



Cuestionario de la segunda parte del ejercicio

Especialidad: A6 D1. Sistemas informáticos para investigación.


Por favor, lea detenidamente antes de comenzar:

- **NO** abra el **CUESTIONARIO** ni empiece el examen hasta que se le indique.
- Para realizar este primer ejercicio se hace entrega de dos documentos:
 1. Cuadernillo con los **casos prácticos prácticos**, sobre las materias del programa de esta convocatoria.
 2. **Hoja de respuestas** donde se consignará la respuesta correcta a cada pregunta.
- Al finalizar la prueba se hará entrega de la hoja de respuestas.
- Sólo se calificará las respuestas desarrolladas en la **HOJA DE RESPUESTAS**
- Una vez abierto el cuestionario, compruebe que consta de todas las páginas y preguntas y que sea legible. En caso contrario solicite uno nuevo al personal del aula.
- Verifique que el número de la solapa donde se recogen sus **datos personales coincide con el número de la hoja** de examen donde se consignan las respuestas.
- El examen se realizará con bolígrafo azul o negro. Si no dispone de uno, solicítelo al Tribunal.
- El cuestionario consta de **2 casos** propuestos
- La persona candidata deberá **ELEGIR UNO de esos dos escenarios, haciéndolo constar en la hoja de respuesta** y, basándose en la afirmación aportada por el tribunal, construir justificadamente un caso específico y plantear las formas de abordar la situación, proponiendo vías de soluciones o mejoras e intervenciones a llevar a cabo, todo debidamente argumentado
- El **enunciado** del caso se entregará **en INGLÉS**. La **contestación** al mismo se desarrollará **en CASTELLANO**.
- Numera las hojas de respuesta en orden de lectura e indique los datos personales solicitadas en la misma.
- Se podrán pedir hojas en blanco para utilizar como borrador, pero estas **NO** serán calificadas.
- **NO Separe** ninguna de las copias de la **HOJA DE RESPUESTAS**. Una vez finalizado, el personal del aula le indicará los pasos a seguir.
- **Dispone de 120 minutos**, máximo, para realizar este ejercicio.



Proceso selectivo por el sistema de acceso libre para ingreso en la Escala de
Tecnólogos de los Organismos Públicos de Investigación, convocado por resolución
de 22 de diciembre de 2025 (BOE N°314 30 de diciembre) – OEP 2023-2024-2025
Primer Ejercicio

Fecha:
10/05/2026
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	<p>Proceso selectivo por el sistema de acceso libre para ingreso en la Escala de Tecnólogos de los Organismos Públicos de Investigación, convocado por resolución de 22 de diciembre de 2025 (BOE N°314 30 de diciembre) – OEP 2023-2024-2025</p> <p>Primer Ejercicio</p>	<p>Fecha: 10/05/2026</p> <p>Página: 3 de 4</p>
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Estudio de CASO NUMERO 1

You have been recently appointed as Technology Specialist at a national research institute, responsible for designing and operating a shared platform service for scientific data analysis, and supporting machine learning and artificial intelligence.

There is already a computing infrastructure that supports multiple research groups working in areas such as physics, bioinformatics and environmental science. However, the current infrastructure presents several issues:


- Users report high wait times (average queue time > 6 hours), both in sequential and parallel jobs.
- The system shows irregular I/O performance. Manual profiling reveals excessive small-file operations from Python-based ML workflows.
- Interactive use on login nodes has increased and users report low system responsiveness.
- Some research groups complain that their urgent jobs remain queued for days, while other groups monopolize a large share of resources.
- GPU nodes show an average utilisation of 27% reported by the users. CUDA jobs frequently fail due to library version conflicts between user environments.
- There is increasing storage demand for IA workloads due to model versions and intermediate data.
- Researchers cannot reproduce computational experiments due to inconsistent module environments. The Operating System is Centos 7 and it has reached its EOL.
- Abnormal network traffic has been detected recently by third parties only, suggesting a potential cybersecurity incident. Some experimental data streams are interrupted, and partial data loss is suspected.
- Energy consumption has increased by 35% in one year without a proportional increase in scientific output.

Additionally:

- The platform must scale to support a growing number of users and experiments.
- Funding agencies can provide additional resources but require reproducibility, traceability and sustainability metrics.
- Management requests accountability and a plan to improve service quality without replacing the entire cluster immediately due to budget constraints.

Tasks:

- a) Identify and prioritise the main issues and requirements. (5 points)
- b) Propose a detailed technical plan to address each problem and requirement, including specific technologies, tools, and configurations. (10 points)
- c) Define the Governance Model (Policies, SLAs, and Roles) and Service Management strategy, outlining a realistic implementation timeline and resource requirements. (10 points)

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Estudio de CASO NUMERO 2

An OPI (Organismo Público de Investigación) operates a 40-hectare experimental farm featuring three crop types: olive groves, vineyards, and citrus orchards. The project requires the deployment of sensors for ambient and soil temperature, humidity, rainfall, and leaf water potential. Data must be accessible to researchers at the central headquarters (80 km away) and to international collaborators.

The proposed design must address several critical constraints that define the project's feasibility. First, the project operates under a strictly limited IT infrastructure budget. Regarding connectivity, the site lacks fiber optic infrastructure, leaving the system entirely dependent on a 4G/LTE mobile network characterized by irregular and unstable coverage across the 40-hectare area. Finally, the system demands high reliability and long-term resilience with minimal on-site technical intervention.

To do:

- a) Describe the end-to-end system architecture you would propose, from the sensor layer to data access layer. Justify the choice of communication protocols and topology. (7 points)
- b) The institute's IT department has raised the possibility of using a public cloud platform for data storage and processing. Analyze the technical and economic factors that should drive this decision. Propose and justify a specific architecture. (5 points)
- c) Define the security measures you would implement to ensure integrity and controlled access to the collected data, considering both local infrastructure and potential remote access by international collaborators. (3 points)
- d) The system must operate reliably for at least 5 years with minimal on-site technical intervention. Describe your strategy for remote monitoring, preventive maintenance, and incident management. (3 points)
- e) The institute is considering expanding the system to three additional farms in different regions within the next two years. Provide a cost and scalability analysis of your proposed solution, identifying which components of your architecture would need to change and which would scale naturally. (7 points)