

M. Tech. Ag. Engg.
Soil & Water Con.

10P/289/3

Question Booklet No.....

(To be filled up by the candidate by blue / black ball-point pen)

Roll No.

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Roll No. (Write the digits in words).....

Serial No. of Answer Sheet.....

Day and Date.....

.....
(Signature of Invigilator)

INSTRUCTIONS TO CANDIDATES

(Use only **blue/black ball-point pen** in the space above and on both sides of the **Answer Sheet**)

1. Within 10 minutes of the issue of the Question Booklet, check the Question Booklet to ensure that it contains all the pages in correct sequence and that no page/question is missing in case of faulty Question Booklet bring it to the notice of the Superintendent/Invigilators immediately to obtain a fresh Question Booklet.
2. Do not bring any loose paper, written or blank, inside the Examination Hall *except the Admit Card without its envelope*.
3. A separate Answer Sheet is given. ***It should not be folded or mutilated. A second Answer Sheet shall not be provided. Only the Answer Sheet will be evaluated.***
4. Write your ***Roll Number and Serial Number of the Answer Sheet by pen*** in the space provided above.
5. ***On the front page of the Answer Sheet, write by pen your Roll Number in the space provided at the top, and by darkening the circles at the bottom. Also, wherever applicable, write the Question Booklet Number and the Set Number in appropriate places.***
6. No overwriting is allowed in the entries of Roll No., Question Booklet No. and Set No. (if any) on OMR sheet and Roll No. and OMR sheet No. on the Question Booklet.
7. Any changes in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfair means.
8. Each question in this Booklet is followed by four alternative answers. ***For each question, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by pen as mentioned in the guidelines given on the first page of the Answer Sheet.***
9. For each question, darken only one circle on the Answer Sheet. If you darken more than one circle or darken a circle partially, the answer will be treated as incorrect.
10. ***Note that the answer once filled in ink cannot be changed.*** If you do not wish to attempt a question leave all the circles in the corresponding row blank (such question will be awarded zero marks).
11. For rough work, use the inner back page of the title cover and the blank page at the end of this Booklet.
12. Deposit ***both the Question Booklet and the Answer Sheet*** at the end of the Test.
13. You are not permitted to leave the Examination Hall until the end of the Test.
14. If a candidate attempts to use any form of unfair means, he/she shall be liable to such punishment as the University may determine and impose on him/her.

[अर्थात् निर्देश हिन्दी में अन्तिम आवरण-पृष्ठ पर दिये गए हैं]

Total No. of Printed Pages : 25

10P/289/3

No. of Questions : 120

प्रश्नों की संख्या : 120

Time : 2 hours

Full Marks : 360

समय : 2 घण्टे

पूर्णांक : 360

Note : (1) Attempt as many questions as you can. Each question carries 3 (Three) marks. **One mark will be deducted for each incorrect answer.** Zero mark will be awarded for each unattempted question.

अधिकाधिक प्रश्नों को हल करने का प्रयत्न करें। प्रत्येक प्रश्न 3 (तीन) अंक का है। प्रत्येक गलत उत्तर के लिए एक अंक काटा जायेगा। प्रत्येक अनुत्तरित प्रश्न का प्राप्तांक शून्य होगा।

(2) If more than one alternative answers seem to be approximate to the correct answer, choose the closest one.

यदि एकाधिक वैकल्पिक उत्तर सही उत्तर के निकट प्रतीत हों, तो निकटतम सही उत्तर दें।

1. A dimensionless number representing the ratio of inertial forces to viscous forces in fluid flow is better known as

(1) Stanton number

(2) Prandtl number

(3) Froude number

(4) Reynold's number

2. Weighted creep ratio (WCR) is defined as the ratio of
- (1) Critical head and seepage path
 - (2) Weighted creep distance and total head loss
 - (3) Weighted creep distance and seepage path
 - (4) Critical head and weighted creep distance
3. Vernoulli's equation is an equation of
- (1) Conservation of mass
 - (2) Conservation of linear momentum
 - (3) Conservation of angular momentum
 - (4) Conservation of energy
4. Identify the incorrect or false statement. The length of flow path for a flow through foundation of a hydraulic structure can be increased by providing
- (1) an upstream clay blanket
 - (2) a downstream cutoff wall
 - (3) an upstream cutoff wall
 - (4) None of the above
5. The head over a V-notch at the end of channel is 75 cm, if an error of 0.15 cm is possible in the measurement of head, then the percentage error in computing the discharge will be
- (1) 0.3
 - (2) 0.5
 - (3) 1.0
 - (4) 1.5
6. Net outgoing long wave radiation is equal to
- (1) Short wave radiation reflected from ground surface
 - (2) Difference between radiation from ground surface upward and the downward long wave radiation
 - (3) Radiation because of temperature of earth surface
 - (4) None of the above

7. Sky radiation is defined as
- (1) Total direct solar radiation on earth surface
 - (2) Downward scattered and reflected component of thermal radiation
 - (3) Total reflected radiation from earth surface
 - (4) Night time radiation coming from extra terrestrial bodies
8. The basic assumption of the unit hydrograph theory is
- (1) Non-linear response and time invariance
 - (2) Linear response and non-linear time variance
 - (3) Linear response and time invariance
 - (4) Linear response and time variance
9. Leakage factor has the dimension of
- (1) Length
 - (2) Time
 - (3) Velocity
 - (4) Resistance
10. Water held in intra molecular space of a soil mass due to surface tension is termed as
- (1) Capillary water
 - (2) Structural water
 - (3) Gravitational water
 - (4) Absorbed water
11. The basic assumption of the unit hydrograph theory is
- (1) Non-linear response and time invariance
 - (2) Linear response and non-linear time variance
 - (3) Linear response and time invariance
 - (4) Linear response and time variance

12. An agricultural land is said to be waterlogged, when
- (1) The land is completely submerged under standing water
 - (2) There is flowing water over the land
 - (3) The pH value of the soil becomes as high as 8.5
 - (4) The soil pores in the root zone get saturated with water either by the actual water table or by its capillary fringe for a longer period
13. The main objective of lining of irrigation channel is to
- (1) Reduce seepage loss
 - (2) Increase carrying capacity
 - (3) Maintain their shape
 - (4) Attain constant discharge
14. In drip irrigation design, the design criterion is generally based on an emitter flow variation
- (1) <20% (2) >20% (3) <5% (4) <10%
15. Humidity is measured by a
- | | |
|----------------|-------------------|
| (1) Hygrometer | (2) Hyetometer |
| (3) Hydrometer | (4) Pyrheliometer |
16. If discharges in two circular orifices O_1 and O_2 placed at depths of 20 cm and 80 cm below a constant level of water in a tank are equal, the ratio of the diameters of the orifices O_1 and O_2 is
- (1) 1:2 (2) 2:1 (3) $\sqrt{2}:1$ (4) $1:\sqrt{2}$

17. Rating curve expresses the relationship between
- (1) Stage versus discharge
 - (2) Stage versus velocity
 - (3) State versus time
 - (4) Stage versus sediment load
18. Conservation bench terrace is designed for
- (1) Semi-arid region
 - (2) Arid region
 - (3) Humid region
 - (4) None of the above
19. A steady state flow condition exists when
- (1) The water level in the wells ceases to decline
 - (2) The water level responds to changes in atmospheric pressure
 - (3) The water level drops as the pumping is continuer
 - (4) None of the above
20. With increase in supplied irrigation water, the yield of the crops
- (1) Increases continuously
 - (2) Decreases continuously
 - (3) Increases up to a certain limit and then becomes constant
 - (4) Increases up to a certain limit and then decreases
21. The time taken for a tank (filled to height 'h' above its flat base) to empty through an orifice in the base varies as the following power of 'h'
- (1) 1
 - (2) $1/2$
 - (3) $-1/2$
 - (4) -1

22. The discharge rate of drip irrigation usually ranges from
- (1) 2-10 lit/day
 - (2) 2-10 lit/hr
 - (3) 2-10 lit/min
 - (4) 2-10 lit/sec
23. From the hydraulic efficiency point of view, the most efficient cross-section of an open channel is
- (1) Semi circular
 - (2) Trapezoidal
 - (3) Rectangular
 - (4) Parabolic
24. Well yield per unit drawdown in an unconfined aquifer is referred as
- (1) Storage coefficient
 - (2) Specific yield
 - (3) Well yield
 - (4) Transmissivity
25. Advantage of a submersible pump is
- (1) It gives more discharge at low head
 - (2) It gives high discharge at high head
 - (3) It can be used in very deep tube-wells
 - (4) Its energy consumption is low
26. At sub-critical state of flow, the ratio of gravitational and inertial forces is
- (1) More than 1
 - (2) Less than 1
 - (3) Equal to 1
 - (4) None of the above

27. The consumptive use of water for crop represents
- (1) Transpiration needs of the crop
 - (2) Evaporation needs of the cropped area
 - (3) Evapotranspiration needs of the cropped area plus the minor quantity required in plant metabolism
 - (4) None of the above
28. Under open channel flow conditions, the hydraulic jump is formed when the Froude number is
- (1) Equal to one
 - (2) Less than one
 - (3) More than one
 - (4) None of the above
29. Total depth of irrigation to a crop is known as
- (1) Duty
 - (2) Delta
 - (3) Base
 - (4) Crop evapotranspiration
30. For irrigating orchards, the most suitable method is
- (1) Border irrigation method
 - (2) Basin irrigation method
 - (3) Sprinkler irrigation method
 - (4) Drip irrigation method
31. The standard recording gauge adopted in India is of
- (1) Telemetry type
 - (2) Weighing bucket type
 - (3) Tipping bucket type
 - (4) Natural siphon type

32. If the size of a watershed increases, the runoff
- (1) Volumes and rates decrease
 - (2) Volumes and rates increase
 - (3) Volume decreases but the rate increases
 - (4) Volume increases but the rate decreases
33. The line above which there is no hydrostatic pressure and below which there is hydrostatic pressure is referred as
- (1) Flow line
 - (2) Streamline
 - (3) Seepage line
 - (4) Piezometric surface
34. For the storm runoff analysis, the base flow separation is performed on
- (1) a unit hydrograph
 - (2) a flood hydrograph
 - (3) a hyetograph
 - (4) a hydrograph of effluent stream only
35. The volute of centrifugal pump changes
- (1) Pressure head into velocity head
 - (2) Frictional head into velocity head
 - (3) Velocity head into pressure head
 - (4) Velocity head into frictional head
36. Terraces constructed on contour lines are called
- (1) Graded terraces
 - (2) Level terraces
 - (3) Bench terraces
 - (4) Drainage type terraces

37. Bench terraces are constructed to change
- (1) The slope of land only
 - (2) The length of slope only
 - (3) Both the land slope and the slope length
 - (4) None of the above
38. Graded terraces are recommended for the areas where
- (1) Rainfall is high
 - (2) Rainfall is low
 - (3) Soil depth is more
 - (4) Soil is of shallow depth
39. When water from a confined aquifer is pumped, which one of the following is lowered ?
- (1) Water table
 - (2) Piezometric surface
 - (3) Drawdown
 - (4) None of the above
40. The exact method of computing volume of earthwork in land levelling is
- (1) Four point method
 - (2) Prismoidal formula
 - (3) End area method
 - (4) None of the above
41. The Universal Soil Loss Equation, primarily developed for small watersheds, estimates
- (1) Permissible annual soil loss
 - (2) Maximum annual soil loss
 - (3) Average annual soil loss
 - (4) Minimum permissible annual soil loss

42. The most active portion of a gully is
- (1) The gully tail
 - (2) The gully head
 - (3) The gully banks
 - (4) The gully bed
43. Drop spillway structures are usually limited to drops of
- (1) 3 m
 - (2) 5 m
 - (3) 10 m
 - (4) More than 10 m
44. Cutoff wall in a spillway is provided to
- (1) Check piping
 - (2) Check erosion
 - (3) Increase possibility of erosion
 - (4) Provide weir aeration
45. The stilling basin with a chute spillway is provided for
- (1) Energy formation
 - (2) Energy dissipation
 - (3) Discharge measurement
 - (4) Wave formation
46. The equipment which continuously records the water level of the flowing stream is called as
- (1) Current meter
 - (2) Parshall flume
 - (3) Discharge recorder
 - (4) Stage level recorder
47. The suspended sediment in a flowing stream is measured by
- (1) a stage level recorder
 - (2) a Parshall flume
 - (3) a Coshocton wheel sampler
 - (4) a cipoletti weir

48. Shelterbelts are most effective, if installed
- (1) At an angle of 45° from the prevailing wind direction
 - (2) At an angle more than 90° from the prevailing wind direction
 - (3) Parallel to the prevailing wind direction
 - (4) Perpendicular to the prevailing wind direction
49. The relative proportion of silt, sand and clay determines
- (1) Soil structure
 - (2) Soil texture
 - (3) Soil series
 - (4) Soil stratification
50. The pressure of soil water above the water table is
- (1) More than atmospheric
 - (2) Equal to atmospheric
 - (3) Less than atmospheric
 - (4) None of the above
51. If n = pump speed (rpm), Q = pump discharge (m^3/sec) H = total head (meter), the specific speed of pump will be
- (1) $\frac{nQ^{3/4}}{H^{1/2}}$
 - (2) $\frac{nQ^{1/2}}{H^{3/4}}$
 - (3) $\frac{HQ^{3/4}}{n^{1/2}}$
 - (4) $\frac{nQ}{H^{3/4}}$
52. For partially penetrating well, the depth of observation well should be
- (1) Half of the depth of test well
 - (2) 2 times the depth of test well
 - (3) Equal to depth of test well
 - (4) $\frac{3}{4}$ times the depth of test well

53. Yearly sequence and spatial arrangements of crops and fallow in given area is referred to as

- (1) Cropping intensity
- (2) Cropping system
- (3) Cropping pattern
- (4) Cropping arrangements

54. The field capacity and available soil moisture are referred to as

- (1) Soil moisture constants
- (2) Soil moisture physics
- (3) Soil moisture range
- (4) Soil moisture index

55. Volume of water present in total pore volume is referred to as

- (1) Volume of wetness
- (2) Saturation
- (3) Degree of saturation
- (4) Moisture content

56. The sum of exchangeable cations absorbed by soil expressed in mill equivalents per 100 gm of soil is referred to as

- (1) Cation exchange
- (2) Cation percent
- (3) Exchangeable cation
- (4) Cation exchange capacity

57. Bridging action in tube-wells can be broken by

- (1) Developing well by over pumping
- (2) Developing well by surging
- (3) Constructing well by reverse rotary method
- (4) Controlling pH of groundwater

58. The sum of well loss and formation loss is known as

- (1) Total well loss
- (2) Friction loss
- (3) Drawdown
- (4) Head loss

59. The most common method of land levelling design is
- (1) Profile method
 - (2) Plan inspection method
 - (3) Contour adjustment method
 - (4) Plane method
60. The ratio of the equivalent depth of drainage water to the depth of irrigation water is referred to as
- (1) Drainage coefficient
 - (2) Leaching requirement
 - (3) Fraction of drainage water
 - (4) None of the above
61. The volume of water, the confined aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in the component of head normal to the surface, is referred to as
- (1) Coefficient of storage
 - (2) Hydraulic conductivity
 - (3) Transmissibility
 - (4) Specific yield
62. A tube well which does not make use of strainer and contracted at a location where high yielding sand stratum is underlain by strong impervious stratum of clay is known as
- (1) Collector well
 - (2) Fully penetrating well
 - (3) Cavity well
 - (4) None of the above
63. The ratio expressed in percentage of irrigation water stored in root zone and available for crop production to that delivered at the head of the field is known as
- (1) Irrigation efficiency
 - (2) Project efficiency
 - (3) Farm irrigation efficiency
 - (4) Field irrigation efficiency

64. Effective root zone depth of sugarcane is considered as
(1) 60 cm (2) 90 cm (3) 120 cm (4) 180 cm
65. Measure of dryness of a region is referred to as
(1) Drying coefficient (2) Aridity index
(3) Assimilation (4) Humidity
66. If a soil has $\text{pH} = 8.5$, $\text{EC} = 4 \text{ mmhos/cm}$ at 25°C and $\text{ESP} = 15$, the soil is referred as
(1) Saline-alkali (2) Alkali
(3) Saline (4) None of the above
67. Aquifers which are overlain or underlain by semi-permeable strata are referred to as
(1) Confined aquifer (2) Leaky aquifer
(3) Perched aquifer (4) Unconfined aquifer
68. The pressure of water above water table will be
(1) Positive (2) $>$ Atmospheric
(3) Negative (4) None of the above
69. The number of the days that can be allowed for applying one irrigation to a given design area during the peak period of consumptive use of the crop is referred to as
(1) Irrigation interval (2) Irrigation frequency
(3) Irrigation intensity (4) Irrigation period

70. Recommended safe limit of land slope for efficient irrigation in medium (loamy) soils is
- (1) 0.4-0.6 percent (2) 1.0-2.0 percent
(3) 0.2-0.4 percent (4) 2.0-4.0 percent
71. Horizontal centrifugal pump has
- (1) Vertical impeller mounted on a horizontal shaft
(2) Horizontal impeller mounted on a vertical shaft
(3) Impeller mounted on a shaft having 30° tilt from vertical
(4) None of the above
72. Jet pumps are the combination of centrifugal pump and jet mechanism where
- (1) Jet is placed at ground surface and centrifugal pump in the well below water surface
(2) Centrifugal pump is placed at ground surface and jet in the well below water surface
(3) Centrifugal pump and jet, both are placed in the well below water surface
(4) Centrifugal pump and jet, both are placed at ground surface
73. The weight of oven dry soil per unit volume of wet soil divided by density of water is referred to as
- (1) Bulk density (2) Density of soil
(3) Apparent specific gravity (4) None of the above

74. Almost all natural groundwater motion has Reynold's number equal to
- (1) One
 - (2) $< One$
 - (3) $> One$
 - (4) None of the above
75. The method to analyse pumping test data for unsteady flow to a well in confined aquifer which is applicable for large value of time and small values of distance of observation well from test well was given by
- (1) Hantush
 - (2) De-Glee
 - (3) Theis
 - (4) Cooper and Jacob
76. If a saturation extract of soil has Electrical Conductivity less than 4 m mhos/cm and SAR less than 13, the soil is referred to as
- (1) Normal
 - (2) Sodic
 - (3) Saline-sodic
 - (4) Saline
77. If the viscous forces are so strong, relative to the inertial forces, that viscosity plays a significant part in determining flow behaviour then flow in the channel will be
- (1) Turbulent
 - (2) Laminar
 - (3) Discontinuous flow
 - (4) None of the above
78. The albedo is the ratio of
- (1) Actual to yearly average rainfall/day
 - (2) Actual to monthly average temperature/day
 - (3) Actual to maximum possible hours of bright sun shine/day
 - (4) None of the above

79. The lines of equal rainfall are called
- (1) Isohytal (2) Isothermal
(3) Isothyetal (4) Contour
80. The surface drains which are best suited to the drainage of scattered depression or pot holes where the depth of cut is not over 1 m are referred to as
- (1) Bedding (2) Parallel field ditch system
(3) Random field ditch system (4) Parallel lateral ditch system
81. The portion of the precipitation that makes its way towards stream channels, lakes or oceans as surface flow is referred to as
- (1) Drain flow (2) Surface flow
(3) Runoff (4) Drainage coefficient
82. Fixing of irrigation for each shareholder of an outlet on the basis of his size of holding under the culturable command area of the outlet is referred to as
- (1) Warabandi (2) Intensity of irrigation
(3) Irrigation scheduling (4) Irrigation share
83. The efficiency of reciprocating pump compared to that of centrifugal pump to handle small discharge at high head is
- (1) Same (2) More
(3) Less (4) None of the above

84. Thiessen polygon method is used.
- (1) to find out groundwater storage
 - (2) to identify change in surface storage
 - (3) to find out average depth of rainfall over the basin
 - (4) None of the above
85. A steady state water flow condition exists when
- (1) The water level responds to change in atmosphere pressure
 - (2) The water level drops as the pumping is continued
 - (3) The water level first drops then it starts rising
 - (4) The water level in the well ceases to decline
86. The term isotropic means
- (1) Hydraulic conductivity varies with direction
 - (2) Hydraulic conductivity varies with space
 - (3) Hydraulic conductivity is constant in all directions
 - (4) Hydraulic head is constant with time
87. A perched water table
- (1) May lie below the groundwater table
 - (2) Gives a fair amount of sustained yield
 - (3) May lie above the groundwater table
 - (4) May be present in artesian aquifer

88. The foot valve is installed in the suction line while pumping with
- (1) Cavity well
 - (2) Deep tube-wells in confined aquifer
 - (3) Deep tube-wells in unconfined aquifer
 - (4) Open well
89. Cavity wells are usually constructed in
- (1) Perched aquifer
 - (2) Shallow confined aquifer
 - (3) Deep confined aquifer
 - (4) Unconfined aquifer
90. Keeping the hydraulic properties as constant, doubling the diameter of well screen in a phreatic aquifer, well discharge will increase about
- (1) 100%
 - (2) 50%
 - (3) No effect
 - (4) About 11%
91. The length of screen in cavity well is decided
- (1) Using well log
 - (2) By sieve analysis of aquifer material
 - (3) 1/3 of confined aquifer
 - (4) No screen is provided
92. Effective rainfall means
- (1) Rainfall which percolates into groundwater
 - (2) Total amount of rainfall
 - (3) Amount of rainfall used by the plants
 - (4) Amount left in the field after runoff

93. Specific speed ns of a centrifugal pump is defined

$$(1) \quad ns = \frac{n\sqrt{Q}}{H^{5/2}} \qquad (2) \quad ns = \frac{nQ}{H^{5/2}}$$

$$(3) \quad ns = \frac{n\sqrt{Q}}{H^{3/4}} \qquad (4) \quad ns = \frac{n\sqrt{Q}}{H^{1/2}}$$

94. Drainage coefficient means, depth of water to be removed from a drainage field in

- (1) Three days (2) Two days
(3) One day (4) Depends on type of crop

95. The void ratio of soil is expressed as

- (1) Reciprocal of porosity
(2) Ratio of volume of pores to the total volume of soil
(3) Ratio of volume of pores to the volume of solids
(4) None of the above

96. Hydraulic ram is a

- (1) Positive displacement pump
(2) Centrifugal pump
(3) Impulse type pump
(4) None of the above

97. Normal discharge of a 10 cm diameter tube-well is about

- (1) 10 lit/sec (2) 100 lit/sec
(3) 20 lit/sec (4) None of the above

98. Inflow rate in surface irrigation should be

- (1) < infiltration rate (2) > infiltration rate
 (3) = infiltration rate (4) Not related to above

99. Leaching requirement (LR) is defined as

- (1) $LR = [(EC \text{ of Irrigation water}) / (EC \text{ of drainage water})] \times 100$
 (2) $LR = [(EC \text{ of drainage water}) / (EC \text{ of irrigation water})] \times 100$
 (3) Total water required for irrigation in a field
 (4) None of the above

100. For operation of a centrifugal pump without cavitation, the suction lift plus other losses must be

- (1) = atmospheric pressure (2) > atmospheric pressure
 (3) < atmospheric pressure (4) None of the above

101. The period in days for which water is supplied to a crop in a canal command is called

- (1) Duty (2) Delta
 (3) Base period (4) None of the above

102. Water application efficiency in drip irrigation is usually

- (1) 60% (2) 70% (3) 90% (4) 50%

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133. Ethanol can be easily obtained from substances rich in
- (1) Lipids
 - (2) Carbohydrates
 - (3) Proteins
 - (4) Secondary metabolites
134. Which of the following is concerned with phasing out of CFCs ?
- (1) Montreal Protocol
 - (2) Ramsar convention
 - (3) Outer space treaty
 - (4) SAARC summit
135. Photochemical smog formation starts with
- (1) NO_2
 - (2) SO_2
 - (3) Hydrocarbons
 - (4) VOCs
136. PAN is the
- (1) Initiation material of Photochemical smog
 - (2) Intermediate product of Photochemical smog
 - (3) Termination product of Photochemical smog
 - (4) Harmless product of Photochemical smog
137. Methane in biogas accounts for
- (1) 50-68%
 - (2) 80-86%
 - (3) 90-94%
 - (4) 100%
138. Water vapours are present in the
- (1) Troposphere
 - (2) Stratosphere
 - (3) Mesosphere
 - (4) Thermosphere
139. URL stands for
- (1) Uniform Resource Locator
 - (2) Universal Resource Locator
 - (3) Unlimited Resource Locator
 - (4) Upgraded Resource Locator

107. Submersible pumps are suitable for the condition where
- (1) Water is to be lifted from shallow depth
 - (2) Water is to be lifted from deep tube-well
 - (3) Large quantity of water required
 - (4) Any where
108. Minimum thickness of gravel packs in case of tube-well is
- (1) 20 cm
 - (2) 20 mm
 - (3) 7.5 cm
 - (4) None of the above
109. The flow in open channel is critical when
- (1) Froude number < 1
 - (2) Froude number > 1
 - (3) Froude number = 1
 - (4) Froude number > 1 and Reynold number > 2000
110. Multistage centrifugal pump issued for
- (1) Low discharge condition
 - (2) High discharge low head condition
 - (3) Higher head condition
 - (4) All of the above
111. Water storage efficiency is defined as
- (1) $(\text{Water stored in root zone})/(\text{Water delivered to the field})$
 - (2) $(\text{Water stored in the root zone during irrigation})/(\text{Water needed in the root zone prior to irrigation})$
 - (3) $(\text{Water stored in the field})/(\text{Water applied in the field})$
 - (4) None of the above

112. A layer is designated as impervious if its hydraulic conductivity is

- (1) 1/5 to 1/10 of hydraulic conductivity of upper layer
- (2) 50% hydraulic conductivity of upper layer
- (3) 40% hydraulic conductivity of upper layer
- (4) None of the above

113. Cut/fill ratio in land levelling is kept around

- (1) 1.2
- (2) 0.8
- (3) 2.1
- (4) 4.0

114. In an open channel at critical state of flow the specific energy

- (1) is minimum
- (2) has two alternate depths of flow
- (3) is maximum
- (4) is zero

115. Sodium adsorption ratio (SAR) is expressed as

(1)
$$SAR = \frac{Ca^{++}}{\sqrt{(Na^+ + Mg^{++})/2}}$$

(2)
$$SAR = \frac{Na^+}{\sqrt{(Ca^{++} + Cl^-)/2}}$$

(3)
$$SAR = \frac{Na^+}{\sqrt{(Ca^{++} + Mg^{++})/2}}$$

- (4) None of the above

116. The ratio between the irrigated area and quantity of water used in a command is called

- (1) Delta
- (2) Base period
- (3) Duty
- (4) Base ratio

117. The concept of Potential Evapotranspiration was suggested by
- (1) Blaney-Criddle
 - (2) Christiansen
 - (3) Thornthwaite
 - (4) Darcy
118. Rotary pumps are commonly used
- (1) For lifting irrigation water
 - (2) For lifting lubricating oils etc.
 - (3) For lifting air vapour mixture
 - (4) None of the above
119. Water application efficiency is defined as
- (1) $(\text{Water stored in the root zone during irrigation}) / (\text{Water needed in the root zone prior to irrigation})$
 - (2) $(\text{Water stored in the root zone}) / (\text{Water delivered to the field})$
 - (3) $(\text{Water stored in the field}) / (\text{Water diverted from the source})$
 - (4) None of the above
120. Jacob's modification of Theis non-equilibrium equation are valid for
- (1) Smaller value of 'u'
 - (2) Higher value of well function
 - (3) Early pumping data
 - (4) Long duration pumping data
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अभ्यर्थियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण-पृष्ठ पर तथा उत्तर-पत्र के दोनों पृष्ठों पर केवल नीली-काली बाल-प्वाइंट पेन से ही लिखें)

1. प्रश्न पुस्तिका मिलने के 10 मिनट के अन्दर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ मौजूद हैं और कोई प्रश्न छूटा नहीं है। पुस्तिका दोषयुक्त पाये जाने पर इसकी सूचना तत्काल कक्ष-निरीक्षक को देकर सम्पूर्ण प्रश्नपत्र की दूसरी पुस्तिका प्राप्त कर लें।
2. परीक्षा भवन में लिफाफा रहित प्रवेश-पत्र के अतिरिक्त, लिखा या सादा कोई भी खुला कागज साथ में न लायें।
3. उत्तर-पत्र अलग से दिया गया है। इसे न तो मोड़ें और न ही विकृत करें। दूसरा उत्तर-पत्र नहीं दिया जायेगा। केवल उत्तर-पत्र का ही मूल्यांकन किया जायेगा।
4. अपना अनुक्रमांक तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से निर्धारित स्थान पर लिखें।
5. उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुक्रमांक निर्धारित स्थान पर लिखें तथा नीचे दिये वृत्तों को गाढ़ा कर दें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का नम्बर उचित स्थानों पर लिखें।
6. ओ० एम० आर० पत्र पर अनुक्रमांक संख्या, प्रश्न-पुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्न-पुस्तिका पर अनुक्रमांक सं० और ओ० एम० आर० पत्र संख्या की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।
7. उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष-निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा यह एक अनुचित साधन का प्रयोग माना जायेगा।
8. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं। प्रत्येक प्रश्न के वैकल्पिक उत्तर के लिये आपको उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत्त को उत्तर-पत्र के प्रथम पृष्ठ पर दिये गये निर्देशों के अनुसार पेन से गाढ़ा करना है।
9. प्रत्येक प्रश्न के उत्तर के लिये केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अथवा एक वृत्त को अपूर्ण भरने पर वह उत्तर गलत माना जायेगा।
10. ध्यान दे कि एक बार स्याही द्वारा अंकित उत्तर बदला नहीं जा सकता है। यदि आप किसी प्रश्न का उत्तर नहीं देना चाहते हैं, तो सम्बन्धित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।
11. रफ कार्य के लिये इस-पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा अंतिम खाली पृष्ठ का प्रयोग करें।
12. परीक्षा के उपरान्त प्रश्न-पुस्तिका एवं उत्तर-पत्र परीक्षा भवन में जमा कर दें।
13. परीक्षा समाप्त होने से पहले परीक्षा भवन से बाहर जाने की अनुमति नहीं होगी।
14. यदि कोई अभ्यर्थी परीक्षा में अनुचित साधनों का प्रयोग करता है, तो वह विश्वविद्यालय द्वारा निर्धारित दंड का/की भागी होगा / होगी।