



## Cambridge O Level

---

**MATHEMATICS (SYLLABUS D)**

Paper 1

**MARK SCHEME**

Maximum Mark: 80

---

4024/11

May/June 2022

**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the May/June 2022 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

---

This document consists of 7 printed pages.

# Marking Scheme 4024 O N 03

**SJ Ball**



## **Marking Scheme 4024 O N 03:**

Getting the books **Marking Scheme 4024 O N 03** now is not type of challenging means. You could not unaccompanied going taking into account books increase or library or borrowing from your contacts to entrance them. This is an definitely simple means to specifically acquire guide by on-line. This online broadcast Marking Scheme 4024 O N 03 can be one of the options to accompany you past having other time.

It will not waste your time. receive me, the e-book will no question reveal you extra concern to read. Just invest little time to get into this on-line pronouncement **Marking Scheme 4024 O N 03** as with ease as evaluation them wherever you are now.

[https://staging.conocer.cide.edu/data/browse/Download\\_PDFS/Life%20Science%20Paper%20Grade%20Question%20Paper%202014%20November.pdf](https://staging.conocer.cide.edu/data/browse/Download_PDFS/Life%20Science%20Paper%20Grade%20Question%20Paper%202014%20November.pdf)

## **Table of Contents Marking Scheme 4024 O N 03**

1. Understanding the eBook Marking Scheme 4024 O N 03
  - The Rise of Digital Reading Marking Scheme 4024 O N 03
  - Advantages of eBooks Over Traditional Books
2. Identifying Marking Scheme 4024 O N 03
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Marking Scheme 4024 O N 03
  - User-Friendly Interface
4. Exploring eBook Recommendations from Marking Scheme 4024 O N 03
  - Personalized Recommendations
  - Marking Scheme 4024 O N 03 User Reviews and Ratings
  - Marking Scheme 4024 O N 03 and Bestseller Lists

5. Accessing Marking Scheme 4024 O N 03 Free and Paid eBooks
  - Marking Scheme 4024 O N 03 Public Domain eBooks
  - Marking Scheme 4024 O N 03 eBook Subscription Services
  - Marking Scheme 4024 O N 03 Budget-Friendly Options
6. Navigating Marking Scheme 4024 O N 03 eBook Formats
  - ePub, PDF, MOBI, and More
  - Marking Scheme 4024 O N 03 Compatibility with Devices
  - Marking Scheme 4024 O N 03 Enhanced eBook Features
7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Marking Scheme 4024 O N 03
  - Highlighting and Note-Taking Marking Scheme 4024 O N 03
  - Interactive Elements Marking Scheme 4024 O N 03
8. Staying Engaged with Marking Scheme 4024 O N 03
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Marking Scheme 4024 O N 03
9. Balancing eBooks and Physical Books Marking Scheme 4024 O N 03
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Marking Scheme 4024 O N 03
10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
11. Cultivating a Reading Routine Marking Scheme 4024 O N 03
  - Setting Reading Goals Marking Scheme 4024 O N 03
  - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Marking Scheme 4024 O N 03
  - Fact-Checking eBook Content of Marking Scheme 4024 O N 03
  - Distinguishing Credible Sources
13. Promoting Lifelong Learning

- Utilizing eBooks for Skill Development
- Exploring Educational eBooks

#### 14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

### **Marking Scheme 4024 O N 03 Introduction**

In today's digital age, the availability of Marking Scheme 4024 O N 03 books and manuals for download has revolutionized the way we access information. Gone are the days of physically flipping through pages and carrying heavy textbooks or manuals. With just a few clicks, we can now access a wealth of knowledge from the comfort of our own homes or on the go. This article will explore the advantages of Marking Scheme 4024 O N 03 books and manuals for download, along with some popular platforms that offer these resources. One of the significant advantages of Marking Scheme 4024 O N 03 books and manuals for download is the cost-saving aspect. Traditional books and manuals can be costly, especially if you need to purchase several of them for educational or professional purposes. By accessing Marking Scheme 4024 O N 03 versions, you eliminate the need to spend money on physical copies. This not only saves you money but also reduces the environmental impact associated with book production and transportation. Furthermore, Marking Scheme 4024 O N 03 books and manuals for download are incredibly convenient. With just a computer or smartphone and an internet connection, you can access a vast library of resources on any subject imaginable. Whether you're a student looking for textbooks, a professional seeking industry-specific manuals, or someone interested in self-improvement, these digital resources provide an efficient and accessible means of acquiring knowledge. Moreover, PDF books and manuals offer a range of benefits compared to other digital formats. PDF files are designed to retain their formatting regardless of the device used to open them. This ensures that the content appears exactly as intended by the author, with no loss of formatting or missing graphics. Additionally, PDF files can be easily annotated, bookmarked, and searched for specific terms, making them highly practical for studying or referencing. When it comes to accessing Marking Scheme 4024 O N 03 books and manuals, several platforms offer an extensive collection of resources. One such platform is Project Gutenberg, a nonprofit organization that provides over 60,000 free eBooks. These books are primarily in the public domain, meaning they can be freely distributed and downloaded. Project Gutenberg offers a wide range of classic literature, making it an excellent resource for literature enthusiasts. Another popular platform for Marking Scheme 4024 O N 03 books and manuals is Open Library. Open Library is an initiative of the Internet Archive, a non-profit organization dedicated to digitizing cultural artifacts and making them accessible to the public. Open Library hosts millions of books, including both public domain works and contemporary titles. It also allows users to

borrow digital copies of certain books for a limited period, similar to a library lending system. Additionally, many universities and educational institutions have their own digital libraries that provide free access to PDF books and manuals. These libraries often offer academic texts, research papers, and technical manuals, making them invaluable resources for students and researchers. Some notable examples include MIT OpenCourseWare, which offers free access to course materials from the Massachusetts Institute of Technology, and the Digital Public Library of America, which provides a vast collection of digitized books and historical documents. In conclusion, Marking Scheme 4024 O N 03 books and manuals for download have transformed the way we access information. They provide a cost-effective and convenient means of acquiring knowledge, offering the ability to access a vast library of resources at our fingertips. With platforms like Project Gutenberg, Open Library, and various digital libraries offered by educational institutions, we have access to an ever-expanding collection of books and manuals. Whether for educational, professional, or personal purposes, these digital resources serve as valuable tools for continuous learning and self-improvement. So why not take advantage of the vast world of Marking Scheme 4024 O N 03 books and manuals for download and embark on your journey of knowledge?

### **FAQs About Marking Scheme 4024 O N 03 Books**

How do I know which eBook platform is the best for me? Finding the best eBook platform depends on your reading preferences and device compatibility. Research different platforms, read user reviews, and explore their features before making a choice. Are free eBooks of good quality? Yes, many reputable platforms offer high-quality free eBooks, including classics and public domain works. However, make sure to verify the source to ensure the eBook credibility. Can I read eBooks without an eReader? Absolutely! Most eBook platforms offer webbased readers or mobile apps that allow you to read eBooks on your computer, tablet, or smartphone. How do I avoid digital eye strain while reading eBooks? To prevent digital eye strain, take regular breaks, adjust the font size and background color, and ensure proper lighting while reading eBooks. What the advantage of interactive eBooks? Interactive eBooks incorporate multimedia elements, quizzes, and activities, enhancing the reader engagement and providing a more immersive learning experience. Marking Scheme 4024 O N 03 is one of the best book in our library for free trial. We provide copy of Marking Scheme 4024 O N 03 in digital format, so the resources that you find are reliable. There are also many Ebooks of related with Marking Scheme 4024 O N 03. Where to download Marking Scheme 4024 O N 03 online for free? Are you looking for Marking Scheme 4024 O N 03 PDF? This is definitely going to save you time and cash in something you should think about. If you trying to find then search around for online. Without a doubt there are numerous these available and many of them have the freedom. However without doubt you receive whatever you purchase. An alternate way to get ideas is always to check another Marking Scheme 4024 O N 03. This

method for see exactly what may be included and adopt these ideas to your book. This site will almost certainly help you save time and effort, money and stress. If you are looking for free books then you really should consider finding to assist you try this. Several of Marking Scheme 4024 O N 03 are for sale to free while some are payable. If you arent sure if the books you would like to download works with for usage along with your computer, it is possible to download free trials. The free guides make it easy for someone to free access online library for download books to your device. You can get free download on free trial for lots of books categories. Our library is the biggest of these that have literally hundreds of thousands of different products categories represented. You will also see that there are specific sites catered to different product types or categories, brands or niches related with Marking Scheme 4024 O N 03. So depending on what exactly you are searching, you will be able to choose e books to suit your own need. Need to access completely for Campbell Biology Seventh Edition book? Access Ebook without any digging. And by having access to our ebook online or by storing it on your computer, you have convenient answers with Marking Scheme 4024 O N 03 To get started finding Marking Scheme 4024 O N 03, you are right to find our website which has a comprehensive collection of books online. Our library is the biggest of these that have literally hundreds of thousands of different products represented. You will also see that there are specific sites catered to different categories or niches related with Marking Scheme 4024 O N 03 So depending on what exactly you are searching, you will be able to choose ebook to suit your own need. Thank you for reading Marking Scheme 4024 O N 03. Maybe you have knowledge that, people have search numerous times for their favorite readings like this Marking Scheme 4024 O N 03, but end up in harmful downloads. Rather than reading a good book with a cup of coffee in the afternoon, instead they juggled with some harmful bugs inside their laptop. Marking Scheme 4024 O N 03 is available in our book collection an online access to it is set as public so you can download it instantly. Our digital library spans in multiple locations, allowing you to get the most less latency time to download any of our books like this one. Merely said, Marking Scheme 4024 O N 03 is universally compatible with any devices to read.

### **Find Marking Scheme 4024 O N 03 :**

~~life science paper grade question paper 2014 november~~

~~life science exemplar grade 11 midyear~~

*life science caps 2014 grade12*

*life science september 2014 formal test grade 11*

~~life science paper 2 memo grade 11 2014 nov~~

life science grade 1 final exam paper 2 scope

*life science question paper test no1*



[life science p2 grade final examination](#)

[life science grade 11 exemplar memo 2012 p3 practical](#)

**life science september 2014 exam memorandum grade 12**

~~life science march 2014 common paper kzn~~

[life science p september 2013 memo](#)

~~life science paper for 2and scope~~

**life science examination paper grade 2014 november**

[life science p2grade 12final](#)

### **Marking Scheme 4024 O N 03 :**

[football cv examples writing tips 2023 free guide](#) - Feb 09 2023

web key takeaways for a football cv as a football player your cv example is a different ballgame to most other professionals adjust it accordingly kick off with a top cv summary find some slick examples that epitomise your professional value don t forget to highlight your top soft skills too

**football cv how to create a professional one with examples** - Dec 07 2022

web what is a cv how do you write a professional football cv when why you need a football cv 1 basic personal and player information 2 football specific profile picture 3 playing experience team achievements 4 personal achievements 5 strengths and weaknesses of your game 6 education and or

[futbolcu cv Örnekleri cv lazım](#) - Mar 10 2023

web futbolcu cv Örnekleri futbol spor dalında bulunan ve bu alanda çalışan kişilere futbolcu denilmektedir Özellikle günümüzde birçok ülkeden pek çok insan futbolcu olmak istemekte ve bu bölümden mezun olanlar da iyi takımlara transfer olmayı dilemektedirler futbolcu cv si hazırlanırken özellikle daha önce hangi kulüplerde

[football cv example template free download](#) - Jun 13 2023

web oct 6 2022 football cv example 6 october 2022 by aaron case cprw reviewed by the cv genius cprw team having trouble getting your football cv noticed by your target clubs our football cv example template and writing tips below will guide you to make a standout job application build my cv now

[best football player cv sample in 2023 cv owl](#) - Oct 05 2022

web football player cv sample learn more about football player cv example cv writing tips cv formats and much more start editing this football player cv sample with our online cv builder ats friendly cv 1 and 2 page cv version 100 editable add or remove sections change colors download in a4 us letter start editing now or sign

**football cv how to write a football cv 2020 template download** - Nov 06 2022

web a football cv curriculum vitae or résumé is a written outline of your football ability playing history and personal profile however players often overlook this important document choosing to concentrate on their on field training hoping a scout will spot them among the millions of hopefuls worldwide

football cv template examples writing guide zety - Jul 14 2023

web aug 14 2023 how to write a football cv that will land you more interviews or have scouts showing up to your next game tips and examples of how to put skills and achievements on a football cv how to describe your experience on a cv for football players or coaches to get into any club you want

*download football player cv for free formtemplate* - Feb 26 2022

web we provide professional and detailed football cv template for you anyone who is in need of the football cv template can download it from our website for free page 1 4 5 based on 281 votes football player cv name bruno cazarine constantino birth date 06 05 83 25 years old height 1 88 m

football player cv bunny net - Dec 27 2021

web football player cv name bruno cazarine constantino birth date 06 05 83 25 years old height 1 88 m weight 82 kg position striker skills good technique skilled good header really good physical strength previous clubs

**football player cv edit fill sign online handypdf** - Mar 30 2022

web edit fill sign download football player cv online on handypdf com printable and fillable football player cv

*download football cv template for free formtemplate* - Apr 30 2022

web a football player cv is the resume customized specially for football players an excellent football cv will draw the attention of the football coach and sports manager as we all know a football cv template is used specially for football players since the competition is more and more fierce

**football player cv download cv template for free pdf or word** - May 12 2023

web download football player cv our cv template forms usually come in several formats first download the football player cv file in the format you are interested in its size is only 44 22 kb the easiest way to edit these is in doc docx or xls format

**football cv template examples and writing guide 2023** - Apr 11 2023

web aug 16 2023 a football cv also known as a football resume or soccer cv is a document that outlines your playing history and achievements skills and fitness levels and general player profile coaches and clubs will need to see your football cv before talking further and scouts won t know to see you without one

**football player resume samples qwikresume** - Jun 01 2022

web 5 7 years level executive education bs in science football player resume objective an energetic out going competitive

person who enjoys new challenges a hard working and honest vibrant individual is interested in a position in the industry that gives him the ability to grow and succeed

*how to write a killer football cv play away global* - Jan 28 2022

web 1 personal bio as the title suggests in this section you need to include all of your personal information coaches wont recruit just anyone they will want to know how old you are what position s you re comfortable playing in don t list too many here really think about where you re at your strongest

*download football player cv for free tidyform* - Jul 02 2022

web download a free football player cv to make your document professional and perfect find other professionally designed templates in tidyform

**footballer cv example cv writing guide get noticed by agents** - Aug 15 2023

web footballer cv example if you re seeking a career as a footballer a strong cv is fundamental to stand out from the crowd enabling you to get noticed and get signed by a top club a good cv will create a pleasant reading experience for agents and allow managers to quickly see that you have the talents they are looking for

*football cv template cv template master* - Sep 04 2022

web apr 29 2021 text preview of this cv template this is a text only preview download the formatted word file using the link above jasper macintyre professional footballer gamekeeper s cottage newstead abbey ravenhead nottingham ng15 9ff phone 07984 111222 email jasper mac gmail com

professional football player resume example livecareer - Aug 03 2022

web search hundreds of thousands of real resumes samples from livecareer s resume example directory the largest publicly searchable database of graded resumes livecareer resume builders

**how to create an effective soccer player cv ifx soccer news** - Jan 08 2023

web jan 14 2021 a football soccer cv curriculum vitae or resume is a written outline of your soccer abilities playing history and contact details a professional soccer cv is something all players should have to enhance your chances of being recruited for soccer

**20th century boy trinity initial grade guitar youtube** - Feb 09 2023

web shop product code 308171b 10 63 in stock usually despatched within 24 48 hours estimated price converted from uk retail price this book contains a selection of 13

**classical guitar trinity college london** - Mar 10 2023

web trinity s classical guitar books feature newly selected repertoire from initial to grade 8 they showcase more pieces by female composers and include duets up to grade 5 and

[trinity initial grade classical guitar technical suite youtube](#) - Feb 26 2022

web session skills example 1 simple rock trinity college london press example 2 simple rock trinity college london press  
example 3 pop trinity college london press example 4 pop trinity college london press

**guitar rock pop trinity college london** - Jun 13 2023

web trinity guitar initial 2016 2019 free download as pdf file pdf or read online for free trinity classical guitar initial syllabus 2016 2019

*trinity college london acoustic guitar 2020 2023 initial syllabus* - Oct 05 2022

web dec 15 2017 trinity college london s rock and pop graded song books contain real songs from legendary artists with specially written performance notes for the rock and

*classical guitar 2020 2023 showcase initial grade 5 duets* - Jul 02 2022

web aug 1 2013 demonstration of the technical exercises required for trinity classical guitar exam initial graderoller costera minor momentdeep end of the pool

**trinity guitar initial 8 95 london guitar studio** - Sep 04 2022

web guitar initial we have 11 books for you instruments guitar levels initial grade 1 grade 2 categories classical rock pop

**guitar syllabus trinity college london** - Aug 03 2022

web here is the guitar play through from this song as found in the trinity rock and pop guitar syllabus for lessons on how to play material like this please vi

[classical guitar exam pieces from 2020 initial trinity college](#) - Nov 06 2022

web jens franke and jørgen skogmo perform a selection of duets from initial grade 5 of trinity s classical guitar syllabus initial the bells of dawn initial ojos azules

*rock pop initial guitar trinity college london approximately* - Dec 27 2021

[trinity grade initial guitar wicked game youtube](#) - Mar 30 2022

web acoustic guitar exam pieces from 2020 initial grade 2 trinity college london publisher trinity college london in stock usually despatched within 24 48 hours

**guitar initial rock pop trinity college london** - Aug 15 2023

web guitar initial at initial you can develop a range of skills and techniques including power chords rythm off the riff melodic playing and chord accuracy in the exam you ll

**classical guitar trinity college london** - Jan 28 2022

*trinity s acoustic guitar syllabus 2020 2023 pieces* - May 12 2023

web aug 5 2021 20th century boy trinity initial grade guitar atom music school 25 2k subscribers subscribe 170 35k views 2 years ago initial grade trinity guitar hey

**guitar trinity college london** - Nov 25 2021

trinity college london classical guitar 2020 2023 initial syllabus - Jan 08 2023

web acoustic guitar exam pieces from 2020 initial grade 2 trinity college london

**trinity rock pop 2018 guitar initial cd presto music** - Jun 01 2022

web all requirements are in trinity s book guitar scales arpeggios and studies from 2016 initial grade 5 further information is available in the graded syllabus technical

guitar initial ebooks trinity college london press - Apr 30 2022

web internet archive language english 28 p of music 31 cm contains 6 pieces from the trinity college london rock pop examination syllabus 2012 2017 for initial guitar

*classical guitar sample booklet trinity college london* - Dec 07 2022

web i am delighted to introduce this syllabus containing details of grade exams for guitar like all trinity college london trinity syllabuses this syllabus is designed to enable

*trinity r p guitar initial morriss music* - Oct 25 2021

**classical guitar 2020 2023 showcase initial grade 3** - Jul 14 2023

web guitar initial grade 1 grade 2 grade 3 grade 4 grade 5 grade 6 grade 7 grade 8 guitar performance is at the heart of trinity s rock pop guitar exams whether self

**trinity guitar initial 2016 2019 pdf entertainment general** - Apr 11 2023

web trinity college london classical guitar 2020 2023 initial syllabus the international music examinations board of trinity college london music for your grade exam every

vidyarthiplus com for civil uniport edu ng - Dec 17 2021

web aug 11 2023 vidyarthiplus com for civil 2 10 downloaded from uniport edu ng on august 11 2023 by guest mechanics of solids and structures 2nd edition david w a rees

**vidyarthiplus com for civil copy help environment harvard edu** - Jun 22 2022

web vidyarthiplus com for civil introduction to design for civil engineers jan 20 2023 an introduction to design for civil engineers is a concise book that provides the reader with

[anna university civil notes qp syllabus stucor](#) - Sep 25 2022

web anna university civil department notes question papers syllabus question bank part a b c regulation 2017 2021

**vidyarthiplus chennai facebook** - Jan 30 2023

web vidyarthiplus chennai india 27 722 likes 60 were here vidyarthiplus com educational services event organizer study materials provider tuiti

[vidyarthiplus v educational services](#) - Oct 07 2023

web vidyarthiplus is a complete student portal provides lecture notes question bank and previous year question paper college fest for various university and colleges across india

[vidyarthiplus com for civil ftp dartgo org](#) - May 22 2022

web 4 vidyarthiplus com for civil 2020 07 04 topics addressed in this book involve the major concerns in the wind power generation and wind turbine design a textbook of

*vidyarthi plus vidyarthiplus twitter* - Oct 27 2022

web vidyarthiplus adlı kişiden gelen son tweet ler

**useful website for civil engineers vidyarthiplus v indian** - Sep 06 2023

web department civil engineering study material description useful website for civil engineers houzz com here you can find anything you want a z about your

**b e civil engineering study materials vidyarthiplus** - Aug 05 2023

web department of civil engineering b e civil engineering full study materials question bank lecture notes 2 marks with answers question papers and important

**vidyarthiplus v blog a blog for students** - Nov 27 2022

web effective writing involves expressing ideas logically and coherently using proper grammar vocabulary and sentence structure to be an effective writer one should plan and

[vidyarthiplus com for civil](#) - Jan 18 2022

web 2 vidyarthiplus com for civil 2022 01 29 lack of a fixed infrastructure the inherent mobility the wireless channel and the underlying routing mechanism by ad hoc and

[ph8201 physics for civil engineering notes pdf scribd](#) - Feb 28 2023

web ph8201 physics for civil engineering vidyarthiplus com sns college of engineering coimbatore 107 vidyarthiplus com unit iii lighting design topic

**indian students online education forum vidyarthiplus v** - May 02 2023

web anna university lecture notes for 3rd semester r2013 ece mech cse eee civil auto

*welcome to vidyarthi institute of technology* - Mar 20 2022

web vidyarthi institute of technology a premier institute of central maharashtra aimed excellent training in construction sector presently 30 to 40 supervisory staff working at the

**civil lecture notes vidyarthiplus v indian students online** - Jul 04 2023

web forums in civil lecture notes ce8392 engineering geolog ce8491 soil mechanics uni ge8071 disaster managemen ce6601 design of reinforc en6501 municipal

*vidyarthiplus com for civil uniport edu ng* - Jul 24 2022

web jul 5 2023 merely said the vidyarthiplus com for civil is universally compatible gone any devices to read seismic evaluation of existing buildings 1993 07 provides design

*vidyarthiplus com for civil* - Apr 20 2022

web sep 15 2023 vidyarthiplus civil engineering question bank hspace de git 02 infra openwrt org 2 33 600 engineering books gate department of civil ies

**vidyarthiplus com for civil** - Aug 25 2022

web 2 vidyarthiplus com for civil 2022 12 06 pollution and control engineering for students of civil engineering this comprehensive text now in its second edition provides an in

**vidyarthiplus in facebook** - Dec 29 2022

web vidyarthiplus path to success the future depends on what we do in the present mahatma gandhi

**rcc calculation software for civil engineers vidyarthiplus v** - Jun 03 2023

web rcc calculation software for civil engineers details it is nothing but a document created by microsoft excel format it is used for calculation of reinforced concrete in

**infraz 13 symposium for civil vidyarthiplus v indian** - Apr 01 2023

web infraz 13 symposium infraz 13 event departments civil infraz 13 is organised by prathyusha institute of technology and management chennai tamil nadu infraz 13

[vidyarthiplus com for civil](#) - Feb 16 2022

web vidyarthiplus com for civil downloaded from zapmap nissan co uk by guest larsen mathews machine design data book phi learning pvt ltd open channel flow 2nd