## INDIAN MARITIME UNIVERSITY
### (A Central University, Government of India)

## Entrance Test for Admission to Ph.D / Integrated Ph.D / MS (By Research)

## MODEL QUESTION PAPER

Subject Name:  **NAVAL ARCHITECTURE**                    Maximum Marks: 50

### There will be 50 questions and each question carry 1 mark.

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Students are required to choose the answer nearest to the correct answer from the multiple choices given for each question.

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1. A floating vessel has a length between perpendiculars = 150.0m, breadth =23m, mean draught = 9.1m and its LCG is at midship, LCB is 1.0m forward of midship and LCF is 1.0m aft of midship. Which of the following answers give the correct aft draught if the vessel trims by 1.5m by aft?

   a.  8.34m
   b.  8.36m
   c.  9.84m
   d.  9.85m

2. A constant triangular cross section body of length L floats level trim in water with one of its vortices in water. Its midship area coefficient, block coefficient and prismatic coefficient are respectively given as

   a.  0.5,1,1
   b.  0.5,0.5,1
   c.  0.5,0.5,0.5
   d.  1,0.5,1

3. Position of centre of buoyancy of vessel is at

   a.  Centroid of underwater hull
   b.  Centroid of the full cargo space
   c.  Centroid of all masses
   d.  Centroid of hull where buoyancy is maximum

4. Froude number is the ratio between

a. Inertial and Gravitational forces
b. Inertial and viscous forces
c. Inertial and drag forces
d. Inertial and lift forces

5. A ship model is to be tested for resistance. Ship length is 150m and it has a speed of 20 knots. If the model length is chosen to be 6m, considering Reynold's similarity, what will be the model speed?

a. 500m/sec
b. 2.06m/sec
c. 4m/sec
d. 257.2m/sec

6. If V is speed in m/sec, g is acceleration due to gravity, L is length and v is kinematic coefficient of viscosity of water, then Froude number is defined as

a. $V/\sqrt{(gL)}$
b. $V/\sqrt{L}$
c. $VL/v$
d. None of the above

7. A screw propeller is fitted behind a single screw ship. Its propulsive efficiency behind the ship will be

a. more than open water efficiency
b. less than open water efficiency
c. equal to open water efficiency
d. not related to open water efficiency

8. A ship has a metacentric radius of 7.5m in fully loaded floating condition. If its centre of buoyancy is 3.5m above base and its centre of gravity is 8.0m above base, what is the metacentric height?

a. 3.0m
b. 4.0m
c. 4.5m
d. 3.5m

9. CPP in ship terminology means

a. Controlled Pitch Propeller
b. Curved Pitch Partition

c.    Combined Pitch Parameter

d.    Computed Pitch Perimeter

10.    A submarine with circular cross section with a diameter of 10m, has its centre of gravity 4.25m above base. In the submerged condition, Is the submarine

a.    stable

b.    unstable

c.    neither stable nor unstable

d.    at neutral equilibrium

11.    If the natural frequency and the periodically applied force on a vibrating body match, the amplitude of vibration will

a.    increase

b.    cancel out

c.    dampen exponentially

d.    dampen linearly

12.    The direction of flow of a water particle inside the turbulent boundary layer of a body moving in water is

a.    along a stream line

b.    along an isobaric line

c.    along a line parallel to the body surface

d.    random

13. A ship experiences torsional stress due to

a.    head sea condition

b.    beam sea condition

c.    oblique sea condition

d.    none of the above

14.    At the time of end launching of a ship maximum stress occurs at

a.    aft poppet

b.    fore poppet

c.    keel plate

d.    edges of the way end

15.    In a uni-directional random sea state, significant wave height is defined as

a.    average of all wave heights within the data set

b.   average of highest 1/10<sup>th</sup> waves
c.   average of highest 1/3<sup>rd</sup> waves
d.   average of hidhest 1/5<sup>th</sup> waves

16.   A bilge keel is fitted to a ship to

a.   reduce rolling motion
b.   reduce pitching motion
c.   reduce heave
d.   none of the above

17.   When a rudder is turned to an angle, say $10^0$ with a forward speed, lift and drag forces are generated giving a resultant force F at the centre of pressure P situated at a distance of x from the leading edge. If the rudder turning axis is at a distance of y from the leading edge, the steering gear torque required for this turn will be

a.   more than F(x-y)
b.   less than F(x-y)
c.   equal to F(x-y)
d.   could be more or less than F(x-y)

18.   The major component of resistance of a planing boat of 10m length moving at 30 knots speed is

a.   viscous resistance
b.   wave making resistance
c.   spray drag
d.   interference drag

19.   In fluid mechanics, added mass or virtual mass is the _____ added to a system because an accelerating or decelerating body must move some volume of surrounding fluid as it moves through it.

a.   Inertia
b.   additional force in phase with velocity
c.   Drag
b.   Resonance

20.   In a tension leg platform, tension is provided in the legs by

a.   providing hydraulic jacks
b.   by making weight of the platform more than buoyancy
c.   by providing lifting devices externally
d.   by making buoyancy more than weight