

Algebraic Topology
M.Math II year
Mid-Semestral Examination

26.02.2007

1. Decide whether the following statements are TRUE or FALSE. Justify your answers. State precisely the results that you use.
 - (a) If a pull back of a vector bundle ξ is trivial, then so is ξ .
 - (b) Every real rank 1 vector bundle on $S^1 \times \mathbb{R}$ is trivial.
 - (c) The tangent bundle of S^2 splits as the Whitney sum of two line bundles.
 - (d) $w(\gamma^1) = 1 + a$.
 - (e) There exists a vector bundle η such that $\gamma^1 \oplus \eta$ is trivial.

2. Answer any *two* of the following.
 - (a) Determine the least integer k assuming that $\mathbb{R}P^9$ can be immersed in \mathbb{R}^{9+k} .
 - (b) Describe all the real line bundles over $S^1 \times S^1$ upto isomorphism.
 - (c) Let $n = 2^k$. Find all the Stiefel-Whitney numbers of $\mathbb{R}P^n$.