

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

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| 11. List the regimes of open channel flow. | CO1 | [K ₁] |
| 12. Water flows at a uniform depth of 2 m in a trapezoidal channel having a bottom width 6m, side slopes 2 horizontal to 1 vertical. If it has to carry a discharge of 65 cumecs, Compute the bottom slope required to be provided. Take Manning's N = 0.025 | CO1 | [K ₂] |
| 13. For a constant specific energy of 1.8 Nm/N, Calculate the maximum discharge that may occur in a rectangular channel 5.0 m wide. | CO2 | [K ₂] |
| 14. Draw a typical specific energy diagram and mark salient points. | CO2 | [K ₁] |
| 15. List various flow profiles of GVF. | CO3 | [K ₁] |
| 16. Classify hydro machines. | CO4 | [K ₁] |
| 17. What is the use of a draft tube? | CO4 | [K ₂] |
| 18. Why priming is required for a centrifugal pump? | CO5 | [K ₂] |
| 19. What is the function of an Air vessel? | CO5 | [K ₂] |
| 20. What is the significance of an indicator diagram? | CO6 | [K ₂] |

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

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| 21. A channel carries a discharge of 5 cumecs with a flow depth of 1 m. The side slopes are 1 to 1 and bed slope 1 in 3520. Find the bed width and the velocity. The values of Chezy's Constant for this channel for different values of hydraulic radius 'R' are as tabulated below. | CO1 | [K ₃] |
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Hydraulic radius R	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4
Chezy's Constant	34	35	37	38	39	40	41	41

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| 22. A rectangular channel which is laid on a bottom slope 0.0064 has to carry 20 cumecs of water, Determine the width of the channel when the flow is in critical condition. Take Manning's N = 0.015. | CO2 | [K ₃] |
| 23. In a rectangular channel 3.5 m wide laid at a slope of 0.0036, uniform flow occurs at a depth of 2 m. Find how high can the hump be raised without causing afflux? If the upstream depth of flow is to be raised to 2.5 m, what should be the height of the hump? Take Manning's N = 0.015. | CO3 | [K ₃] |

24. A trapezoidal channel having bottom width 8 m and side slope 1:1, carries a discharge of 80 cumecs. Find the depth conjugate to initial depth of 0.75 m before the jump. Also determine the loss of energy in the jump. CO3 [K₃]
25. A jet of water 75 mm in diameter having a velocity of 20 m/s strikes a series of flat plates arranged around the periphery of a wheel such that each plate appears successively before the jet. If the plates are moving at a velocity of 5 m/s, compute the force exerted by the jet on the plate, the work done per second on the plate and the efficiency of the jet. CO4 [K₃]
26. A single acting reciprocating pump has a plunger of diameter 250 mm and stroke of 350 mm. If the speed of the pump is 60 r.p.m and it delivers 16.5 liters per second of water against a suction head of 5m and a delivery head of 20 m, find the theoretical discharge, coefficient of discharge, the slip, the percentage of slip of the pump and the power required to drive the pump. CO5 [K₃]
27. A Pelton wheel has to be designed for the following data: CO6 [K₃]
Power to be developed = 6,000 kW
Net head available = 300 m, Running at 550 rpm.
Ratio of jet diameter to wheel diameter = 1/10
Overall efficiency = 85%
Find number of jets, diameter of the jet, diameter of the wheel and the quantity of water required.
