Andhra Pradesh State Council of Higher Education

Notations :

1.Options shown in green color and with ✔ icon are correct.

2.Options shown in red color and with ✖ icon are incorrect.

Question Paper Name :	Mathematics 19th Oct 2022 Shift 2
Duration :	120
Total Marks :	140
Display Marks:	No
Share Answer Key With Delivery Engine :	Yes
Calculator :	None
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console?	Yes
Change Font Color :	No
Change Background Color :	No
Change Theme :	No
Help Button :	No
Show Reports :	No
Show Progress Bar :	No
Is this Group for Examiner? :	No
Examiner permission :	Cant View
Show Progress Bar? :	No

Research Methodology

Section Id :	549470410
Section Number :	1
Mandatory or Optional :	Mandatory
Number of Questions :	59
Section Marks :	70
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Is Section Default? :	null

Question Number : 1 Question Id : 54947029181 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The most desirable skill of teacher is to

Options :

make the students understand what the teacher says

1. ✔

cover the prescribed course

2. ✖

keep students relaxed while teaching

3. ✖

keep higher authorities informed about the class activities

4. ✖

Which of the following orders are the three levels of teaching?

     (i) Memory level of teaching

     (ii) Understanding level of teaching

     (iii) Reflective level of teaching

     (iv) Pedagogical level of teaching

Options :

1. ✔   (i), (ii), and (iii)

2. ✖   (ii), (iii), and (iv)

3. ✖   (i), (iii), and (iv)

4. ✖   (i), (ii), and (iv)

The best way a teacher can try to inculcate good values among students is

Options :

teaching by way of storytelling

1. ✖

by developing sense of discipline

2. ✖

ideal behaviour of teacher themselves

3. ✔

to take their parents into confidence

4. ✖

Question Number : 4 Question Id : 54947029184 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Morphographs is the term associated with

Options :

Corrective spelling

1. ✔

Corrective teaching

2. ✖

Corrective learning

3. ✖

Corrective behaviour

4. ✖

Question Number : 5 Question Id : 54947029185 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If you get an opportunity to teach a visually challenged student along with normal students, what type of treatment would you like to give him in the class?

Options :

Not giving extra attention because majority may suffer

1. ✖

Take care of him sympathetically in the classroom

2. ✖

You will think that blindness is his destiny and hence you cannot do anything

3. ✖

Arrange a seat in the front row and try to teach at a pace convenient to him

4. ✔

Question Number : 6 Question Id : 54947029186 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For a teacher, which of the following methods would be correct for writing on the blackboard?

Options :

Writing fast and as clearly as possible

1. ✖

Writing the matter first and then asking students to read it

2. ✖

Asking a question to students and then writing the answer as stated by them

3. ✖

Writing the important points as clearly as possible

4. ✔

Question Number : 7 Question Id : 54947029187 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Who developed the interaction analysis category system in education for increasing the teacher's effectiveness

Options :

Flander

1. ✔

Rayon

2. ✖

Amidon and Simon

3. ✖

Richard Over

4. ✖

Question Number : 8 Question Id : 54947029188 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

What do you consider as the main aim of interdisciplinary research?

Options :

To bring out holistic approach to research

1. ✔

To reduce the emphasis of single subject in research domain

2. ✖

3. ✖ To oversimplify the problem of research

4. ✖ To create a new trend in research methodology

Question Number : 9 Question Id : 54947029189 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The research which is exploring new facts through the study of the past is called

Options :

1. ✖ Philosophical research

2. ✔ Historical research

3. ✖ Mythological research

4. ✖ Content analysis

Question Number : 10 Question Id : 54947029190 Display Question Number : Yes Is Question Mandatory : No Calculator : None

The government of India conducts census after every 10 years. The method of research used in this process is

Options :

Case study

1. ✖

Developmental

2. ✖

Survey

3. ✔

Experimental

4. ✖

Question Number : 11 Question Id : 54947029191 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The process not needed in experimental research is

Options :

Observation

1. ✖

Manipulation and replication

2. ✖

Controlling

3. ✖

Reference collection

4. ✔

Question Number : 12 Question Id : 54947029192 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Ex post facto research means

Options :

The research is carried out after the incident

1. ✔

The research is carried out prior to the incident

2. ✖

The research is carried out along with the happening of an incident

3. ✖

The research is carried out keeping in mind the possibilities of an incident

4. ✖

Arrange the following steps of research in correct sequence:

I. Identification of research problem

II. Listing of research objectives

III. Collection of data

IV. Methodology

V. Data analysis

VI. Results and discussion

Options :

1. ✖   I, II, III, V, IV, and VI

2. ✔   I, II, III, IV, V, and VI

3. ✖   II, I, III, IV, V, and VI

4. ✖   II, I, IV, III, V, and VI

A variable that is presumed to cause a change in another variable is called

Options :

1. A categorical variable ✖

2. A dependent variable ✖

3. An independent variable ✔

4. An intervening variable ✖

Is Section Default? : null

Question Id : 54947029195 Sub Question Shuffling Allowed : Yes Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (15 to 21)

Read the following passage carefully and answer the questions from 15 to 21:

The great Acharyas have said that everything discovered has a great goal; surrender yourself to that goal and act towards it by drawing your inspiration from that goal whereby you will get a new column of energy. Do not allow this energy to be dissipated in the futile memory of past regrets or failures, or excitement of the present, and bring that entire energy focused into activity, that is, the highest creative action in the world outside, whereby the individual who is till now considered the most inefficient finds his way to the highest achievement and success.

This can be said very easily in a second. In order to train our mind to this attitude, consider able training is needed because we have already trained our mind wrongly to such an extent that we have become perfect in imperfections. Not knowing the art of action, we have mastered artists in doing wrong things; the totality of activity will bring the country to a wrong end indeed.

If each one is given a car to achieve an ideal socialistic pattern and nobody knows driving, but starts driving, what would be the condition on road? Everybody has equal rights on the public road. Then, each car will necessarily dash against the other and there is bound to be a jumble.

There seems to be a very apt pattern of life that we are heading to. Every one of us is a vehicle. We know how to go forward. The point intellect is very powerful and everybody is driving but nobody knows how to control the mental energy and direct it properly or guide it to the proper destination.

Sub questions

Question Number : 15 Question Id : 54947029196 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

What is the effect of wrong training of our mind?

Options :

Becoming perfect in all aspects of life

1. ✖

Becoming master artists

2. ✖

Taking the country to wrong destination

3. ✖

Carrying on activities without knowing how to control mental energies

4. ✔

Question Number : 16 Question Id : 54947029197 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The source of energy according to the author is

Options :

Highest creative action

1. ✖

Proper training of mind

2. ✖

Inspiration from past events

3. ✖

Stimulation obtained from a set goal

4. ✔

Question Number : 17 Question Id : 54947029198 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The author's main focus in the passage is

Options :

Finding out a worthy goal in life

1. ✖

Regulation of energy in proper channels

2. ✔

Struggle for equal rights

3. ✖

Car accidents due to lack of driving skills

4. ✖

Question Number : 18 Question Id : 54947029199 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The country may perish because of

Options :

Failures in past acts

1. ✖

Wrong deeds performed without proper knowledge

2. ✔

Complete surrender to anyone goal

3. ✖

Directing mental energy to the right destination

4. ✖

Question Number : 19 Question Id : 54947029200 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The author considers everyone to be a vehicle that knows how to go forward

Options :

Without driving energy

1. ✖

With least consideration for others

2. ✖

With no sense of direction

3. ✔

With no control on speed

4. ✖

Question Number : 20 Question Id : 54947029201 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following can be considered as the most suitable title for the passage?

Options :

Human mind versus car

1. ✖

Channelization of mental energy

2. ✔

Mental energy

3. ✖

Life without a goal
4. ✖

Question Number : 21 Question Id : 54947029202 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

How do you interpret that "we have become perfect in imperfections"?

Options :

We have already trained our minds wrongly
1. ✔

We have trained the artists with proper art of action
2. ✖

Right performance with wrong training
3. ✖

Wrong performance with right training
4. ✖

Is Section Default? :   null

Question Number : 22 Question Id : 54947029203 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the three components are parts of the human communication process?

Options :

1. ✖   Message, recording, and feedback

2. ✖   Noise, feedback, and jargon

3. ✔   Message, noise, and feedback

4. ✖   Feedback, message, and critiquing

Question Number : 23 Question Id : 54947029204 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Communication becomes circular when

Options :

1. ✔   The decoder becomes an encoder

2. ✖   The feedback is absent

3. ✖   The source is credible

The channel is clear

4. ✖

Question Number : 24 Question Id : 54947029205 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following statement(s) is/are true in context of paraphrasing?

    (A) It is basically about stating in your own words, your understanding of what has just been said.

    (B) It gives speaker opportunity to find out what message s/he is getting across to you.

Options :

Only A

1. ✖

Only B

2. ✖

Both A and B

3. ✔

Neither A nor B

4. ✖

Question Number : 25 Question Id : 54947029206 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In communication, chatting in internet is

Options :

Verbal communication

1. ✔

Non-verbal communication

2. ✖

Parallel communication

3. ✖

Grapevine communication

4. ✖

Question Number : 26 Question Id : 54947029207 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Chinese Cultural Revolution leader Mao Zedong used a type of communication to talk to the masses known as

Options :

Mass line communication

1. ✔

Group communication

2. ✖

Participatory communication

3. ✖

Dialogue communication

4. ✖

Question Number : 27 Question Id : 54947029208 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Telephone is an example of

Options :

Linear communication

1. ✔

Non–linear communication

2. ✖

Circular

3. ✖

Mechanized

4. ✖

A message beneath a message is labelled as

Options :

Embedded text

1. ✖

Internal text

2. ✖

Intertext

3. ✖

Subtext

4. ✔

0, 3, 8, 15, 24, 35, 48, 63, …

Options :

1. ✔ 80

2. ✘ 82

3. ✘ 83

4. ✘ 84

Question Number : 30 Question Id : 54947029211 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

ABC, CBA, DEF, … , GHI, IHG

Options :

1. ✘ JKL

2. ✔ FED

3. ✘ DFE

IJK

4. ✖

If 'PAT' is coded as 'QRBCUV', then how will you code 'GRACE'?

Options :

HISTBCDEFG

1. ✔

HISTBCDEGF

2. ✖

HISBTCDEFG

3. ✖

HISTBCEDFG

4. ✖

If B is the only child of C's grandfather's only daughter, then how is C's father related to B?

Options :

Maternal uncle

1. ✔

Father

2. ✘

Paternal uncle

3. ✘

Can't be determined

4. ✘

Question Number : 33 Question Id : 54947029214 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Shalini walked 15 m towards south, took right turn, and walked 3 m. She took a right turn again and walked 15 m before stopping. Which direction did Shalini face after stopping?

Options :

West

1. ✘

South

2. ✘

East

3. ✖

North

4. ✔

Question Number : 34 Question Id : 54947029215 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If A's income is 25% more than B's and B's income is 20% more than C's, by what percent is A's income more than C's?

Options :

15%

1. ✖

25%

2. ✖

33.5%

3. ✖

50%

4. ✔

Question Number : 35 Question Id : 54947029216 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A train whose length is 320 m is running at a speed of 36 kmph. How much time will it take to pass a pole?

Options :

30 s

1. ✖

32 s

2. ✔

36 s

3. ✖

40 s

4. ✖

Question Number : 36 Question Id : 54947029217 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A deductive argument is valid if

Options :

Premises are false and conclusion is true

1. ✖

Premises are false and conclusion is also false

2. ✖

Premises are true and conclusion is false

3. ✖

Premises are true and conclusion is true

4. ✔

Question Number : 37 Question Id : 54947029218 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The spread of the Internet for higher education is premised on

Options :

Research and development is vital

1. ✖

Browsing encourages critical thinking

2. ✖

Easy management and dissemination of knowledge

3. ✔

India should be second to none in the world

4. ✖

Question Number : 38 Question Id : 54947029219 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Given below are two statements followed by two conclusions I and II. Assuming that the given statements are true even if they are at variance with the commonly known facts, pick up one of the following answer choice which you think is correct.

Statements:
        All boys are men.
        All men are fathers.
Conclusions:
        I. Some men are boys.
        II. All boys are fathers.

Options :

        If only conclusion I follows

1. ✖

        If only conclusion II follows

2. ✖

If both I and II follow

3. ✔

If neither I nor II follows

4. ✖

Question Number : 39 Question Id : 54947029220 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Given below are two statements followed by two conclusions I and II. Assuming that the given statements are true even if they are at variance with the commonly known facts, pick up one of the following answer choice which you think is correct.

Statements:

Some benches are chairs.

Hammer is a bench.

Conclusions:

I. Some chairs are benches.

II. Hammer is not a chair.

Options :

If only conclusion I follows

1. ✔

If only conclusion II follows

2. ✖

If both I and II follow

3. ✖

If neither I nor II follows

4. ✖

Question Number : 40 Question Id : 54947029221 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which one of the following is not an argument?

Options :

Devadutt does not eat in the day so he must be eating at night.

1. ✖

If Devadutt is growing fat and if he does not eat during the day, then he will be eating at night.

2. ✔

Devadutt eats in the night so he does not eat during the day.

3. ✖

Since Devadutt does not eat in the day, he must be eating in the night.

4. ✖

Which of the following are Central Universities?
(i) Pondicherry University
(ii) Vishwa Bharati
(iii) H.N.B. Garhwal University
(iv) Kurukshetra University
Select the correct answer from the codes given below:

Options :

(i), (ii), and (iii)

1. ✔

(i), (iii), and (iv)

2. ✖

(ii), (iii), and (iv)

3. ✖

(i), (ii), and (iv)

4. ✖

Question Number : 42 Question Id : 54947029223 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The first virtual University of India came up in

Options :

1. ✖
   Andhra Pradesh

2. ✔
   Maharashtra

3. ✖
   Uttar Pradesh

4. ✖
   Tamil Nadu

Is Section Default? : null

Question Id : 54947029224 Sub Question Shuffling Allowed : Yes Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Question Numbers : (43 to 45)

Note:

Study the following table carefully and answer questions 43 – 45. It consists of breakup of expenses of a company over different years.

Year	Salary	Items of expenditure rupees in lakhs			
		Fuel & Transport	Bonus	Interest on loans	Taxes
1998	288	98	3.00	23.4	83
1999	342	112	2.52	32.5	108
2000	324	101	3.84	41.6	74
2001	336	133	3.68	36.4	88
2002	420	142	3.96	49.4	98

Sub questions

Question Number : 43 Question Id : 54947029225 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

What is the average amount of interest per year which the company had to pay during this period?

Options :

32.43 lakhs

1. ✖

33.72 lakhs

2. ✖

34.18 lakhs

3. ✖

36.66 lakhs

4. ✔

Question Number : 44 Question Id : 54947029226 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Total expenditure on all these items in 1998 was approximately what percent of the total expenditure in 2002?

Options :

62%

1. ✖

66%

2. ✖

69%

3. ✔

71%

4. ✖

The ratio between the total expenditure on taxes for all the years and the total expenditure on fuel and transport for all the years, respectively, is approximately

Options :

1. ✖ 4 : 7

2. ✔ 10 : 13

3. ✖ 15 : 18

4. ✖ 5 : 8

Is Section Default? : null

Question Id : 54947029228 Sub Question Shuffling Allowed : Yes Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0
Question Numbers : (46 to 49)

Note:

Study the following pie chart care fully and answer questions 46–49. It consists of data on tourist arrival from different countries. Total tourist traffic is 20 lakhs.
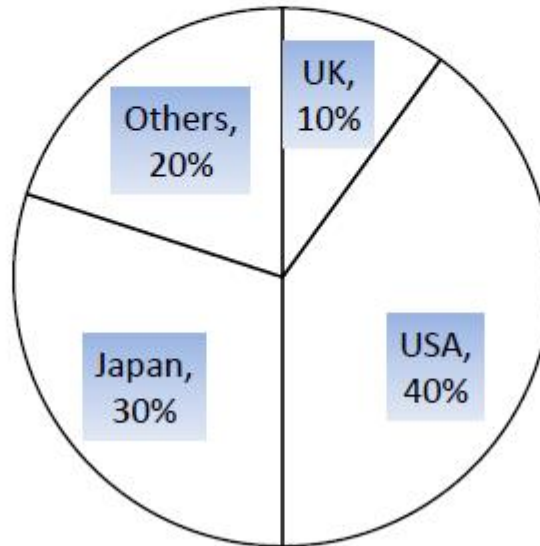
Sub questions

Question Number : 46 Question Id : 54947029229 Display Question Number : Yes Is Question Mandatory : No Calculator : None
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The difference between tourist numbers from USA and Japan is

Options :

2 lakhs

1. ✔

3 lakhs

2. ✖

4 lakhs

3. ✖

5 lakhs

4. ✖

Question Number : 47 Question Id : 54947029230 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If the number of tourists from UK doubles up while the total remains the same, then the new angle extended by tourists from UK will be

Options :

60°

1. ✖

72°

2. ✔

90°

3. ✖

120°

4. ✖

Question Number : 48 Question Id : 54947029231 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The angle extended at the centre by sector of tourists from USA is

Options :

108°

1. ✖

118°

2. ✖

144°

3. ✔

165°

4. ✖

Question Number : 49 Question Id : 54947029232 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If the tourist traffic from USA shows a growth of 50% while the total number of tourists remains the same, then the new percentage from USA is

Options :

1. ✖   40%

2. ✖   45%

3. ✔   50%

4. ✖   60%

Is Section Default? :   null

Question Number : 50 Question Id : 54947029233 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The institution promoted by the Department of IT to provide communication infrastructure and services to academic research institutions in India is

Options :

1. ✖   INFLIBNET

2. ✖   UGC

ERNET

3. ✔

No Option

4. ✖

Question Number : 51 Question Id : 54947029234 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

MICR stands for

Options :

Magnetic Ink Character Reader

1. ✔

Magnetic Ink Code Reader

2. ✖

Magnetic Ink Cases Reader

3. ✖

No Option

4. ✖

Question Number : 52 Question Id : 54947029235 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following is not related to information security on the Internet?

Options :

Data encryption

1. ✖

Water marking

2. ✖

Data hiding

3. ✖

Information retrieval

4. ✔

Question Number : 53 Question Id : 54947029236 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

World Wide Web was proposed by

Options :

Bill Gates

1. ✖

ARPANET

2. ✖

Tim Berners-Lee

3. ✖

Bill Rogers

4. ✔

Question Number : 54 Question Id : 54947029237 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Name of the protocol that supports linking from one web page to another page

Options :

HTML

1. ✖

IP

2. ✖

HTTP

3. ✔

FTP

4. ✖

Question Number : 55 Question Id : 54947029238 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

ISDN stands for

Options :

Integrated Services Digital Network

1. ✔

Intelligent Services Digital Network

2. ✖

Individual Services Digital Network

3. ✖

Image Services Digital Network

4. ✖

Question Number : 56 Question Id : 54947029239 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Exclusive educational channel of IGNOU is known as

Options :

Gyan Darshan

1. ✔

Gyan Vani

2. ✖

Doordarshan

3. ✖

Prasar Bharati

4. ✖

Question Number : 57 Question Id : 54947029240 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Ozone depletion is caused due to increase in the level of

Options :

Water vapour

1. ✖

Chlorofluorocarbo

2. ✔

Oxygen

3. ✖

Carbon monoxide

4. ✖

Question Number : 58 Question Id : 54947029241 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following is the most dangerous and long-lasting?

Options :

Nuclear waste

1. ✔

Volcano ash

2. ✖

Mining waste

3. ✖

Biomedical waste

4. ✖

Question Number : 59 Question Id : 54947029242 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Petrol engines release gaseous oxides of

Options :

Sulphur

1. ✖

Nitrogen

2. ✔

Phosphorous

3. ✖

Carbon

4. ✖

Question Number : 60 Question Id : 54947029243 Display Question Number : Yes Is Question Mandatory : No Calculator : None
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following causes the least pollution when burnt?

Options :

Petrol

1. ✖

Diesel

2. ✖

Coal

3. ✖

Natural gas

4. ✔

Question Number : 61 Question Id : 54947029244 Display Question Number : Yes Is Question Mandatory : No Calculator : None
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The increased water demand in the cities can be better met by

Options :

Larger desalination plants

1. ✖

Adoption of conservation measures

2. ✔

Drilling more tube wells

3. ✖

By sewerage treatment plants

4. ✖

Question Number : 62 Question Id : 54947029245 Display Question Number : Yes Is Question Mandatory : No Calculator : None
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which one of the following is a renewable resource?

Options :

Natural gas

1. ✖

Petroleum

2. ✖

Ground water

3. ✔

Coal

4. ✖

Question Number : 63 Question Id : 54947029246 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which National Park is situated at the highest altitude in the country?

Options :

Corbett National Park

1. ✖

Hemis National Park

2. ✔

Silent Valley National Park

3. ✖

Dachigam National Park

4. ✖

Question Number : 64 Question Id : 54947029247 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The National Knowledge Commission, a high level advisory body to Prime Minister of India, with the objective of transforming India into a knowledge society was set up in the year

Options :

2005

1. ✔

2006

2. ✖

2007

3. ✖

2008

4. ✖

Question Number : 65 Question Id : 54947029248 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Who was the chairman of University Education Commission set up in 1948?

Options :

Dr S. Radhakrishnan

1. ✔

Dr D. S. Kothari

2. ✖

Maulana Abul Kalam Azad

3. ✖

C. D. Deshmukh

4. ✖

Question Number : 66 Question Id : 54947029249 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The Constitution of India (originally) is divided into

Options :

20 parts

1. ✖

22 parts

2. ✔

24 parts

3. ✖

42 parts

4. ✖

Question Number : 67 Question Id : 54947029250 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which Fundamental Right is concerned with the abolition of social distinctions?

Options :

Right to equality

1. ✔

Right against exploitation

2. ✖

Right to life and liberty

3. ✖

Cultural and educational rights

4. ✖

Question Number : 68 Question Id : 54947029251 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

An ordinance can be promulgated in case

Options :

1. ✖ of conflict between two Houses on a bill

2. ✔ both Houses of Parliament are not in session

3. ✖ the Lok Sabha has been dissolved

4. ✖ of elections

Question Number : 69 Question Id : 54947029252 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A Money Bill passed by the Lok Sabha has to be passed by Rajya Sabha within

Options :

Three months

1. ✗

Fourteen days

2. ✓

Twenty-one days

3. ✗

One month

4. ✗

Question Number : 70 Question Id : 54947029253 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

By which of the following measures NITI Aayog was established?

Options :

Cabinet resolution

1. ✓

Parliament resolution

2. ✗

President

3. ✖

Prime Minister

4. ✖

Mathematics

Section Id :	549470411
Section Number :	2
Mandatory or Optional :	Mandatory
Number of Questions :	70
Section Marks :	70
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Is Section Default? :	null

Question Number : 71 Question Id : 54947029254 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The set of all limit points of the set $\left\{\frac{2}{x+1} / x \in (-1, 1)\right\}$ in R, is _____.

Options :

1. ✖ $(1, \infty)$

2. ✖ $[-1, 1]$

3. ✔ $[1, \infty)$

4. ✖ $[-1, \infty)$

Question Number : 72 Question Id : 54947029255 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The unit digit of 2^{100} is _____.

Options :

1. ✖ 2

2. ✖ 4

3. ✔ 6

4. ✖ 8

Question Number : 73 Question Id : 54947029256 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For $x \in (0, 1)$, a function $f(x)$ is defined as $f(x) = \begin{cases} e^x, & x \text{ is rational} \\ e^{1-x}, & x \text{ is irrational} \end{cases}$

Then which of the following is true?

Options :

1. ✔   *f* is continuous only at one point in (0, 1)

2. ✘   *f* is continuous for all $x \in (0, 1)$

3. ✘   *f* is discontinuous at only one point in (0, 1)

4. ✘   *f* is discontinuous at every point in (0, 1)

Question Number : 74 Question Id : 54947029257 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Let the function *f* be defined by,

$$a_n = \begin{cases} \frac{1}{2^n}, & \text{if } \frac{1}{2^{n+1}} < x \le \frac{1}{2^n}, n = 0, 1, 2, ... \\ 0, & \text{else} \end{cases}$$

Then find $\int_0^1 f(x)dx$.

Options :

1. ✘   0

2. ✖ 1

3. ✔ $\dfrac{2}{3}$

4. ✖ $\dfrac{3}{2}$

Question Number : 75 Question Id : 54947029258 Display Question Number : Yes Is Question Mandatory : No Calculator : None
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following sequence of functions is uniformly convergent
on (0, 1)?

Options :

1. ✔ x^n

2. ✖ $\dfrac{x}{nx+1}$

3. ✖ $\dfrac{n}{nx+1}$

4. ✖ $\dfrac{1}{nx+1}$

Let

$$a_n = \begin{cases} 1 + \frac{1}{n}, & \text{if n is even} \\ -1 - \frac{1}{n}, & \text{if n is odd} \end{cases}$$

Then which one of the following is TRUE?

Options :

1. ✖

$$\limsup_{n \to \infty} a_n = \liminf_{n \to \infty} a_n = 1$$

2. ✖

$$\limsup_{n \to \infty} a_n = \liminf_{n \to \infty} a_n = -1$$

3. ✖

$$\limsup_{n \to \infty} a_n = -1, \quad \liminf_{n \to \infty} a_n = 1$$

4. ✔

$$\limsup_{n \to \infty} a_n = 1, \quad \liminf_{n \to \infty} a_n = -1$$

Question Number : 77 Question Id : 54947029260 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following is NOT CORRECT?

Options :

1. ✖ The real line is a complete metric space

2. ✔ The space of rational numbers with the usual metric is complete

3. ✖ The complex plane with the usual metric is complete

4. ✖ The space of continuous function on [a b] is complete

Question Number : 78 Question Id : 54947029261 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Let F be a subfield of the complex numbers. In F^3, Let $\alpha_1 = (3, 0, -3), \alpha_2 = (-1, 1, 2), \alpha_3 = (4, 2, -2)$ and $\alpha_4 = (2, 1, 1)$. Which one of the following sets is linearly dependent?

Options :

1. ✖ $\{\alpha_2, \alpha_3, \alpha_4\}$

2. ✗ $\{\alpha_1, \alpha_3, \alpha_4\}$

3. ✗ $\{\alpha_1, \alpha_2, \alpha_4\}$

4. ✓ $\{\alpha_1, \alpha_2, \alpha_3\}$

Question Number : 79 Question Id : 54947029262 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If $T : R^3 \rightarrow R^3$ defined as $T(x, y, z) = (x - y, x - y, 0)$, then ____.

Options :

1. ✓ dim $N(T) = 2$

2. ✗ dim $R(T) = 2$

3. ✗ $R(T) = N(T)$

4. ✗ $N(T) \subset R(T)$

Question Number : 80 Question Id : 54947029263 Display Question Number : Yes Is Question Mandatory : No Calculator : None

If A is a square matrix of order 4 with $detA = 6$ and if $det(Adj\ 3A) = 2^x.3^y$, then $x + y = $ ____

Options :

1. ✗ $\quad$ 15

2. ✗ $\quad$ 16

3. ✗ $\quad$ 12

4. ✓ $\quad$ 18

Question Number : 81 Question Id : 54947029264 Display Question Number : Yes Is Question Mandatory : No Calculator : None
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

if $A = \begin{bmatrix} 0 & 1-i \\ -1-i & i \end{bmatrix}$ and $B = A^T\overline{A}$. Then ____.

Options :

1. ✓ $\quad$ all Eigen values of B are real

2. ✗ $\quad$ An Eigen of A is zero

3. ✖ An Eigen of B is purely imaginary

4. ✖ A has a non-zero real Eigen value

Question Number : 82 Question Id : 54947029265 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Let E be an orthogonal subset of an inner product space X. Then find the value of $\|x - y\|$ for $x \neq y$, $x, y \in E$.

Options :

1. ✔ $\sqrt{2}$

2. ✖ $\sqrt{3}$

3. ✖ 1

4. ✖ 2

Question Number : 83 Question Id : 54947029266 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Let $V(\mathbb{R})$ be the vector space of polynomials with inner product defined by $(f, g) = \int_0^1 f(t)g(t)dt$, $f, g \in V$. If $f(x) = x^2 + x - 4$ and $g(x) = x - 1$, $x \in [0, 1]$, then find $(f, g) + \|g\|^2$.

Options :

1. ✔ $\dfrac{25}{12}$

2. ✖ $\dfrac{27}{12}$

3. ✖ $\dfrac{29}{12}$

4. ✖ $\dfrac{31}{12}$

Question Number : 84 Question Id : 54947029267 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Let A be the matrix of the quadratic form $(x_1 + 2x_2 + 3x_3 + \ldots + nx_n)^2$. Then find the sum of all the entries of A.

Options :

1. ✖ Σn

2. ✗ Σn^2

3. ✗ $n\Sigma n^2$

4. ✓ Σn^3

Question Number : 85 Question Id : 54947029268 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Find the stationary point at which the function $f(x, y) = x^3 + y^3 - 3x - 12y + 20$ attains its maximum.

Options :

1. ✗ $(1, 2)$

2. ✗ $(-1, 2)$

3. ✗ $(1, -2)$

4. ✓ $(-1, -2)$

The function $f(z) = |z|^2$ is _____.

Options :

1. ✖   Analytic everywhere

2. ✖   Analytic nowhere

3. ✔   Analytic at $z = 0$

4. ✖   Analytic at $z \neq 0$

Find the radius of convergence of the power series

$$\sum_{n=0}^{\infty} \frac{2^{-n}}{1 + in^2} Z^n$$

Options :

1. ✖ 0

2. ✖ 1

3. ✔ 2

4. ✖ ∞

Find the value of $\int_{|z|=1} \frac{\sin z}{z} dz$

Options :

1. ✖ $\frac{\pi}{2}$

2. ✔ 0

3. ✖ π

4. ✖ $\frac{3\pi}{2}$

The function $f : \mathbb{C} \to \mathbb{C}$ defined by $e^z + e^{-z}$ has _____.

Options :

1. ✖ finitely many zeros

2. ✔ infinitely many zeros

3. ✖ no zeros

4. ✖ only real zeros

Find the number of primitive roots modulo 8.

Options :

1. ✔ 0

2. ✖ 1

3. ✖ 2

Infinitely many
4. ✖

If p is a prime number and b is an integer than which of the following
is TRUE?

Options :

1. ✖ $b^{p-1} \equiv b(mod\ p)$

2. ✔ $b^{p} \equiv b(mod\ p)$

3. ✖ $b^{p} \not\equiv b(mod\ p)$

4. ✖ $b^{p-1} \not\equiv (mod\ p)$

The order of the element 3 in the group G = {1,2,...,16} w.r.t. multiplication modulo 17 is

Options :

1. ✗ 4

2. ✗ 8

3. ✗ 12

4. ✓ 16

Find the number of automorphisms on $F(\sqrt[3]{2})$, where F is a field of rational numbers.

Options :

1. ✗ 0

2. ✓ 1

3. ✖ 2

4. ✖ 3

Question Number : 94 Question Id : 54947029277 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The number of idempotent elements in an integral domain is

Options :

1. ✖ 3

2. ✖ 4

3. ✖ 5

4. ✔ at most 2

Question Number : 95 Question Id : 54947029278 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which one of the following statements is correct?

Options :

1. ✗ Every Principal ideal domain is an Euclidean domain.

2. ✗ Every Unique factorization domain is a Principal ideal domain.

3. ✓ Every Principal ideal domain is a unique factorization domain.

4. ✗ Every Unique factorization domain is an Euclidean domain.

Question Number : 96 Question Id : 54947029279 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Find the minimal polynomial of $\sqrt{2} - 3\sqrt{3}$ over Q.

Options :

1. ✗ $x^4 + 58x^2 + 625$

2. ✗ $x^4 - 58x^2 - 625$

3. ✓ $x^4 - 58x^2 + 625$

4. ✖ $x^4 + 58x^2 - 625$

Question Number : 97 Question Id : 54947029280 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Let (X, T) be a Topological space, where $X = \{a, b, c\}$. Then which of the following is not a topology on X.

Options :

1. ✖ $\{\phi, a, X\}$

2. ✖ $\{\phi, X\}$

3. ✖ $\{\phi, \{a\}, \{a, b\}, X\}$

4. ✔ $\{\phi, \{a\}, \{a, b\}, \{b, c\}\}$

Question Number : 98 Question Id : 54947029281 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Every finite point set in a Hausdorff space is _____.

Options :

1. ✖ Open

2. ✔ Closed

3. ✖ Hausdorff space

4. ✖ Connected

Question Number : 99 Question Id : 54947029282 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which one of the following is not a dense subspace of $\mathbb{R}$?

Options :

1. ✖ Q

2. ✖ $\mathbb{R} \setminus Q$

3. ✔ $\mathbb{Z}$

4. ✖ $\mathbb{R}$

In a course, a teacher gives five grades, {A, B,C,D,F}. What is the minimum number of students required so that four of them are guaranteed to get the same grade?

Options :

1. ✖ 14

2. ✔ 16

3. ✖ 18

4. ✖ 19

Find the largest interval of existence of the solution of the initial value problem, $x' = x^2 + \cos^2 t$, $x(0) = 0$, in the rectangle $R = \{(t, x) : 0 \le t \le a, \ |x| \le b, \ a \ge \frac{1}{2}, \ b > 0\}$.

Options :

1. ✗ $[\frac{1}{2}, 1]$

2. ✗ $[1, 2]$

3. ✓ $[0, \frac{1}{2}]$

4. ✗ $[\frac{1}{2}, \frac{3}{2}]$

Question Number : 102 Question Id : 54947029285 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The singular solution of the differential equation, $y = x\frac{dy}{dx} + \left(\frac{dy}{dx}\right)^3$ is

_____.

Options :

1. ✓ $4x^3 + 27y^2 = 0$

2. ✗ $4y^2 - 27x^3 = 0$

3. ✗ $4x^2 + 27y^3 = 0$

$$4y^3 + 27x^2 = 0$$

4. ✖

Solve the initial value problem, $y''' + y'' = 0$, $y(0) = 1$, $y'(0) = 0$, $y''(0) = 1$.

Options :

1. ✖ $y = 1 + e^{-x}$

2. ✔ $y = x + e^{-x}$

3. ✖ $y = \frac{x}{2} + e^x$

4. ✖ $y = x - \frac{e^{-x}}{2}$

Particular integral of $y'' - 2y' + y = xe^x \sin x$ is _____.

Options :

1. ✔ $-e^x(x \sin x + 2 \cos x)$

2. ✘ $-e^x(x \cos x + 2 \sin x)$

3. ✘ $e^x(x \cos x + 2 \sin x))$

4. ✘ $e^x(x \sin x + 2 \cos x)$

Question Number : 105 Question Id : 54947029288 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Find the general solution of the system

$$\frac{dx}{dt} = x + y, \quad \frac{dy}{dt} = 4x - 2y.$$

Options :

1. ✔ $x = c_1 e^{-3t} + c_2 e^{2t}; \ y = -4c_1 e^{-3t} + c_2 e^{2t}$

2. ✘ $x = c_1 e^{-2t} + c_2 e^{2t}; \ y = c_1 e^{-2t} + c_2 e^{3t}$

3. ✖ $x = c_1 e^{4t} + c_2 e^{-3t}; \; y = -c_1 e^{3t} + c_2 e^{2t}$

4. ✖ $x = c_1 e^{3t} + c_2 e^{2t}; \; y = c_1 e^{-2t} + c_2 e^{2t}$

Question Number : 106 Question Id : 54947029289 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Solve: $xy'' - y' = 3x^2$

Options :

1. ✖ $y = x^2 + c_1 x + c_2$

2. ✔ $y = x^3 + c_1 x^2 + c_2$

3. ✖ $y = x^3 + c_1 x + c_2$

4. ✖ $y = 2x^3 + c_1 x^2 + c_2 x$

Question Number : 107 Question Id : 54947029290 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A solution of the differential equation $2x^2\frac{d^2y}{dx^2} + 3x\frac{dy}{dx} - y = 0, \quad x > 0$ that passes through the point $(1, 1)$ is _____.

Options :

1. ✖ $y = \frac{1}{x^2}$

2. ✖ $y = \frac{1}{\sqrt{x}}$

3. ✔ $y = \frac{1}{x}$

4. ✖ $y = x^{-3/2}$

Question Number : 108 Question Id : 54947029291 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The set of real numbers λ, for which BVP $y'' + \lambda y = 0, \quad y(0) = 0, \quad y(\pi) = 0$ has non trivial solution, is _____.

Options :

1. ✖ $\{\sqrt{n}/n \in Z^+\}$

$\{n^2/n \in Z^+\}$

2. ✔

Set of real numbers

3. ✖

$(-\infty, 0)$

4. ✖

Question Number : 109 Question Id : 54947029292 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Find the Eigen values λ_n and Eigen functions $y_n(x)$ of $y''+\lambda y = 0$, $y(0) = 0$, $y(\frac{\pi}{2}) = 0$.

Options :

$\lambda_n = 2n^2$, $y_n(x) = \sin nx$

1. ✖

$\lambda_n = 3n^2$, $y_n(x) = \sin 3nx$

2. ✖

$\lambda_n = 4n^2$, $y_n(x) = \sin 2nx$

3. ✔

$\lambda_n = 5n^2$, $y_n(x) = \sin 4nx$

4. ✖

Question Number : 110 Question Id : 54947029293 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

solve $e^y dx + (xe^y + 2y)dy = 0$.

Options :

1. ✘ $x + y^2 = c$

2. ✘ $xe^y + y = c$

3. ✘ $2x + y^2 = c$

4. ✔ $xe^y + y^2 = c$

Question Number : 111 Question Id : 54947029294 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Write the partial differential equation by eliminating the constants a and b from the equation $2z = (ax + y)^2 + b$.

Options :

1. ✘ $px - qy = p^2$

2. ✔ $px + qy = q^2$

3. ✖ $px + q^2y = p$

4. ✖ $p^2x + qy = p^2$

The solution of the partial differential equation $2\frac{\partial z}{\partial x} + 3\frac{\partial z}{\partial y} = 1$ is _____.

Options :

1. ✖ $\phi(x - 2z, y + 3z) = 0$

2. ✖ $\phi(x + 2z, y - 3z) = 0$

3. ✖ $\phi(x + 2z, y + 3z) = 0$

4. ✔ $\phi(x - 2z, y - 3z) = 0$

Solve $(D^2 + DD' + D' - 1)z = \cos(x + 2y) + e^y$.

Options :

1. ✖ $z = e^x\varphi(2y) + e^{-x}\psi(x + 2y) + \cos(x + 2y) - xe^y$

2. ✖ $z = e^{2x}\varphi(y) + e^{-x}\psi(x - y) + \frac{1}{2}\sin(x + 2y) + xe^y$

3. ✖ $z = e^{2x}\varphi(y) - e^{-x}\psi(x + 2y) + \frac{1}{2}\cos(x + 2y) - xe^y$

4. ✔ $z = e^x\varphi(y) + e^{-x}\psi(x + y) + \frac{1}{2}\sin(x + 2y) - xe^y$

Question Number : 114 Question Id : 54947029297 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The partial differential equation, $\frac{\partial T}{\partial t} = \frac{\partial^2 T}{\partial x^2}$ is _____.

Options :

1. ✔   Parabolic

2. ✖   Hyperbolic

3. ✖   Elliptic for $x < 0$

Elliptic for $x > 0$

4. ✖

Find the complete solution of

$$\frac{\partial^2 z}{\partial x^2} + 6\frac{\partial^2 z}{\partial x \partial y} + 9\frac{\partial^2 z}{\partial y^2} = 0$$

Options :

1. ✖ $z = \varphi(y + 3x) + \psi(y - 3x)$

2. ✖ $z = \varphi(y - 3x) + x\psi(y + 3x)$

3. ✖ $z = \varphi(y + 3x) + x\psi(y - 3x)$

4. ✔ $z = \varphi(y - 3x) + x\psi(y - 3x)$

Which of the following is the wave equation?

Options :

1. ✖ $\dfrac{\partial^2 f}{\partial x^2} + \dfrac{\partial^2 f}{\partial y^2} = 0$

2. ✖ $\dfrac{\partial^2 f}{\partial x^2} = A\dfrac{\partial f}{\partial t}$

3. ✔ $\dfrac{\partial^2 f}{\partial x^2} = A^2\dfrac{\partial^2 f}{\partial t^2}$

4. ✖ $\dfrac{\partial^2 f}{\partial x^2} + \dfrac{\partial^2 f}{\partial y^2} + \dfrac{\partial^2 f}{\partial z^2} = 0$

Question Number : 117 Question Id : 54947029300 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The number of boundary conditions required to solve the partial differential equation $\dfrac{\partial^2 \phi}{\partial x^2} + \dfrac{\partial^2 \phi}{\partial y^2} = 0$ is

Options :

1. ✖ 0

2. ✗ $\dfrac{1}{}$

3. ✗ 2

4. ✔ 4

Question Number : 118 Question Id : 54947029301 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Find a particular integral of the equation $(D^2 - D')z = 2y - x^2$.

Options :

1. ✗ $z = xy$

2. ✗ $z = xy^2$

3. ✔ $z = x^2y$

4. ✗ $z = x^2y^2$

Question Number : 119 Question Id : 54947029302 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The boundary value problem, $x^2 \frac{d^2y}{dx^2} - 2xy\frac{dy}{dx} + 2y = 0$, $y(1) + Ay'(1) = 1$, $y(2) + By'(2) = 2$ has unique solution if _____.

Options :

1. ✗ $A = -1$, $B = -2$

2. ✗ $A = -2$, $B = 2$

3. ✗ $A = -3$, $B = 2/3$

4. ✔ $A = -1$, $B = 2$

Question Number : 120 Question Id : 54947029303 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The differential equation $y'(x) = f(y(x))$ is defined on $\mathbb{R}$, f is an even function and y is an odd function. Then

Options :

1. ✔ $-y(-x)$ is also solution

2. ✗ $y(x).y(-x)$ is also solution

$-y(x)$ is also solution

3. ✖

$y(-x)$ is also solution

4. ✖

Question Number : 121 Question Id : 54947029304 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The Newton-Raphson iteration $x_{n+1} = \frac{1}{2}\left(x_n + \frac{R}{x_n}\right)$ can be used to compute the _____.

Options :

Reciprocal of R

1. ✖

Square of R

2. ✖

Square root of R

3. ✔

Logarithm of R

4. ✖

Question Number : 122 Question Id : 54947029305 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Find the value of $\Delta^2 x^3$ at $x = 0$.

Options :

1. ✗ 2

2. ✗ 4

3. ✗ 0

4. ✔ 6

Question Number : 123 Question Id : 54947029306 Display Question Number : Yes Is Question Mandatory : No Calculator : None
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

By using the Trapezoidal rule, find the area bounded by the curve and
the x-axis from x=7.47 to x=7.52 from the following data.

x	7.47	7.48	7.49	7.50	7.51	7.52
f(x)	1.93	1.95	1.98	2.01	2.03	2.06

Options :

1. ✗ 0.996

0.09

2. ✗

0.09965

3. ✔

0.00996

4. ✗

Consider the following system of linear equations,

$$20x + y - 2z = 17$$
$$3x + 20y - z = -18$$
$$2x - 3y + 20z = 25$$

Let $x_0 = 0$, $y_0 = 0$ and $z_0 = 0$ be the initial approximation to the solution of the system. If (x_1, y_1, z_1) is the first approximation to the solution by Gauss-Seidel method, then find the value of y_1.

Options :

$\frac{17}{20}$

1. ✗

$$17$$

2. ✗

$$-\frac{411}{400}$$

3. ✔

$$-\frac{18}{20}$$

4. ✗

Question Number : 125 Question Id : 54947029308 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Consider $y' = x + y$, $y(1) = 0$, and by using Taylor's series, find $y(1.1)$.

Options :

1. ✔ 0.1103

2. ✗ 0.2012

3. ✗ 0.1273

4. ✗ 0.0123

The order of the convergence of the Secant method is _____.

Options :

1. ✖ 0

2. ✖ 1

3. ✔ 1.62

4. ✖ 2

The function y=f(x) is given in the points (1,3), (2,12) and (5,147). Find the value of y for x=1.5, by using the Langrange's interpolation formula.

Options :

1. ✖ $\dfrac{159}{4}$

2. ✗ $\dfrac{15}{2}$

3. ✗ $\dfrac{11}{4}$

4. ✓ $\dfrac{21}{4}$

Question Number : 128 Question Id : 54947029311 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Find the shortest distance between the parabola $y = x^2$ and the straight line $x - y = 5$.

Options :

1. ✗ $2\sqrt{2}$

2. ✓ $\dfrac{19\sqrt{2}}{8}$

3. ✗ $\dfrac{21\sqrt{2}}{8}$

4. ✖ $3\sqrt{2}$

What is the curve $y(x)$ extremises on the functional, $\int_0^1 [y'^2 + 24xy]dx$, $y(0) = 0$, $y(1) = 1$?

Options :

1. ✖ $y(x) = x^3 - 2x$

2. ✔ $y(x) = 2x^3 - x$

3. ✖ $y(x) = x^3 + 2x$

4. ✖ $y(x) = 2x^3 + x$

Find the curve on which the functional $\int_0^{\frac{\pi}{2}}((y')^2 - y^2 + 2xy)dy$ with $y(0) = 0$, and $y(\frac{\pi}{2}) = 0$ be maximized.

Options :

1. ✔ $y = x - \frac{\pi}{2} \sin x$

2. ✖ $y = x - \pi \sin x$

3. ✖ $y = 2x \cos x$

4. ✖ $y = 2x \sin x$

Question Number : 131 Question Id : 54947029314 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Solve the integral equation, $\varphi(x) = 2 + x + \int_0^x (x - t)\varphi(t)dt.$

Options :

1. ✖ $\varphi(x) = 1 - e^x$

2. ✖ $\varphi(x) = \frac{1}{2}e^{-x} + 3e^x$

3. ✔ $\varphi(x) = \frac{3e^x + e^{-x}}{2}$

$$\varphi(x) = 1 + \frac{e^x}{2}$$

4. ✗

Find the integral equation corresponding to the differential equation $\frac{d^2y}{dx^2} + y = \cos x$ with the initial condition $y(0) = 0$, $y'(0) = 1$.

Options :

1. ✗ $y(x) = (x - \cos x) + \int_0^x (x - t)u(t)dt$

2. ✗ $y(x) = (1 + \cos x) - \int_0^x (t - x)u(t)dt$

3. ✔ $y(x) = (\cos x - x) - \int_0^x (x - t)u(t)dt$

4. ✗ $y(x) = (1 + \cos^2 x) + \int_0^x (x - t)u(t)dt$

The function $\phi(x) = 1 + \lambda x$ is a solution of the integral equation $x = \int_0^x e^{x-\xi}\phi(\xi)d\xi$, then the value of λ is _____.

Options :

1. ✖ $\lambda = 1$

2. ✖ $\lambda = 2$

3. ✔ $\lambda = -1$

4. ✖ $\lambda = -2$

Question Number : 134 Question Id : 54947029317 Display Question Number : Yes Is Question Mandatory : No Calculator : None
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Find the integral equation corresponding to the differential equation $y'' + 2xy' + y = 0$ with the initial condition $y(0) = 1, \ y'(0) = 0$.

Options :

1. ✖ $u(x) - \frac{1}{2}\int_0^x (x - \frac{t}{2})u(t)dt + 1 = 0$

$$u(x) + \int_0^x (x - t)u(t)dt + 1 = 0$$

2. ✖

$$u(x) + \frac{1}{2} \int_0^x (x - t)u(t)dt + 1 = 0$$

3. ✖

$$u(x) + \int_0^x (3x - t)u(t)dt + 1 = 0$$

4. ✔

Question Number : 135 Question Id : 54947029318 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Solve $u_{xx} + u_{yy} = -1$, $|x| \leq 1$, $|y| \leq 1$, $u = 0$ at $x = \pm 1$ *and* $y = \pm 1$.

Options :

1. ✔ $u(x, y) = \frac{5}{16}(1 - x^2)(1 - y^2)$

2. ✖ $u(x, y) = \frac{7}{16}(1 + x^2)(1 - y^2)$

3. ✖ $u(x, y) = \frac{5}{16}(1 + x^2)(1 + y^2)$

4. ✖ $u(x, y) = \frac{1}{16}(1 - x^2)(2 + y^2)$

Question Number : 136 Question Id : 54947029319 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The constraints that can be expressed as equation form are called

Options :

1. ✖ Rheonomous constraints

2. ✖ non-holonomic constraints

3. ✔ holonomic constraints

4. ✖ scleronomous constraints

Question Number : 137 Question Id : 54947029320 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

For an ideal spring mass arrangement, which one of the following is NOT TRUE?

Options :

1. ✗ The Hamiltonian is $\dot{x} = \frac{P_x}{m}$

2. ✗ The Hamiltonian is $\dot{P}_x = -kx$

3. ✗ The Hamiltonian equation of motion is $\ddot{x} + \frac{k}{m}x = 0$

4. ✔ The Hamiltonian equation of motion is $\ddot{x} = kx$

Find the degree of freedom of a rigid body moving in space with one point fixed.

Options :

1. ✗ 2

2. ✔ 3

3. ✗ 6

4. ✗ 9

Find the Routhian R of the Legrangian L, where L is given by

$$L = \frac{\mu}{2}(\dot{r}^2 + r^2\dot{\theta}^2) + \frac{GMm}{r} \quad when \quad \mu = \frac{mM}{m + M}$$

Options :

1. ✗ $R = \frac{1}{2}\mu r^2 + \theta^2$

2. ✔ $R = -\frac{1}{2}\mu\dot{r}^2 + \frac{P_\theta}{2\mu r^2} - \frac{GMm}{r}$

3. ✗ $R = \frac{\partial L}{\partial \theta}$

4. ✗ $R = \mu r^2 + \dot{\theta}^2 + \frac{GMm}{r^2}P_\theta$

Two objects of masses $m_1 - 200gms.$ and $m_2 = 500gms.$ possess respectively, velocities $\bar{v_1} = 10\bar{i}$ m/s and $\bar{v_2} = 3\bar{i} + 5\bar{j}$ m/s just for to a collision during which they become permanently attached to each other. Then, find the velocity of the centre of mass.

Options :

1. ✖ $\bar{v} = 5\bar{i} - \frac{25}{7}\bar{j}$

2. ✖ $\bar{v} = \frac{25}{7}\bar{i} + 5\bar{j}$

3. ✔ $\bar{v} = 5\bar{i} + \frac{25}{7}\bar{j}$

4. ✖ $\bar{v} = \frac{25}{7}\bar{i} - 5\bar{j}$