University of Mumbai

Examination 2021 under cluster __ (Lead College: _KJSIEIT_)

Examinations Commencing from 1 June 2021

Program: T.E.(Civil) (Rev-2016) (Choice based)

Curriculum Scheme: Rev - 2016

Examination: TE VI

Course Code: CEC605_ and Course Name: Water Resources Engineering –I

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	The system of irrigation practiced on Hill slope is
Option A:	Contour farming
Option B:	Check irrigation
Option C:	Border method of irrigation
Option D:	Sprinkler irrigation
2.	For standing crops in undulating sandy fields, the best method of irrigation is
Option A:	Sprinkler irrigation
Option B:	Free flooding
Option C:	Check method
Option D:	Furrow method
3.	Mixed cropping is defined as
Option A:	Two or more crops grown during any year
Option B:	Two or more crops grown during the same crop , season in different fields
Option C:	Two or more crop seasons of the year
Option D:	Growing of two or more crops together in the same field during the same crop season.
4.	Irrigation frequency is a function of
Option A:	Crop only
Option B:	Soil, crop and climate
Option C:	Soil, crop, climate and fertilizer
Option D:	Soil and climate
5.	If Duty (D) is 1428 Ha/cumecs and base period (B) is 120 days for an irrigated crop, then delta in meters is given by
Option A:	1.028m
Option B:	0.73m
Option C:	1.38m
Option D:	0.01m
6.	The ration of quantity of water stored in the root zone of the crops to the quantity of water actually delivered in the field is known as
Option A:	Water conveyance efficiency
Option B:	Water application efficiency

Option C:	Water use efficiency
Option D:	Water storage efficiency
7.	With the increase in the quantity of Water supplied the yield of the most crops
Option A:	Increases continuously
Option B:	Decreases continuously
Option C:	Increases up to a certain limit and then decrease
Option D:	Increases up to a certain limit and then becomes constant
8.	The following recording gauge produces the mass curve of precipitation as their record.
Option A:	Symons rain gauge
Option B:	Tipping – bucket type
Option C:	Weighing- bucket type
Option D:	Both Symons and tipping bucket type
9.	A Hyetograph is a plot of
Option A:	Rainfall volume with time.
Option B:	Rainfall intensity with time.
Option C:	rainfall intensity with duration
Option D:	Discharge vs. time.
10.	The rate of rainfall for successive 30 min periods of a 4 – hour storm are as follows: 3.5, 6.5, 8.5, 7.8, 6.4, 4.0, 4.0, 6.0, cm /hr. Taking a value of φ – index as 4.5 cm/hour. Compute the 1. Total rainfall 2. Total rainfall excess 3. W- index
Option A:	23.35cm, 6.35cm, 4.25 cm/hr.
Option B:	23.00cm, 6.00 cm, 4.00 cm/hr.
Option C:	24.5cm, 6.5cm, 4.5cm/hr.
Option D:	25.5cm , 7.0cm , 5.0 cm/hr.
11.	When base flow is separated from the storm- hydrograph the resulting plot is known as
Option A:	Excess – run off hydrograph
Option B:	Excess – rainfall hydrograph
Option C:	Direct – runoff hydrograph
Option D:	Direct – rainfall hydrograph
12.	A geological formation which neither contains water nor transmit any water through it.
Option A:	Aquifer
Option B:	Aquifuge
Option C:	Aquitard
Option D:	Aquiclude
13.	Specific capacity
Option A:	A constant for a given well
Option B:	Depends on aquifer characteristic
Option C:	Increases with discharge rate

Option D:	Decreases with time from the start of pumping
14.	A 45- cm well penetrates an unconfined aquifer of saturated thickness 30 m completely. Under a steady pumping rate for a long time the drawdown at two observation wells 15 m and 30 m form the well are 5.0 m and 4.2 m respectively. If the permeability of the aquifer is 20 m /day, determine the discharge and the drawdown at the pumping well.
Option A:	3683.90 m^3/sec , drawdown – 10.54 m
Option B:	3790.89 m^3/sec , drawdown – 9.54 m
Option C:	3650. 67 m^3/sec , drawdown – 8.54 m
Option D:	3860.76 , m^3/sec , drawdown – 6.54 m
15.	The volume of water that can be extracted by force of gravity from a unit volume of aquifer material is called
Option A:	Specific retention
Option B:	Specific yield
Option C:	Specific capacity
Option D:	Specific storage
16.	Yield of a reservoir represents
Option A:	the inflow into the reservoir
Option B:	the capacity of the reservoir
Option C:	the outflow demand on the reservoir
Option D:	the optimum value of catchment yield
17.	The surcharge storage in a dam reservoir is the volume of water stored between
Option A:	Minimum and maximum reservoir levels
Option B:	Minimum and normal reservoir levels
Option C:	Normal and maximum reservoir levels
Option D:	Dead storage level and maximum reservoir level .
18.	Bank storage in dam reservoir
Option A:	Increases the computed reservoir capacity
Option B:	Decreases the computed reservoir capacity
Option C:	Sometime increases and sometime decreases the computed reservoir capacity.
Option D:	Has no effect on computed reservoir capacity.
19.	A Dam reservoir , catering to flood control , irrigation and water supply although basically design for irrigation alone is a
Option A:	Multipurpose reservoir
Option B:	Single purpose reservoir
Option C:	Distribution reservoir
Option D:	Single purpose and multipurpose reservoir.
20.	The method of growing crops on ridges , running on the sides of water ditches , is known as
Option A:	Flood irrigation
Option B:	Furrow irrigation
Option C:	Check irrigation
Option D:	Basin irrigation

<table>
<tr><td>Q2</td><td></td></tr>
<tr><td>A</td><td>Solve any Two 5 marks each</td></tr>
<tr><td>i.</td><td>Explain the factor affecting runoff</td></tr>
<tr><td>ii.</td><td>Explain the methods of improving duty</td></tr>
<tr><td>iii.</td><td>Explain the zones of storage in a reservoir.</td></tr>
<tr><td>B</td><td>Solve any One 10 marks each</td></tr>
<tr><td>i.</td><td>Table below gives the necessary data about the crop, their duty and area under each crop, commanded by a canal taking off from storage tank. Taking time factor for the canal to be 0.65 and capacity factor 0.8. Determine the design discharge for the canal, considering transit losses as 15 %.
<table>
<tr><td>Crop</td><td>Base period(days)</td><td>Area (Ha)</td><td>Duty at the head of the canal (Ha/cumec)</td></tr>
<tr><td>Sugarcane</td><td>320</td><td>850</td><td>580</td></tr>
<tr><td>Overlap for sugarcane in hot weather</td><td>90</td><td>120</td><td>580</td></tr>
<tr><td>Wheat (R)</td><td>120</td><td>600</td><td>1600</td></tr>
<tr><td>Bajri (K)</td><td>120</td><td>500</td><td>2000</td></tr>
<tr><td>Vegetable (HW)</td><td>120</td><td>360</td><td>600</td></tr>
</table></td></tr>
<tr><td>ii.</td><td>Find the ordinates of the storm hydrograph resulting from a 3 hr. storm with rainfall of 2 cm, 6.75 cm and 3.75 cm during subsequent 3 hrs. intervals. The ordinates of unit 3 hr. hydrograph are given in the following table
<table>
<tr><td>Time (hrs)</td><td>03</td><td>06</td><td>09</td><td>12</td><td>15</td><td>18</td><td>21</td><td>24</td></tr>
<tr><td>Ordinates of UH(Cumecs)</td><td>0</td><td>110</td><td>365</td><td>500</td><td>390</td><td>310</td><td>250</td><td>235</td></tr>
<tr><td>Time (hrs)</td><td>03</td><td>06</td><td>09</td><td>12</td><td>15</td><td>18</td><td>21</td><td>24</td></tr>
<tr><td>Ordinates of UH(Cumecs)</td><td>175</td><td>130</td><td>95</td><td>65</td><td>40</td><td>22</td><td>10</td><td>0</td></tr>
</table></td></tr>
<tr><td></td><td>Assume an initial loss of 5 mm, infiltration index of 2.5 mm/hour and base flow of 10 cumecs</td></tr>
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<tr><td>Q3</td><td></td></tr>
<tr><td>A</td><td>Solve any Two 5 marks each</td></tr>
<tr><td>i.</td><td>Explain the different surface irrigation methods.</td></tr>
<tr><td>ii.</td><td>Derive an expression for discharge from well fully penetrating in a unconfined aquifer.</td></tr>
<tr><td>iii.</td><td>Describe the various methods of computing average rainfall over a basin.</td></tr>
<tr><td>B</td><td>Solve any One 10 marks each</td></tr>
<tr><td>i.</td><td>A well penetrates fully 10 m thick confined aquifer of medium sand having coefficient of permeability as 0.005 m/s. The well radius is 10 cm and is to be worked under a drawdown of 4 m at the well face. Calculate the discharge from the well. What will be the percentage increases in the discharge if the radius of the well is doubled? Take R=300m in each case.</td></tr>
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<tr><td>ii.</td><td>Fix the control levels D.S.L., F.R.L, H.F.L and T.B.L from the given data
1. Effective storage required for the crops = 3200 ham
2. Carryover allowance = 10 % of effective storage.
3. Tank losses = 20 % of effective storage
4. Dead storage = 10 % of gross storage.
5. Wind velocity = 80 kmph.
6. Fetch length = 30 km.
7. Length of spillway = 80 m.
8. M.F.D.= 500 m^3/s
9. Use Francis formula – Q = 1.84 L H ^3/2.
<table><tr><td>Contour RL(m)</td><td>81</td><td>84</td><td>87</td><td>-</td><td>105</td><td>108</td><td>111</td></tr><tr><td>Storage (Mm^3)</td><td>3.62</td><td>4.25</td><td>5.33</td><td>-</td><td>44.75</td><td>49.26</td><td>59.25</td></tr></table></td></tr>
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