- **Topics:** Entity Relationship Diagrams, Mapping
- Assignments must be completed individually.
- No late assignments will be accepted.
- Submit your completed solutions to **Crowdmark**.
- **Rubric:** Each question is worth 5 points, and will be graded according to the following rubric:
  - 5 points: Excellent (no mistake, or only a very small mistake)
  - 4 points: Good (some mistakes)
  - 3 points: OK (lots of mistakes)
  - 2 points: Unsatisfactory (mostly wrong but has some merit)
  - 1 point: Poor (mostly wrong but has one good idea)
  - 0 points: Wrong (totally off, or no answer)

[5] 1. Draw an entity-relationship diagram to store the following publishing information:

(i) Every author has a unique ID, and might have a URL pointing to their personal web site.

(ii) An author might write multiple publications.

(iii) Each publication has a unique ID (PUBID), and could be a book, a journal, a proceedings, or an article.

(iv) A proceedings consists of articles presented in a conference, while a journal is made up of written articles.

(v) A proceedings or a journal has one and only author, who is actually the chief editor.

(vi) A book or an article might have multiple authors.

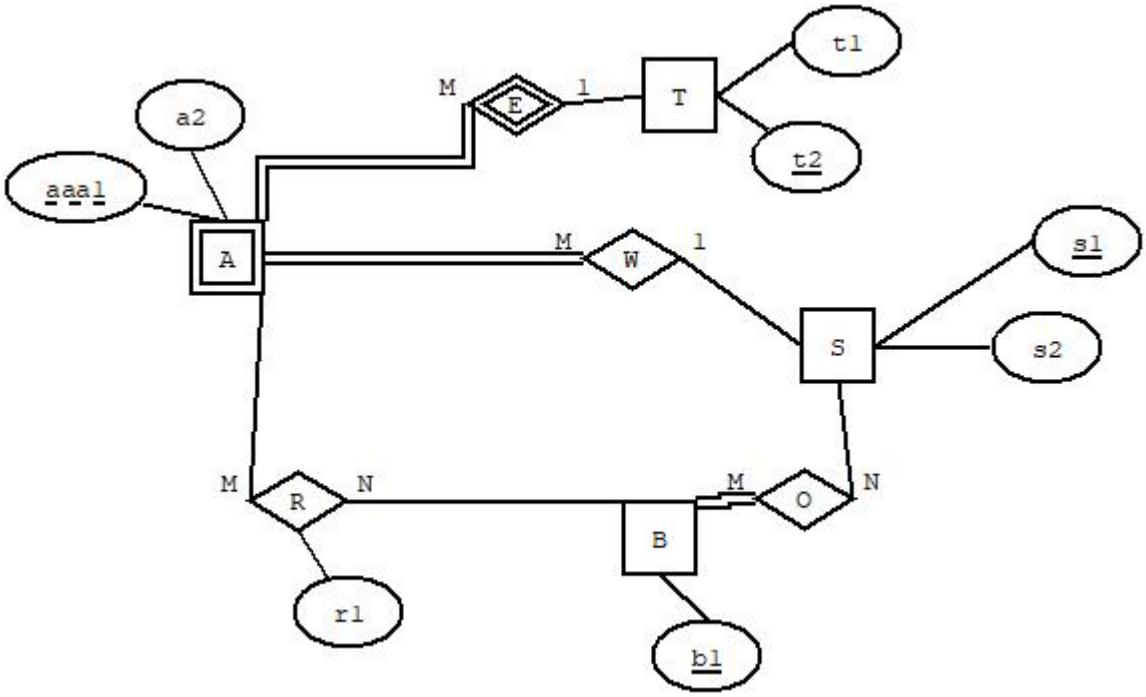
(vii) A book might or might not contain any articles.

(viii) An article might appear in book(s), journal(s), or proceedings.

Instructions:

- When needed, make your own assumptions, based on your understanding of the problem.
- Your assumptions will be graded according to their reasonableness.
- Fill in the missing attributes like names, titles etc.
- Make sure to also properly specify primary keys, participation constraints and cardinality constraints.

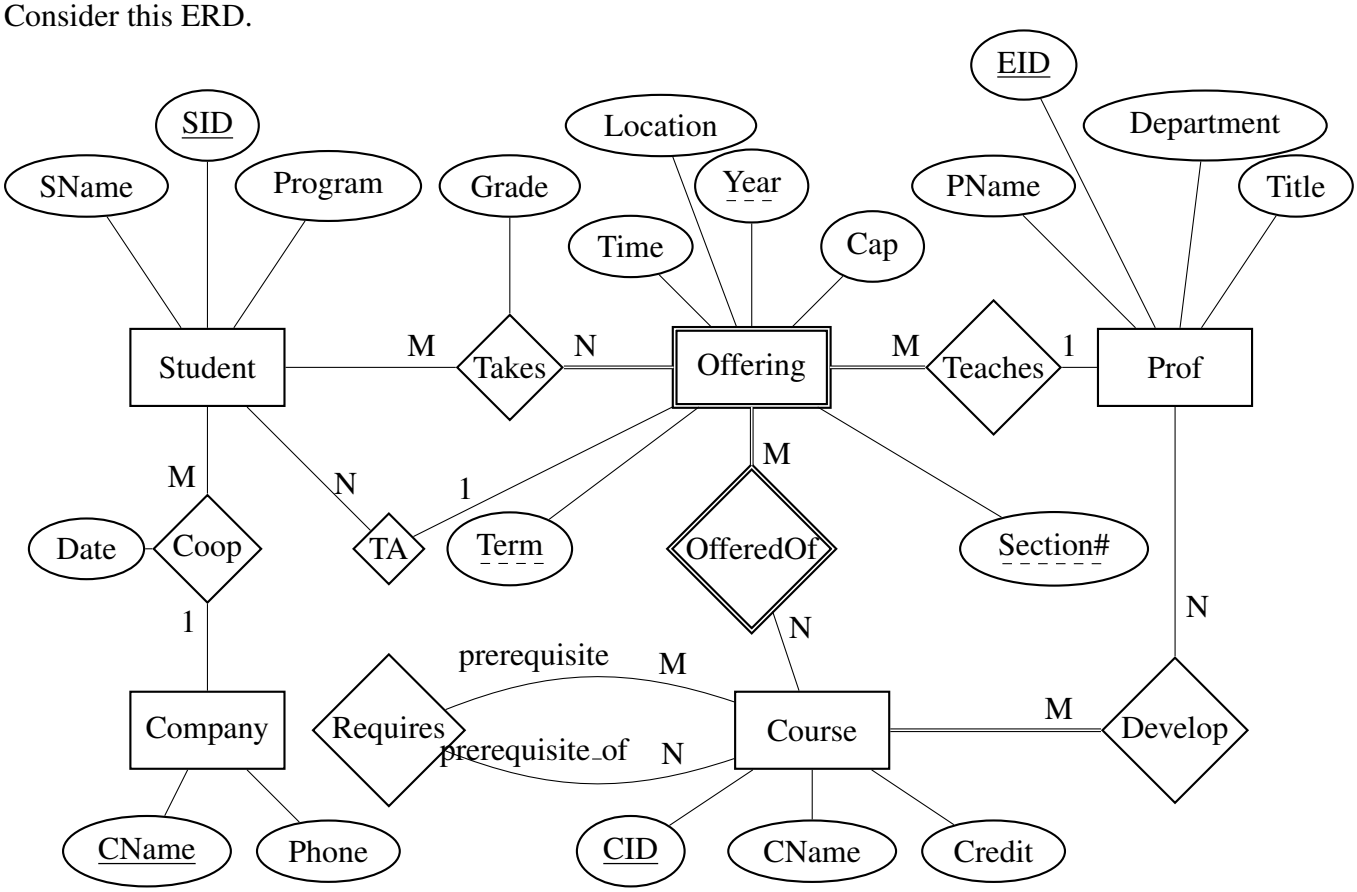
[5] 2. The rules of mapping an ERD to a relational schema are well defined and you do not need to know the semantics of the diagram to properly convert it to a relational model. This is why I deliberately made the names meaningless in this exercise. Map the following ER diagram into a relational schema. Make sure to include the proper primary keys and foreign keys.



[5] 3. Based on your own experience about eBay.ca, draw an entity-relationship diagram to store related information about the site. Note that you don't need to include all the functions and attributes, just the most important ones. When needed, make your own assumptions, based on your understanding of the problem. Your assumptions will be graded according to their reasonableness.

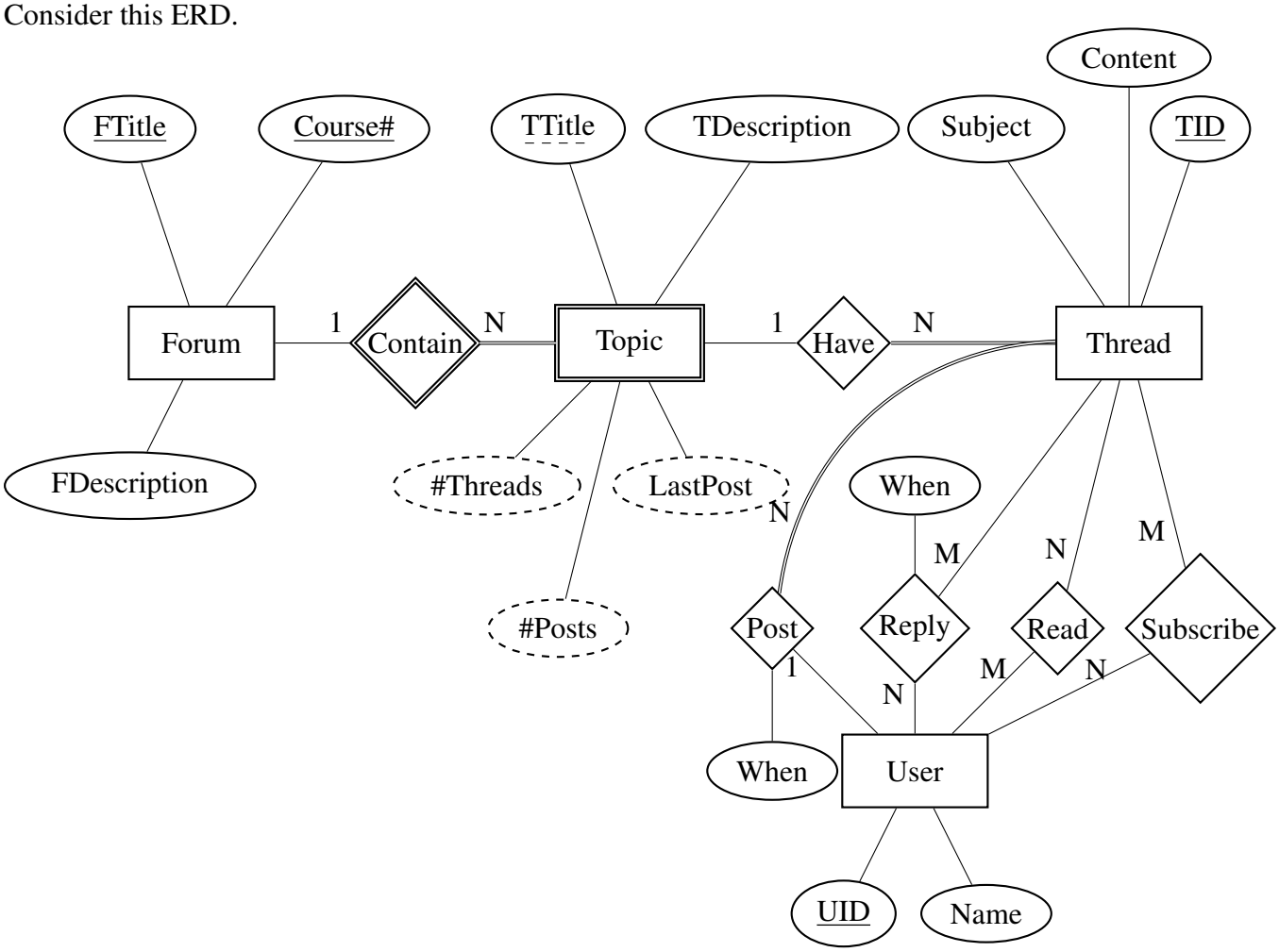
[5] 4. Great West Life has been providing outstanding service to University of Waterloo since 1994. They have been storing the claim information in files. Now they want to modernize their practice. You have been requested to design a database to store information on health claims. A health claim form is attached on the last page of this assignment. Based on the form, identify the entities and attributes. Then draw a complete entity-relationship diagram to model the data in the claim form. Make sure to include proper primary keys, relationships, cardinality constraints, and participation constraints. When needed, make your own assumptions, based on your understanding of the problem. Your assumptions will be graded according to their reasonableness.

[5] 5. Consider this ERD.



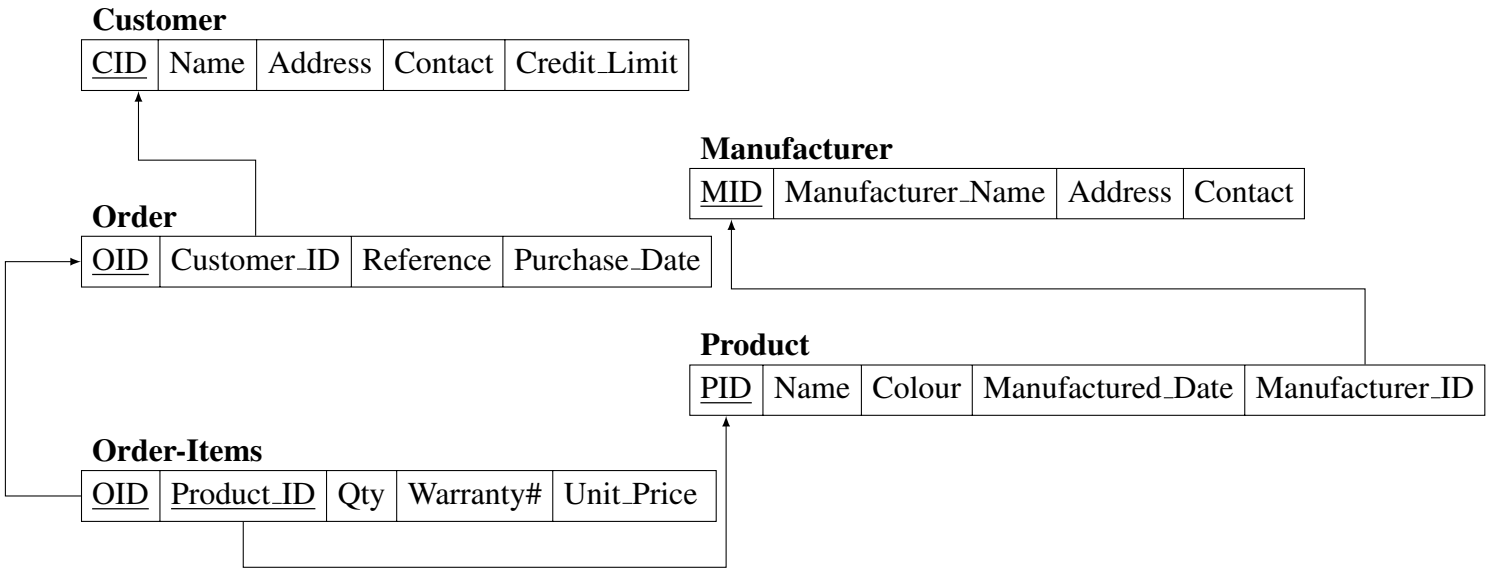
Map the provided ERD into a Relational Database schema. Make sure to include the proper primary keys and foreign keys.

[5] 6. Consider this ERD.



Map the provided ERD into a Relational Database schema. Make sure to include the proper primary keys and foreign keys.

[5] 7. Consider the provided **Sales** Relational Database model:



The database involves the displayed relations, where as usual primary keys are underlined, and arrows indicate foreign keys.

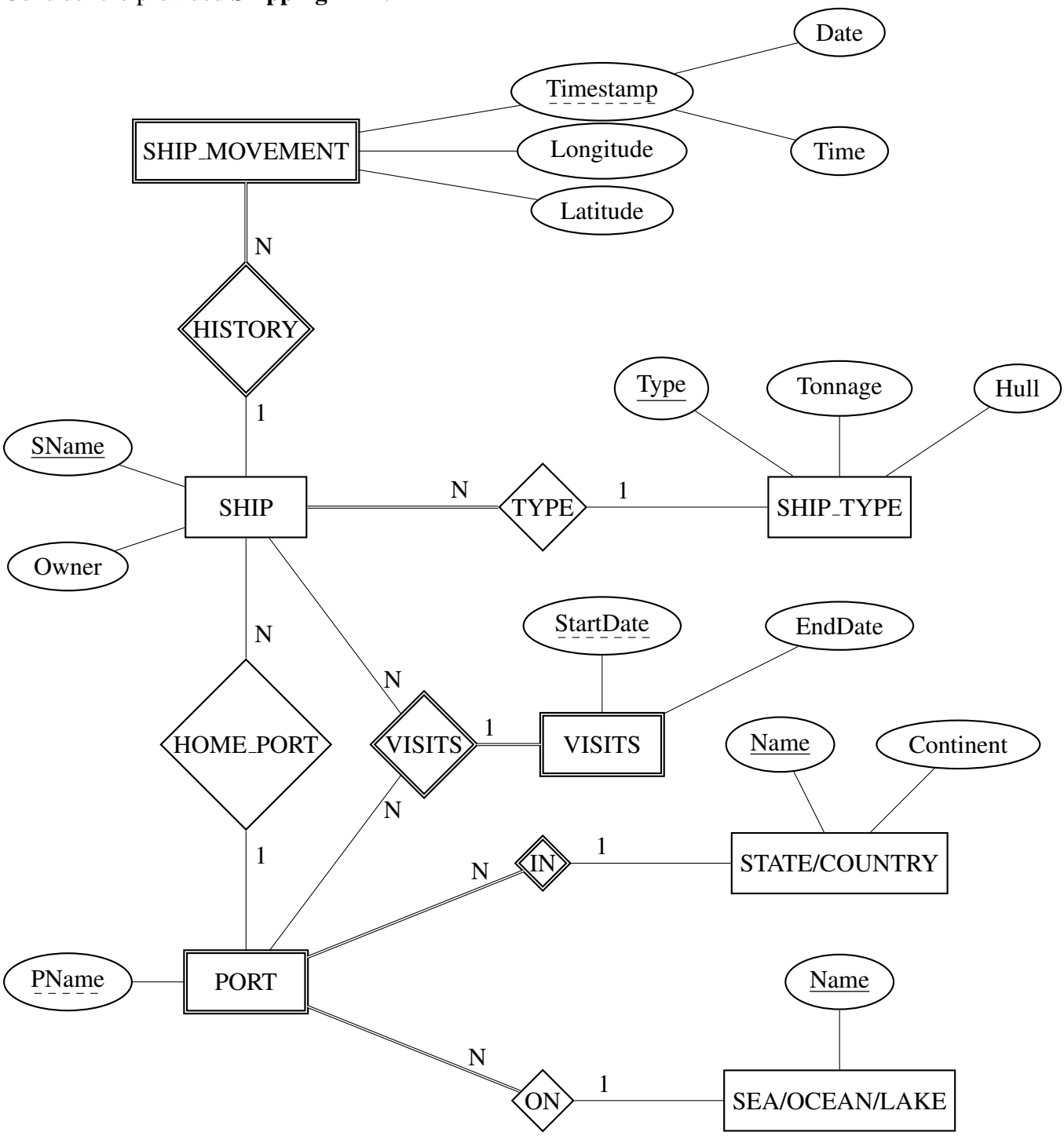
The Sales database stores the following information.

- A customer might place some order.
- An order contains some item(s).
- An item is a product made by some manufacturer, who might offer a warranty for the product.

Reverse engineer the schema, to re-construct the ERD which created it.

- Make your own assumptions based on your understanding of the problem when needed.
- Your assumptions will be graded by their reasonableness.
- You can fill in the missing attributes like names, titles etc.
- Make sure to also properly specify all primary keys, participation constraints and cardinality constraints.

[5] 8. Consider the provided **Shipping** ERD:



Modify the Shipping ERD to accommodate the following changes:

- Add an ID to every port so that it can be uniquely identified on its own.
- Due to the improved precision of GPS, ship movement can be tracked using the ship's time stamp, longitude and latitude.
- Ship names are no longer unique as they are regulated by different countries.
  - Ships registered in different countries might have the same name.
  - As such, more ship owner information needs to be included, including their names, addresses and phone numbers.
- A ship might be owned by multiple owners and an owner must own at least one ship.
- Every ship now must have a home port.
- We need to include information about whether a state/country is near an ocean, a lake or a sea. If it is, indicate that the country is near the appropriate body of water.
- Also a port now could be on multiple bodies of water (sea/ocean/lake). For example, ports near a river entrance to an ocean could be defined as being on both bodies of water.

THE Great-West Life ASSURANCE COMPANY

HEALTHCARE EXPENSES STATEMENT

INSTRUCTIONS: Attach the bills and receipts for all expenses and itemize them by providing all the information requested.
Note: Drug bills and receipts, other than those required for government drug plans, are part of our records and will not be returned. Therefore, please retain the itemization of expenses that will accompany our cheque or explanation for Income Tax purposes.

IMPORTANT: Please answer all questions. This claim will be returned to you if it is incomplete or contains errors. All claims under this group benefits plan are submitted through the plan member. We may exchange personal information about claims with the plan member and a person acting on his or her behalf when necessary to confirm eligibility and to mutually manage the claims.

Please print

SEND THIS CLAIM TO:

Questions? Call Toll Free: 1.800.957.9777

London Benefit Payments
PO Box 5064 Station B
London ON N6A 0C4

For the deaf or hard of hearing:
Toll Free: 1.800.990.6654

PART 1 EMPLOYEE INFORMATION

PLAN NUMBER	PLAN NAME
57130	UNIVERSITY OF WATERLOO

EMPLOYEE IDENTIFICATION NUMBER	EMPLOYEE NAME	DATE OF BIRTH (Year / Month / Day)

ADDRESS: NUMBER AND STREET	TOWN	PROVINCE	POSTAL CODE	PHONE # HOME:	WORK:

PART 2 COORDINATION OF BENEFITS

Are you or any other member of your family entitled to benefits under any other plan? ☐ Yes ☐ No

If yes, name of family member insured _____ Relationship to employee _____

Name of other insurance company _____ Policy Number _____

Is any member of your family (other than yourself) insured as an employee under this plan? ☐ Yes ☐ No

If yes, name of family member _____

If yes, to either question above, and the patient is a dependent child, please provide spouse's date of birth: _____ / _____ / _____ (Year / Month / Day)

Is treatment required as the result of an accident? ☐ Yes ☐ No If yes, give date, location and explain how accident happened

_____

Is a claim being made for Worker's Compensation Benefits? ☐ Yes ☐ No

PART 3 DEPENDENT INFORMATION

Patient Name	Relationship to Employee	Date of Birth Year	Month	Day	Does patient reside with you? YES	NO	Full-Time Student? YES	NO	If child over 18 years: If student, how many hours per week?	Employed? YES	NO	How many hours worked per week?
					☐	☐	☐	☐		☐	☐	
					☐	☐	☐	☐		☐	☐	
					☐	☐	☐	☐		☐	☐	
					☐	☐	☐	☐		☐	☐	
					☐	☐	☐	☐		☐	☐	

PART 4 CLAIM DETAILS *(If additional space is needed, attach a separate page)*

DRUG EXPENSES

Patient Name	Number of Receipts	Total Charge

OTHER EXPENSES

Type of Expense	Nature of Illness	Total Charge

At Great-West Life, we recognize and respect the importance of privacy. Personal information that we collect will be used for the purposes of assessing your claim and administering the group benefits plan. For a copy of our Privacy Guidelines, or if you have questions about our personal information policies and practices (including with respect to service providers), write to Great-West Life's Chief Compliance Officer or refer to www.greatwestlife.com.

I authorize Great-West Life, any healthcare provider, my plan administrator, other insurance or reinsurance companies, administrators of government benefits or other benefits programs, other organizations, or service providers working with Great-West Life, located within or outside Canada, to exchange personal information when necessary for these purposes. I understand that personal information may be subject to disclosure to those authorized under applicable law within or outside Canada. I certify that the information given is true, correct, and complete to the best of my knowledge.

Employee's Signature _____ Date _____

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