JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- OCTOBER 2017

B.Tech V Semester

COURSE CODE: 10B11CE513   MAX. MARKS: 25

COURSE NAME: Water Resource Engineering

COURSE CREDITS: 04   MAX. TIME: 1.5 HR

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume suitable data if required and not provided.

Q.1   (3+3)

(a) Derive the modified Horton's equation for infiltration capacity and explain its significance.

(b) The following is the set of observed data for successive 15 minute period of 105 minute storm in a catchment. If the ϕ index is 3 cm/hr, estimate the net runoff, the total rainfall and the value of W-index.

Duration (min)	15	30	45	60	75	90	105
Rainfall(cm/hr)	2.0	2.0	8.0	7.0	1.25	1.25	4.5

Q.2.   (2+4)

(a) Briefly describe the various assumptions of unit hydrograph theory.

(b) Given below are the ordinates of a unit hydrograph for a storm of 4-hr.duration. Determine the ordinates of the flood hydrograph when the max. flood observed was 4000 m³/sec and base flow was 250 m³/sec.

Time (hrs)	0	4	8	12	16	20	24
Runoff (cumecs)	0	1500	1200	600	220	80	00

Q.3   (3+3)

(a) Describe briefly the working of any automatic stage recorder with figure.

(b) The regression analysis of a 30 year flood data at a point on a river yielded sample mean of 1200 m³/sec and standard deviation 650 m³/sec. For what discharge would you design the structure at this point to provide 95% assurance that the structure would not fail in the next 50 years? For n=30, mean and standard deviation of the reduced variate are 0.53622 and 1.11238.

Q.4 The following data have been obtained from a river stretch of 250 m. gradually changing its cross section from upstream to downstream:

Readings	Upstream section	Middle section	Downstream section
Area(m²)	108.60	103.10	99.80
Wetted Perimeter(m)	65.30	60.70	59.40
Gauge reading(m)	316.80	-	316.55

Determine the flood discharge using slope area method taking Manning's n=0.029.   (7)