

Appendix B

Theory Test for the ATTP Basic Mechanical Module.

- You have one hour to complete this test.
 - Write your answers on the paper provided and put your name on each sheet.
- 1) What are the main construction elements of a wind turbine? (6 marks)
 - 2) What are the main mechanical elements of a wind turbine? (6 marks)
 - 3) What are the essential elements of PPE required by an offshore wind turbine technician? (5 marks)
 - 4) What is the correct name of the yo-yo system? (1 mark)
 - 5) What is meant by LOTO and when is it used? (2 marks)
 - 6) What units are torque wrenches set to? (1 mark)
 - 7) What are the consequences of over tightening bolts? (2 marks)
 - 8) What are the consequences of bolts being too loose? ((2 marks)
 - 9) What is the pitch of a thread? (1 mark)
 - 10) Name 3 types of spanner. (3 marks)
 - 11) What are the consequences of the shaft and gearbox not aligning? (2 marks)
 - 12) What tool is used to check the alignment? (1 mark)
 - 13) What is meant by pitching a wind turbine, and why is it done? (2 marks)
 - 14) What is meant by yawing a wind turbine and why is it done? (2 marks)
 - 15) When inspecting the tower sections for corrosion what would you look for? (2 marks)
 - 16) What do you look for when visually inspecting welded joints? (1 mark)
 - 17) What functions does oil have in a mechanism? (2 marks)
 - 18) What might you find in an oil sample that gives an indication of the condition of a mechanism? (2 marks)
 - 19) What function does grease serve? (2 marks)
 - 20) How is the gap checked between the brake disc and the brake pad? (1 mark)
 - 21) What would a Vernier, Dial or Digital calliper be used for? (1 mark)

Answer Sheet.

- 1) Monopile or foundation, transition piece, tower sections, nacelle, rotor, blades.
- 2) Gearbox, coupling, main shaft, generator, pitch system, yaw system.
- 3) Life jacket, survival suit, hard hat, safety boots, harness.
- 4) Fall arrest system.
- 5) Lock out Tag out. To isolate systems being worked on so that they are safe and cannot be accessed by others.
- 6) Newton metres.
- 7) Possible shearing, weakening by stretching.
- 8) Sections becoming separated, joints vibrating loose.
- 9) Distance moved by the nut in one revolution/distance from the crest of the thread to the crest of the next one.
- 10) Combination, ring and open ended.
- 11) Wear on the bearings, excess heat produced.
- 12) Laser alignment tool.
- 13) Twisting the blades. To maintain the optimum revolutions of the blades.
- 14) Turning the nacelle into or out of the wind. To catch the maximum force of the wind, or to move it away from the wind to allow maintenance.
- 15) Rust, rusty coloured streaks.
- 16) Cracks in the weld.
- 17) To lubricate and to cool the system.
- 18) Metal shards, lack of viscosity.
- 19) To lubricate and to stop the ingress of dust and dirt.
- 20) Using a feeler gauge.
- 21) To measure thicknesses, diameters and lengths.