated as invalid. Each question has exactly one correct answer and has four alternative responses (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.
    Example:(A) ● (C) (D) where (B) is correct response.
7. Rough Work is to be done in the end of this booklet.
8. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
9. Calculators, Log tables any other calculating devices, mobiles, slide rule, text manuals etc are NOT allowed in the examination hall. If any of above is seized from the candidates during examination time; he/ she will be immediately debarred from the examination and corresponding disciplinary action will be initiated by the Center Supervisor as deemed fit.
10. DO NOT FOLD or TEAR OMR Answer sheet as machine will not be able to recognize torn or folded OMR Answer sheet.
11. **You have to return the OMR Answer Sheet to the invigilator at the end of the examination compulsorily** and must not carry it with you outside the Examination Hall. You are however, allowed to carry original question booklet on conclusion of examination.

Paper - II
Civil Engineering/WREMI

Note: This paper contains **FIFTY (50)** multiple-choice questions. Each Question carries **ONE (1)** mark.

01) In turbulent flow in buried water supply pipe, the Darcy Weisbach friction factor depends on?
    A) Froude Number and Pipe Slope
    B) Reynold's Number and relative roughness
    C) Surface Tension on Pipe
    D) Thickness of soil cover on the pipe.

02) If urban catchment A and B have same area. SCS Curve number of catchment A and B are 70 and 90 respectively. Which of the following statement is False?
    A) For same rainfall depths, catchment B will produce more runoff depth than that of A
    B) For same rainfall depths, catchment A will produce more runoff depth than that of B
    C) For same rainfall depths, catchment A and B both will produce same runoff depths.
    D) Catchment A has more impervious land area.

03) Which of the following analysis is carried out to check the safety of earth dam under sudden drawdown condition? (HMP)
    A) Settlement analysis
    B) Seepage analysis through d/s horizontal drain
    C) Stability analysis of downstream slope of the dam
    D) Stability analysis of upstream slope of the dam

04) Lacey's scour depth depends on which of the flowing parameters
    A) Suspended silt load
    B) Depth of pervious foundation
    C) Silt factor
    D) Base flow

05) Aqueduct is provided at the crossing of river and canal where,
    A) Canal Bed is higher than HFL of river
    B) Canal bed is lower than HFL of riven
    C) Both the canal bed and river bed are almost at same level
    D) Canal bed level is lower than river bed level

06) Crop water requirement increases with
    A) Increase in solar radiation
    B) Decrease in wind velocity
    C) Increase in relative humidity
    D) Increase in cloud cover

07) The roller bucket type dissipator is provided in the spillway where
    A) tail water depth is very close to the depth required for jump formation for varying discharges
    B) tail water depth is much lower than the depth required for jump formation
    C) tail water depth is higher than the depth required for jump formation
    D) bed material is alluvium.

08) Which method is used for hydrologic routing of the flood in river?
    A) Level pool Method
    B) Method of Characteristics
    C) Modified Puls Method
    D) Standard Step Method

09) Which of the following methods is used to estimate the aquifer characteristics using unsteady pumping test data?
    A) Swedish slip circle method
    B) Casagrande Method
    C) Jacob Method
    D) Glover Method

10) During design, the earth dam is safeguarded from overtopping failure of the earth dam due to high inflow flood by
    A) Providing sufficient capacity of spillway
    B) Providing high free board
    C) Providing riprap layer on upstream slope
    D) Providing stable slopes in full reservoir condition

11) Lysimeter is used to measure
    A) Evaporation from water
    B) Infiltration of soil
    C) Solar radiation
    D) Evapotranspiration

12) The Double mass Curve technique is adopted to (TMV)
    A) Check the consistency of raingauge records
    B) To find the average rainfall over a number of years
    C) To find the number of raingauges required
    D) To estimate the missing rainfall data

13) The shape of the recession limb of a hydrograph depends on
   A) Basin as well as Storm Characteristics
   B) Storm Characteristics Only
   C) Basin Characteristics Only
   D) Time of Concentration

14) The relationship between Duty and Delta is given by
   A) Delta (metres) = 8.64*Base Period/Duty
   B) Delta (Centimetres) = 8.64*Base Period/Duty
   C) Delta (Millimetres) = 8.64*Base Period/Duty
   D) Delta (metres) = 8.64*Duty/Base Period

15) The process of losing water from the leaves of plants is termed as
   A) Surface Evaporation
   B) Base Flow
   C) Transpiration
   D) Precipitation

16) In drip irrigation system, the filtration unit is provided (HMP)
   A) To remove harmful organism
   B) To supply nutrients
   C) To control pressure in system
   D) To prevent clogging of emitters

17) Chilled concrete used in the construction of large dam (Construction technology
   A) To improve workability
   B) To control heat of hydration
   C) To increase the final setting time
   D) To increase the density of concrete

18) The entrained air in concrete
   A) increase the strength
   B) decreases the workability
   C) increase the workability
   D) increase the setting time

19) Fine grain analysis of soil is carried out by
   A) IS Sieves
   B) Pycnometer
   C) Hydrometer
   D) Penetrometer

20) For a soil to be well graded Coefficient of curvature should lie between
   A) 4 and 6
   B) 1 and 3
   C) 3 and 4
   D) 6 and 10

21) The top of the ground on which the foundation of road rests is called (TMV)
   A) Sub grade
   B) Soling
   C) Base
   D) Wearing Layer

22) The main object of providing a camber is
   A) To make the road surface durable
   B) To make the road surface impervious
   C) To drain off rainwater from road surface, as quickly as Possible
   D) None of these

23) For compacting clayey soil which of the following equipments is used?
   A) Vibratory roller
   B) Rammers
   C) Smooth Whell Roller
   D) Sheep Foor Roller

24) Consolidation of a soil is
   A) Is a measure of ability to allow the water to pass through its pores
   B) Is a measure of the ability of soil to bear stresses without failure
   C) deals with changes in volume of pores in a soil under load
   D) Any of the above

25) The abrupt failure indicated by load settlement curve refers to
   A) Punching shear failure
   B) Indirect shear failure
   C) General shear failure
   D) Local shear failure

26) The camber on road depends on
   A) Amount of rainfall
   B) Thickness of base course
   C) Permeability of subgrade
   D) Bitumen grade of wearing course

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27) Which of the following can be the unit of traffic density?
   A) Number of vehicle per kilometre
   B) Number of vehicle per hour
   C) Ton per axel
   D) Kilometre per hour

28) If A is skew-symmetric 3×3 matrix, $|A| = \underline{\hspace{1cm}}$
   A) 1
   B) 0
   C) -1
   D) 3

29) The measure of central tendency listed below is
   A) The Raw Score
   B) Standard deviation
   C) The Mean
   D) The Range

30) What does GIS stand for?
   A) Geographic Information System
   B) Global Information System
   C) Geospatial Information System
   D) Geological Information

31) The error in measured length due to incorrect holding of chain is
   A) Compensating Error
   B) Cumulative Error
   C) Instrumental Error
   D) Negative error

32) What is the primary purpose of a GIS database?
   A) To store spatial data only
   B) To store attribute data only The Mean
   C) To store both spatial and attribute data
   D) To analyze data

33) In a singly reinforced beam, the effective depth is measured from the compression edge to the
   A) Tensile Edge
   B) Centre of tensile reinforcement
   C) Neutral Axis of the Beam
   D) None of these

34) Vertical Stiffeners in plate girders are provided
   A) To increase bearing strata of web
   B) To prevent local buckling of the flange
   C) To prevent local buckling of the Web
   D) None of these

35) The Critical Path has
   A) Zero or Maximum Float
   B) Zero or Minimum Float
   C) Sometimes maximum and sometimes minimum float
   D) None of these

36) Consider the following statements with respect to aerobic biological treatment of a wastewater.

   1. The microbes carrying out biodegradation uses oxygen as an electron acceptor.
   2. The microbes carrying out biodegradation are working in the absence of oxygen.
   3. The energy content of end-products is very high.

   Identify the correct statements.

   A) 1 and 3
   B) 1 Only
   C) 2 and 3
   D) 3 only

37) A well-mixed water sample contained sand particles of sizes 0.3 mm and 0.6 mm, in equal proportions. When the particles are allowed to settle in a quiescent condition, 100% of 0.3 mm particles settle down in 40 seconds. What percentage of 0.6 mm particles will settle down in 40 seconds?
   A) 100%
   B) 50%
   C) 25%
   D) None of the particles of 0.6 mm size will settle.

38) A sewer P is of diameter D and the other sewer Q is of diameter 2D, both running full and laid at an identical slope. Considering Manning's equation, the ratio of velocity in sewer P to that in sewer Q will be:
   A) 2
   B) 1
   C) $(\frac{1}{2})^{2/3}$
   D) $(\frac{1}{2})^{3/2}$

39) UV radiation in sunlight is prevented from reaching the earth's surface by the presence of ozone in:
   A) Troposphere
   B) Stratosphere
   C) Thermosphere
   D) Mesosphere

[P.T.O]

40) Respiratory suspended particulate matter in air refers to particles of size up to:
   A) 10 micron
   B) 2.5 micron
   C) 25 micron
   D) 65 micron

41) A sample of air emission from an industry contained sulfur dioxide gas. A sample was collected at a temperature of 90 degrees C and at the same time checked by a sensor. The sensor showed sulfur dioxide concentration of 50 micrograms per cubic meter. Later the collected sample was analysed in the lab. At the time of analysis, the temperature of the sample was 25 degrees C. The sulfur dioxide concentration measured in the lab will be:
   A) Equal to 50 micrograms per cubic meter
   B) Greater than 50 micrograms per cubic meter
   C) Less than 50 micrograms per cubic meter
   D) None of the above

42) Out of the following four air pollutants normally found in urban environments, which one is the secondary air pollutant?
   A) Sulfur dioxide
   B) Nitrogen oxide
   C) Hydrogen sulfide
   D) Peroxyacetyl nitrate

43) Flue gas produced from an industrial process contains particulates of size < 1 micron. Which one of the following is best suited unit to remove the particulate matter?
   A) Settling chamber
   B) Electrostatic precipitator
   C) Bag filter
   D) Cyclone

44) At a place, two sources produce noise simultaneously. The total sound pressure level (measured in dB) can be obtained by:
   A) the arithmetic addition of two sound pressure levels
   B) the multiplication of two sound pressure levels
   C) the division of larger sound pressure level value by the lower
   D) the logarithmic addition of two sound pressure levels

45) With reference to the Biomedical Waste (Management and Handling) Rules, 2016, the correct match of Column I with Column II is:

Column I (colour of container)	Column II (type of Biomedical waste)
P. Yellow	1. Urine bags, syringes, gloves, catheters, etc.
Q. Blue	2. human anatomical waste (tissues, organs, body parts), etc.
R. White	3. broken, contaminated, or discarded glass items, medicine vials, etc.
S. Red	4. needles, scalpels, blades, etc.

   A) P-2, Q-1, R-3, S-4
   B) P-4, Q-1, R-3, S-2
   C) P-2, Q-3, R-4, S-1
   D) P-3, Q-4, R-2, S-1

46) One of the following is not the objective of Extended Producer Responsibility (EPR).
   A) Shift the cost and responsibility of waste management from local authorities to producers
   B) Promote design of products that are not easy to reuse or recycle.
   C) Reduce landfill dependence
   D) Encourage sustainable consumption and production

47) Choose the correct order of biodegradability (lowest to highest) of the following municipal solid waste components.
   A) Polyethylene < tissue paper < food waste
   B) food waste < polyethylene < tissue paper
   C) tissue paper < polyethylene < food waste
   D) Polyethylene < food waste < tissue paper

48) Under the Plastics Waste Management Rules, use of which of the following items is banned with effect from 1st July 2022?

   1. Plastic spoons,
   2. Thermocol plates
   3. Plastic wrapping or packing sheets
   4. Ear buds with plastic sticks
   5. Plastic water bottles

   A) 1,2,3
   B) 1,2,3,5
   C) 1,2,3,4
   D) 1,2,4,5

49) Pre-chlorination
   A) Improves coagulation
   B) Reduces Odour
   C) Reduces Taste
   D) All of these

50) Flocculation is a process
   A) That removes algae from stabilization pond effluent
   B) That promotes to aggregation of small particles into larger particles to enhance their removal by gravity
   C) That mixes the coagulant in water
   D) None of these

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Rough Work: