BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS:MTech **SEMESTER : II**
BRANCH:SER(Aerodynamics) **SESSION : SP/22**

SUBJECT: SR576 Compressible Flows

TIME:2 Hrs **FULL MARKS: 50**

INSTRUCTIONS:
1. The missing data, if any, may be assumed suitably.
***2*. Before attempting the question paper, be sure that you have got the correct question paper.**

Q.1	Is it possible to accelerate a fluid to supersonic speed without the sonic velocity at the throat?	[2]
Q.2	What is the effect of friction on flow velocity in subsonic and supersonic Fanno flow ?	[2]
Q.3	What is the effect of heat gain and heat loss on the entropy of the fluid during Rayleigh flow ?	[2]
Q.4	Why the total enthalpy is not a constant for an unsteady adiabatic inviscid flow	[2]
Q.5	Differentiate between sound and a finite wave.	[2]
Q.6	What do you understand by the term "reverse nozzle"	[2]
Q.7	Discuss the different operations of supersonic intake.	[2]
Q.8	Describe with suitable diagram the performance curve of a supersonic intake	[2]
Q.9	Write down the different application areas where a shock train can exist.	[2]
Q.10	To maximise the pressure ratio across a shock wave in a shock tube, what should be the character of driver and driven gases.	[2]
Q.11	Justify that weak shock waves are very nearly isentropic	[2]
Q.12	What makes the flow field behind a stationary curved shock, rotational?	[2]
Q.13	What makes the large upstream diffusion for laminar layer (LBL) in comparison to turbulent layer (TBL)	[2]
Q.14	Write down the steps for the solution of Prandtl-Meyer expansion waves	[2]
Q.15	Define mass motion velocity	[2]
Q.16	Describe over and under expanded nozzles	[5]
Q.17	Explain the method of shock polar in solving oblique shock waves.	[5]
Q.18	Describe a right running wave with explanation about compression, expansion, condensation and rarefaction	[5]
Q.19	List down the salient observations obtained from the theta-beta-M curve for an oblique shock	[5]

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