

# CHAPTER 26 HOMEWORK SOLUTIONS PHY

Chapter 26 Homework Solutions: Physics\*\*

## Questions and Answers

1. **Define power.**

- Rate at which energy is transferred or transformed.

2. **What is the SI unit of power?**

- Watt (W)

3. **Convert 1000 W to horsepower (hp).**

- 1.34 hp

4. **Calculate the power required to lift a 50 kg object 10 m in 5 seconds.**

- 1000 W

5. **What is the mechanical advantage of a machine?**

- Ratio of output force to input force.

6. **Calculate the efficiency of a machine with an input power of 200 W and an output power of 150 W.**

- 75%

7. **What is the ideal mechanical advantage of a lever?**

- Distance from fulcrum to output arm divided by distance from fulcrum to input arm.

8. **Calculate the ideal mechanical advantage of a lever with an output arm length of 2 m and an input arm length of 0.5 m.**

- 4

9. **Define torque.**

- Force applied perpendicular to a lever arm that causes rotation.

10. **What is the SI unit of torque?**

- Newton-meter (N·m)

11. **Calculate the torque applied to a lever with a force of 50 N applied 1 m from the fulcrum.**

- 50 N·m

**12. What is the principle of moments?**

- For a body in equilibrium, the algebraic sum of the moments of all the forces acting on the body about any axis is zero.

**13. Calculate the tension in the rope holding a 250 kg chandelier suspended from the ceiling.**

- 2500 N

**14. What is the angle of repose?**

- Angle between the surface and the line along which an object will start to slide.

**15. Calculate the coefficient of static friction for a block on a surface with an angle of repose of 30°.**

- 0.58

**16. What is the work done by a force?**

- Product of the force and the displacement in the direction of the force.

**17. What is the SI unit of work?**

- Joule (J)

**18. Calculate the work done by a force of 100 N moving an object 5 m.**

- 500 J

**19. What is the relationship between work and energy?**

- Work is a form of energy transfer.

**20. Define the conservation of energy principle.**

- Total energy of a closed system remains constant over time.

**21. What is the efficiency of a heat engine?**

- Ratio of work done to heat absorbed.

**22. Calculate the efficiency of a heat engine that absorbs 1000 J and does 400 J of work.**

- 40%

**23. Define entropy.**

- Measure of disorder in a system.

**24. What is the second law of thermodynamics?**

- Entropy of an isolated system always increases over time.

25. Calculate the change in entropy of a system that goes from an initial state with 100 J of thermal energy to a final state with 50 J of thermal energy.
- 1.39 J/K
26. What is the minimum amount of work required to transfer heat from a cold reservoir to a hot reservoir?
- $T_c \Delta S$ , where  $T_c$  is the temperature of the cold reservoir and  $\Delta S$  is the change in entropy.
27. Calculate the minimum amount of work required to transfer 100 J of heat from a reservoir at 300 K to a reservoir at 400 K.
- 25 J

### Who Needs to Read a Book About This Topic?

Individuals seeking a comprehensive understanding of the fundamentals of physics, particularly in the areas of power, torque, work, energy, and heat transfer, will benefit from reading a book on this topic. This includes students, engineers, scientists, and anyone interested in the practical applications of physics in everyday life.

**What is the story Eleanor Roosevelt a life of discovery about?** The intriguing story of Eleanor Roosevelt told by an award-winning author traces the life of the former first lady, from her early childhood through the tumultuous years in the White House to her active role in the founding of the United Nations after World War II.

**Did Eleanor Roosevelt marry her cousin?** At 15, she attended Allenswood Boarding Academy in London and was deeply influenced by its founder and director Marie Souvestre. Returning to the U.S., she married her fifth cousin once removed, Franklin Delano Roosevelt, in 1905.

**What novel is about Eleanor Roosevelt and her lover?** *White Houses* is historical fiction, based on research and letters exchanged between Eleanor Roosevelt and Lorena Hickok, a journalist who was invited to live in the White House in an adjoining bedroom to the first lady's room during FDR's presidency.

**Does Eleanor Roosevelt have an autobiography?** The *Autobiography* was the fourth of four memoirs written by Roosevelt, the other three being: *This Is My Story* (1937), *This I Remember* (1949), and *On My Own* (1958). She combined those three into *The Autobiography*.

**What was the life lesson learned from Eleanor Roosevelt?** Don't worry about what others may think of you — do what you want. What holds many people back in life, according to Eleanor Roosevelt, is fear. Fear of failure, fear of what others may think, fear of the unknown, fear of change, fear of loss.

**What is Eleanor Roosevelt's famous quote?** “The future belongs to those who believe in the beauty of their dreams.”

**Which president married his first cousin?** He did not. A few American Presidents that did were John Adams and Thomas Jefferson (both married to a third cousin), Martin Van Buren (married to his first cousin once removed), and Franklin Roosevelt (married to his fifth cousin once removed).

**How are FDR and Teddy Roosevelt related?** Two distantly related branches of the family from Oyster Bay and Hyde Park, New York, rose to global political prominence with the presidencies of Theodore Roosevelt (1901–1909) and his fifth cousin Franklin D. Roosevelt (1933–1945), whose wife, First Lady Eleanor

Roosevelt, was Theodore's niece.

**Who was FDR's daughter?** Anna Eleanor Roosevelt Halsted (May 3, 1906 – December 1, 1975) was an American writer who worked as a newspaper editor and in public relations. Halsted also wrote two children's books published in the 1930s. She was the eldest child and only daughter of the U.S. President Franklin D.

**Were Amelia Earhart and Eleanor Roosevelt lovers?** Eleanor Roosevelt was one of America's most beloved First Ladies; Amelia Earhart was called the "First Lady of the Air." These two groundbreaking and unconventional women met and became close friends in 1932, the same year that Earhart made history with her record-breaking nonstop trans-Atlantic flight.

**What novel is about a girl in a wheelchair?** Yes I Can!: A Girl and Her Wheelchair.

**What is the book Eleanor about?** Eleanor follows its subject from birth to her death in 1962. Michaelis sets the stage by providing a list of principal characters, then presents Roosevelt's life in seven parts designed to reflect the myriad roles she played in her transformation from an awkward child into a force of nature.

**Where is Eleanor Roosevelt buried?** In her later years, Mrs. Roosevelt lived at Val-Kill in Hyde Park, New York. She also maintained an apartment in New York City. She died on November 7, 1962, and is buried alongside her husband in the Rose Garden of their estate at Hyde Park, now a national historic site.

**Did Meryl Streep play Eleanor Roosevelt?** The Roosevelts: An Intimate History (TV Mini Series 2014) - Meryl Streep as Eleanor Roosevelt - IMDb.

**Which three statements about Eleanor Roosevelt are true?** The three factual statements about Eleanor Roosevelt are that: She took a stand against the lynching of African Americans and advocated for the Costigan-Wagner antilynching bill; She was a staunch supporter of justice for African Americans, which had her receive death threats from the Ku Klux Klan; And she wrote a ...

**What effect did Eleanor have on the world around her?** Through her activism and post-war diplomacy, she played a key role in the development of civil and human rights for all people. The biography of Eleanor Roosevelt, her personal life, activism, and influence as world leader. The buildings and features at Val-Kill tell the story of Eleanor Roosevelt's.

**What human rights did Eleanor Roosevelt fight for?** Champions of Human Rights Continuing her work on behalf of all people, she advocated equal rights for women, African-Americans and Depression-era workers, bringing inspiration and attention to their causes.

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**What was the purpose of my day by Eleanor Roosevelt?** This column allowed ER to spread her ideas, thoughts, and perspectives on contemporary events to the American public through local newspapers. Through My Day, Roosevelt became the first First Lady to write a daily newspaper column.

**What is a key characteristic that is new about the SPARC M7 processor?** The SPARC M7 processor combines 32 cores along with Software in Silicon features to accelerate application and database performance. The per-thread performance is improved with the entirely new on-chip L2 and L3 cache design and increased processor frequency.

**What is Oracle M7?** Oracle SuperCluster M7 is the only architecture for SAP that uniquely provides Oracle's secure private cloud infrastructure optimized for database and applications with integrated compute, storage, and networking resources as well as virtualization, OS, and management—making it the ideal infrastructure for SAP ...

**Is Oracle Sparc dead?** On September 1, 2017, after a round of layoffs that started in Oracle Labs in November 2016, Oracle terminated SPARC design after completing the M8. Much of the processor core development group in Austin, Texas, was dismissed, as were the teams in Santa Clara, California, and Burlington, Massachusetts.

**How many processor chips does the SPARC T7 4 server have?** Product Overview. Oracle's SPARC T7-4 server is a four processor system that enables organizations to respond to IT demands with extreme security and performance, at a lower cost compared to alternatives.

**What is the architecture of SPARC?** Scalable Processor Architecture (SPARC) is a 32- and 64-bit microprocessor architecture developed by Sun Microsystems in 1987. SPARC is based on reduced instruction set computing (RISC). SPARC has become a widely used architecture for hardware used with UNIX-based operating systems, including Sun's own Solaris systems.

**What are the specs of SPARC M7?**

**What is an M7 server?** The Cisco UCS C220 M7 Rack Server is a versatile general-purpose infrastructure and application server. This high-density, 1RU, 2-socket rack server delivers industry-leading performance and efficiency for a wide range of workloads, including virtualization, collaboration, and bare-metal applications.

**What is the highest version of Oracle?**

**What is Oracle SCM modules?** Oracle Supply Chain Management (SCM) With Oracle Supply Chain Management (SCM) & Manufacturing, organizations can respond quickly to changing demand, supply, and market conditions. Seamlessly connect your supply chain to create a resilient network and process built to outpace change.

**Are SPARC servers still made?** Sparc servers will be shut down permanently August 5th.

**What is the cost of Oracle Sparc server?** SUN Oracle SPARC T5-2 server at Rs 300000 | Server PC in Bengaluru | ID: 2853751345397.

**What does SPARC stand for?** SPARC is known by its acronym, which stands for the Scholarly Publishing and Academic Resources Coalition.

**What does SPARC processor stand for?** The full form of SPARC is Scalable Processor Architecture. SPARC is an open architecture that is highly scalable and designed for faster execution rates.

**What is the maximum memory configuration in a SPARC T7 4 server?** The server supports 16-Gbyte, 32-Gbyte, and 64-Gbyte DIMMs, with up to 4096 Gbytes in a server fully configured with two processor modules. Each processor module can be either half populated (16 DIMMs) or fully populated (32 DIMMs).

**What is the fastest SPARC processor?** With its proven Software in Silicon capabilities coupled with fifth generation core design, the SPARC M8 processor delivers world record processing speed and revolutionary protection against malware and software errors.

**What are the advantages of SPARC?** Oracle's SPARC servers deliver industry-leading core and processor performance, enhanced Oracle Database efficiency, and application acceleration. They are optimized for

running Oracle workloads efficiently, providing scalability, capacity, and cost efficiency for enterprise workloads in cloud environments.

### **Who uses SPARC?**

**What is the difference between SPARC and x86?** x86 (CISC) includes a comprehensive instruction set capable of handling more diverse tasks but may be less efficient in terms of cycles per instruction. SPARC (RISC) features a simplified instruction set that executes quickly and reduces circuit complexity, enhancing speed.

**What is SPARC T7?** Product Overview. Oracle's SPARC T7-1 server is a resilient, single processor system that enables organizations to respond to IT demands with extreme security and performance, at a lower cost compared to alternatives.

**What is the difference between Sparc M7 and M8?** The M8 can handle up to 8TB of RAM, whereas the M7 can hit 16TB due to the higher socket limit. Beyond that, the M8 and the M7 are pretty much the same on paper. Both have 32 cores – the M8's are codenamed "SPARC Next" – and eight threads per core.

**Is SPARC RISC or cisc?** Processors in the x86 family are based on the Complex Instruction Set Computer (CISC) architecture, compared to Reduced Instruction Set Computer (RISC) architecture. The Scalable Processor Architecture (SPARC) designs are RISC-based.

**What is M7 processor?** Highly energy efficient and designed for mixed-signal devices, Cortex-M7 is the highest-performance member of the family. Its DSP capability and flexible system interfaces makes it suitable for a wide variety of applications—from automotive and medical applications to sensor fusion and the Internet of Things (IoT).

**What is an M7?** The M7 business schools are: Harvard Business School, Stanford Graduate School of Business, the University of Pennsylvania's Wharton School, Columbia Business School, Northwestern University's Kellogg School of Management, Chicago Booth, and MIT Sloan.

**What is M7 network?** The term “M7” refers to a consortium of seven prestigious business schools that are considered top-tier and consistently deliver outstanding MBA programs.

### **What are the characteristics of SPARC?**

**Which of the following is a characteristic of the SPARC architecture?** 64-bit architecture: SPARC processors are 64-bit processors, which means that they can address up to 16 exabytes of memory. This makes them ideal for high-performance computing applications that require a large amount of memory.

**What are the advantages of SPARC?** Oracle's SPARC servers deliver industry-leading core and processor performance, enhanced Oracle Database efficiency, and application acceleration. They are optimized for running Oracle workloads efficiently, providing scalability, capacity, and cost efficiency for enterprise workloads in cloud environments.

**What is the latest SPARC processor?** SPARC64 X is the latest 16-core processor developed based on 28 nm semiconductor technology, and will provide extreme performance and high reliability. Fujitsu through extensive experience in processor development, is further evolving SPARC64 processors used in SPARC Enterprise servers and Supercomputers.

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**What does SPARC stand for?** SPARC is known by its acronym, which stands for the Scholarly Publishing and Academic Resources Coalition.

**What are the various instruction formats in the SPARC architecture?**

**How many bits does SPARC have?** SPARC is a general purpose, 32-bit integer and 32, 64, and 128-bit floating- point unit, ISA (instruction set architecture) based on RISC (reduced instruction set computer) designs built at the University of California at Berkeley.

**How big is the Sparcs cache?** Within the SPARC core cluster, each core has its own 16 KB L1 instruction and data cache.

**What was the disadvantage of SPARC?** In spite of caches, the limit on speed was reading instructions and data from main memory. Reading data from DRAM is over ten times slower than the CPU's clock rate. And worse, the latency can include a dozen or more memory clocks.

**Who uses SPARC?**

**Why is SPARC important?** As a repair protein, SPARC plays an important role in manipulating cell proliferation, migration, and cytokine expression (Ng et al., 2013). Susceptibility of SKM-1 cells to Ara-C is enhanced with elevated levels of SPARC expression, accompanied by accelerated cell cycle restriction and apoptosis (Liang et al., 2022).

**What is the most powerful server processor in the world?** The fastest CPU for servers The AMD EPYC 9754 family of CPUs, in particular, is the fastest on the planet right now. The 128-core 'Bergamo' model, which operates across 256 threads, has a base clock speed of 2.4GHz and a turbo speed of 3.7Ghz.

**What OS is SPARC supported by?** Solaris supports SPARC and x86-64 workstations and servers from Oracle and other vendors.

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Jump to Freedom: Answer Key for Study Questions\*\*

**1. What is the title of the book?** A: Jump to Freedom

**2. Who is the author of the book?** A: Ken Handelman

**3. What is the main theme of the book?** A: The importance of education and determination in overcoming obstacles.

**4. Who is the protagonist of the book?** A: Elizabeth Muthoni

**5. What is Elizabeth's biggest dream?** A: To become a doctor

**6. What is Elizabeth's biggest obstacle?** A: Poverty and lack of opportunity

**7. Where does Elizabeth live?** A: Kibera, Kenya

- 8. What is Kibera like?** A: A large slum in Nairobi
- 9. What is BRIDGE International Academies?** A: A non-profit organization that provides low-cost education to children in developing countries
- 10. How does Elizabeth get a scholarship to attend BRIDGE International Academy?** A: She wins a singing competition
- 11. What is Elizabeth's experience like at BRIDGE International Academy?** A: She excels academically and becomes a leader in her community
- 12. What do Elizabeth's teachers and mentors teach her?** A: The value of hard work, determination, and self-belief
- 13. What does Elizabeth do after graduating from BRIDGE International Academy?** A: She attends high school and then medical school
- 14. Where does Elizabeth practice medicine?** A: In rural Kenya
- 15. What does Elizabeth's story teach us?** A: That with education and determination, anyone can overcome poverty and achieve their dreams.
- 16. What is the difference between a slum and a developed area?** A: Slums are characterized by overcrowding, poverty, and lack of basic services, while developed areas have access to education, healthcare, and other amenities.
- 17. What are some of the challenges faced by students in slums?** A: Lack of resources, poor quality of education, and social stigma
- 18. How does BRIDGE International Academies address these challenges?** A: By providing low-cost education, quality teachers, and a supportive learning environment.
- 19. What is the significance of Elizabeth's singing talent?** A: It gives her a platform to share her story and inspire others.
- 20. How does Elizabeth inspire her community?** A: By showing them that dreams can come true with hard work and determination.
- 21. What is the role of teachers and mentors in Elizabeth's success?** A: They provide her with support, guidance, and encouragement.
- 22. What are some of the obstacles that Elizabeth faces as a doctor in rural Kenya?** A: Lack of resources, cultural barriers, and long distances to travel.
- 23. How does Elizabeth overcome these obstacles?** A: By working hard, being innovative, and collaborating with the community.
- 24. What is the greatest lesson that Elizabeth learns on her journey?** A: That education is the key to unlocking human potential.
- 25. What is the significance of Elizabeth's name?** A: "Muthoni" means "freedom" in Kikuyu, symbolizing Elizabeth's journey towards freedom from poverty and ignorance.
- 26. Why is it important to support organizations like BRIDGE International Academies?** A: They provide essential education to children in need, empowering them to break the cycle of poverty.



**27. Who should read "Jump to Freedom"?** A: Anyone interested in social justice, education, and the power of determination.

### **Closing Paragraph**

"Jump to Freedom" is an inspiring story that highlights the transformative power of education. Elizabeth Muthoni's journey reminds us that with the right opportunities and support, anyone can overcome obstacles and achieve their dreams. This book is essential reading for anyone who believes in the importance of investing in education and empowering children around the world.

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