ಕನ್ನಡ (ಕಡ್ಡಾಯ)

ಸಮಯ : 3 ಗಂಟಿಗಳು   ಗರಿಷ್ಠ ಅಂಕಗಳು : 100

ಸೂಚನೆಗಳು

ಅ) ಅಭ್ಯರ್ಥಿಗಳು **ಎಲ್ಲಾ** ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಬೇಕು.

ಆ) ಪ್ರತಿಯೊಂದು ಪ್ರಶ್ನೆಗೆ ನಿಗದಿಪಡಿಸಿರುವ **ಅಂಕ**ಗಳನ್ನು ಸೂಚನೆಯ ನಂತರ ನೀಡಲಾಗಿದೆ.

ಇ) ಸಂಕ್ಷೇಪ ಲೇಖನವನ್ನು **ನಿಗದಿತ ಹಾಳೆ**ಯಲ್ಲಿಯೇ ಬರೆಯಿರಿ.

ಭಾಗ – 1

1. ಈ ಕೆಳಕಂಡ ವಾಕ್ಯಗಳಲ್ಲಿನ **ಕಾಗುಣಿತಾಕ್ಷರ**ಗಳ ತಪ್ಪುಗಳನ್ನು ತಿದ್ದಿ ಬರೆಯಿರಿ :   (5×2=10)

   A) ಅಸೋಕವನದಲಿ ಸೀತೆಯು ಒಂತಿಯಾಗಿದ್ದಲು.

   B) ಪಂಡವರು ದಮರಾಯ,ಬೀಮ, ಅಜುನ, ನಕಲ, ಸಹದೇವ ಎಂಬೈವರು.

   C) ಕನಡನಡು ಕಾಯೇರಿಯಿಂದ ಗೋದಾವರಿವರೆಗಿತ್ತು.

   D) ಸರ. ಎಂ. ವಿಸ್ವೇಸ್ವರಯನವರು ಮೈಸೋರಿನ ದಿವಾನರಾಗಿದ್ದರು.

   E) ನಾವು ಎಸ್ಟು ಕಲಿತರೂ ಸಾಗರದ ಮುಂದೆ ಸಾಸಿವೆಅಂತೆ.

2. ಈ ಕೆಳಕಂಡ ಗಾದೆಗಳಲ್ಲಿ ಎರಡರ ಅರ್ಥ ಸ್ವಾರಸ್ಯವನ್ನು ವಿವರಿಸಿ :   (2×5=10)

   A) ಶಿವಪೂಜೆಯಲ್ಲಿ ಕರಡಿಗೆ ಬಿಟ್ಟ ಹಾಗೆ

   B) ಆಸೆಯೇ ದುಃಖಕ್ಕೆ ಮೂಲ

   C) ಕೆಟ್ಟು ನೆಂಟರ ಸೇರಬೇಡ

   D) ಜೀವನವೆಲ್ಲ ಬೇವು ಬೆಲ್ಲ.

3. ಈ ಕೆಳಕಂಡ ಯಾವುದಾದರೂ ಐದು ಪದಗಳಿಗೆ ವಿರುದ್ಧಾರ್ಥಕ ಪದಗಳನ್ನು ಬರೆಯಿರಿ :   (5×1=5)

   A) ಪೂರ್ವ   F) ಹಿಗ್ಗು

   B) ಅಮೃತ   G) ವಂಚನೆ

   C) ದಯೆ   H) ದಾನವ

   D) ಸಟೆ   I) ಸದ್ಗತಿ

   E) ಬಿಗಿ   J) ನಂಬಿಕೆ.

4. ಈ ಕೆಳಕಂಡ ಗದ್ಯ ಭಾಗವನ್ನು ಓದಿ ಕೊನೆಯಲ್ಲಿರುವ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿ : (5×1=5)

ಪ್ಯಾರಿಸ್‌ನ ಟ್ರಿಯನಾನ್ ಪ್ಯಾಲೇಸ್ ಹೋಟೆಲಿನಲ್ಲಿ ತಂಗಿದ್ದೆ. ಒಂದು ಮಧ್ಯಾಹ್ನ ಯುನೆಸ್ಕೋ ಗ್ರಂಥ ಭಂಡಾರಕ್ಕೆ ಹೋಗೋಣ ಎಂದು ಟ್ಯಾಕ್ಸಿಗಾಗಿ ಆಪರೇಟರಿಗೆ ಹೇಳಿ ಲೌಂಜಿನಲ್ಲಿ ಕಾಯುತ್ತಾ ಕುಳಿತೆ. ಹತ್ತು ನಿಮಿಷಗಳಲ್ಲಿ ಟ್ಯಾಕ್ಸಿ ಬಂತು. ಲೌಂಜಿನ ಗಾಜು ಬಾಗಿಲು ತೆರೆದು ಕಾರಿನ ಚಾಲಕಿ ಕಣ್ಣಿನಿಂದಲೇ ಸುತ್ತಲೂ ಹುಡುಕುತ್ತಾ ನಿಂತಳು. ಹರೆಯದ ಆಕೆಯ ಸೌಂದರ್ಯ ನನ್ನನ್ನು ಬೆರಗುಗೊಳಿಸಿತು. ಕಡೆಯ ಪಕ್ಷ ನಮ್ಮ ರಂಭೆ, ಊರ್ವಶಿ, ಮೇನಕೆ, ತಿಲೋತ್ತಮೆಯರ ಸೌಂದರ್ಯ, ಬೆಡಗು, ಬಿನ್ನಾಣಗಳನ್ನೆಲ್ಲ ಕಡೆದು ಮಾಡಿದ ಈ ಬೆಡಗಿ, ಅರಮನೆಯಲ್ಲಿರಬೇಕಾದವಳು ಪ್ಯಾರಿಸ್‌ನ ಬೀದಿಗಳಲ್ಲಿ ಟ್ಯಾಕ್ಸಿ ಓಡಿಸುತ್ತಿದ್ದಾಳೆಯೇ ?

A) ಲೇಖಕರು ಪ್ಯಾರಿಸ್‌ನ ಯಾವ ಹೋಟೆಲಿನಲ್ಲಿ ತಂಗಿದ್ದರು ?

B) ಲೇಖಕರು ಯಾವ ಗ್ರಂಥ ಭಂಡಾರಕ್ಕೆ ಹೊರಟಿದ್ದರು ?

C) ಕಾರಿನ ಚಾಲಕಿ ಯಾವುದರಿಂದ ಸುತ್ತಲೂ ಹುಡುಕಿದಳು ?

D) ಯಾರು ಯಾರ ಸೌಂದರ್ಯ ಬೆಡಗು ಬಿನ್ನಾಣಗಳನ್ನೆಲ್ಲ ಕಡೆದು ಈ ಬೆಡಗಿಯನ್ನು ಮಾಡಿದ್ದರು ?

E) ಬೆಡಗಿಯು ಎಲ್ಲಿರಬೇಕಾದವಳು ? ಈಗ ಎಲ್ಲಿದ್ದಾಳೆ ? ಏನು ಮಾಡುತ್ತಿದ್ದಾಳೆ ?

ಭಾಗ – 2

5. ಈ ಕೆಳಕಂಡ ಯಾವುದಾದರೂ ಒಂದನ್ನು ಕುರಿತು 250 – 300 ಪದಗಳಲ್ಲಿ ಒಂದು ಪ್ರಬಂಧವನ್ನು ರಚಿಸಿ : (1×15=15)

A) ಕೇಂದ್ರ, ರಾಜ್ಯಗಳ ನಡುವಣ ಸಂಬಂಧ

B) ಸರ್ವಧರ್ಮ ಸಮನ್ವಯ

C) ಇಂದಿನ ಶಿಕ್ಷಣ ಪದ್ಧತಿ

6. ಈ ಕೆಳಕಂಡ ಐದು ಪದಗಳನ್ನು ಬಿಡಿಸಿ ಬರೆಯಿರಿ : (5×2=10)

ಉದಾ : ನಮ್ಮೂರು = ನಮ್ಮ + ಊರು

A) ನೀರೊಳಗೆ   D) ಮೈದೊಳೆ

B) ಶಿವಾನುಭವ   E) ಮುರಾರಿ

C) ಬೆರಗಾಗು   F) ಎಳೆಗೂಸು.

7. ಈ ಗದ್ಯಭಾಗದ ಮೂಲ ಅರ್ಥ ಕೆಡದಂತೆ ಮೂರನೆಯ ಒಂದರಷ್ಟು ಭಾಗಕ್ಕೆ ಸಂಕ್ಷೇಪಿಸಿ ಬರೆಯಿರಿ : (1×15=15)

ನಸುಕಿಗೇ ಎದ್ದು ಜೆಟ್ಟಿಗೆ ಹೋದೆವು. ದೋಂಗ್ರಿಯಲ್ಲಿ ಆಗಲೇ ಕೆಲವು ಜನ ಕುಳಿತಿದ್ದರು. ಅವರಲ್ಲಿ ಬಾಣಂತನ ಮುಗಿಸಿ ಹೊರಟಿದ್ದ ಒಬ್ಬ, ಎಳೆಗೂಸಿನ ತಾಯಿಯೂ ಇದ್ದಳು. ಇಬ್ಬರು ಬಂಗಾಳಿ ತರುಣರು ದೋಣಿಯನ್ನು ನಡೆಸಲು ಸಿದ್ಧವಾಗಿದ್ದರು. ಮೋಟಾರ್ ಸಿಕ್ಕಿಸಿದ್ದ ಈ ನಾಡದೋಣ ದನಗಳ ಗೋದಲಿಯಂತೆ ಉದ್ದಕ್ಕಿತ್ತು. ಕೊಲ್ಲಿಯನ್ನು ಪ್ರವೇಶಿಸುವವರೆಗೆ ಹೆದ್ದೆರೆಗಳ ತೆರೆದ ಕಡಲನ್ನು ಹಾಯಲೇಬೇಕು. ಶುರುವಾಯಿತು ನಮ್ಮ ಪೀಕಲಾಟ. ಅಲೆಗಳು ಭಯಾನಕವಾಗಿದ್ದುವು. ಕೆಲವೊಮ್ಮೆ ಇಪ್ಪತ್ತು ಅಡಿ ದಕ್ಷಿನ ಮೇಲೆ ನಿಂತವರನ್ನು ತೋಯಿಸುವಷ್ಟು ಅಲೆಗಳ ನೀರು

ಎರಚುತ್ತಿತ್ತು. ಆದರೂ ಅವು ನಮ್ಮ ಕೆಳಗೆ, ಮೇಲೆ ಸುರಕ್ಷಿತ ದೂರದಲ್ಲಿ ಇದ್ದ ನಮಗೆ ಅವುಗಳ ಅರ್ಭಟವೂ ಒಂದು ಲೀಲೆಯಂತೆ. ಎಲ್ಲೋ ಅಲೆಗಳು ಮುಖದ ನೇರಕ್ಕೆ ಹೆಡೆಯೆತ್ತಿಕೊಂಡು, ನುಂಗಲು ಬಾಯಿ ತೆರೆದುಕೊಂಡು ಬರುವ ಸರ್ಪಗಳಂತೆ ಭುಸುಗುಟ್ಟಿಕೊಂಡು ಬರುತ್ತಿದ್ದವು. ಇನ್ನೇನು ಅಲೆ ದೋಣಿಯ ಮೇಲೆ ಅಪ್ಪಳಿಸಿ ಮುಳುಗಿಸಿತು, ಮುಳುಗಿಸಿತು ಎನ್ನುವಷ್ಟರಲ್ಲಿ ಬಂದ ಅಲೆಯಷ್ಟೇ ಎತ್ತರಕ್ಕೆ ಜಿಗಿದು ದೋಣಿ ಬಚಾವಾಗುತ್ತಿತ್ತು. ಈ ಆಟ ನೋಡಲು ಎದೆ ಝುಲ್ಲೆನಿಸುತ್ತಿತ್ತು. 'ಈ ನೀರಿನಲ್ಲಿ ಡಾಲ್ಫಿನ್ನುಗಳಿವೆ. ನೋಡುತ್ತಿರಿ. ನಸೀಬು ಇದ್ದರೆ ಕಾಣಬಹುದು' ಎಂದು ದೋಣೆಕಾರರು ಹೇಳಿದರು. ನೀರಿಗೆ ಮಗುಚಿಕೊಳ್ಳುವುದು ಖಂಡಿತ ಎಂಬಂತೆ ಹೊಯ್ದಾಡುತ್ತಿದ್ದ ದೋಣೆಯಲ್ಲಿ ಸಂಭಾಳಿಸಿ ಕೂರುವುದಕ್ಕೇ ಪರಿಪಾಟಲು ಪಡುತ್ತಿದ್ದ ನಮಗೆ, ಡಾಲ್ಫಿನ್ನುಗಳು ಎದುರು ನಿಂತು ಪೋಸುಕೊಟ್ಟರೂ ನೋಡುವ ಮನಸ್ಥಿತಿ ಇರಲಿಲ್ಲ.

8. ಈ ಕೆಳಕಂಡ ನುಡಿಗಟ್ಟುಗಳಲ್ಲಿ **ಐದರ** ಅರ್ಥ ತಿಳಿಸಿ ಅವುಗಳನ್ನು ನಿಮ್ಮ ಸ್ವಂತ ವಾಕ್ಯಗಳಲ್ಲಿ ಪ್ರಯೋಗಿಸಿ :   **(5×3=15)**

A) ಸರಸವಾಡು

B) ಕಾಲಿಗೆ ಬೀಳು

C) ಜಮಾಯಿಸು

D) ಲವಲವಿಕೆ

E) ತೇಜೋವಧೆ ಮಾಡು

F) ಲಕ್ಷ್ಮೀಪುತ್ರ.

9. ಈ ಕೆಳಕಂಡವುಗಳಲ್ಲಿ **ಒಂದನ್ನು** ಕುರಿತು ಪತ್ರ ಬರೆಯಿರಿ :   **(1×15=15)**

A) ನಿಮ್ಮ ಹಳ್ಳಿ ರಸ್ತೆಯ ದುರಸ್ತಿಗಾಗಿ ಸಂಬಂಧಿಸಿದ ಅಧಿಕಾರಿಗಳಿಗೆ ಮನವಿ ಪತ್ರ ಬರೆಯಿರಿ.

B) ನಿಮ್ಮ ಮಿತ್ರರ ವಿವಾಹಮಹೋತ್ಸವಕ್ಕೆ ಬರಲಾಗದಿದ್ದುದಕ್ಕೆ ಸೂಕ್ತ ಕಾರಣವನ್ನು ತಿಳಿಸಿ ಕ್ಷಮೆಕೋರಿ, ಶುಭಾಶಯವನ್ನು ತಿಳಿಸುವ ಪತ್ರವೊಂದನ್ನು ಬರೆಯಿರಿ.

ENGLISH
(COMPULSORY)

Duration : 3 hours

Max. Marks : 100

INSTRUCTIONS

1. Answers should be written in **English** only.

2. Answer **all** the questions.

3. Marks are indicated against each question.

4. Write the <u>Précis</u> on the sheet provided. At the end of your précis, mention the number of words used. Suggest a **suitable** title.

5. Write the question number and sub-question number **correctly**.

PART – A

1. Fill in the blanks with appropriate forms of the verbs given below :   (7×1=7)
   [lead, rise, blow, teach, write, draw, spend]

   A) The water level in the Cauvery_____ rapidly yesterday.

   B) Have you _____ up a plan for the summer holidays ?

   C) The article has been _____ by my uncle.

   D) Mr. Gupta _____ us Economics last year.

   E) The new block was _____ up by a bomb.

   F) Did you _____ all the money on clothes ?

   G) Kapil Dev _____ the Indian team in the 1983 World Cup.

2. Complete the following sentences with appropriate prepositions chosen   (6×1=6)
   from the list in brackets :

   A) She resigned _____ her job at the call centre.
      (for, in, from, by)

   B) The prisoners went hungry _____ several occasions.
      (on, under, against, in)

C) Sleep is vital _____ the learning process.

(with, to, between, by)

D) My professor was educated _____ Oxford.

(of, from, across, at)

E) Have you lived here _____ many years ?
(for, since, from, in)

F) She attended the wedding _____ her colleagues.
(on, with, through, beyond)

3. Each of the following sentences requires an article ['a' or 'an' or 'the']   (6×1=6)
at the appropriate place. Rewrite the sentences using the required article in the
right position :

A) Wars have been fought in name of religion.

B) After years of struggle as young boy, I got my first job in Mumbai.

C) Let us put end to this argument.

D) Would you like to have cup of coffee ?

E) She is excellent housekeeper.

F) It was friendliest place I had ever seen.

4. Correct the following sentences and rewrite them after correction :   (6×1=6)

A) Suppose if you see him, convey my regards.

B) This book is your's.

C) The angry man tried to brake the furniture.

D) Cats don't swim, can they ?

E) She is caring for her old parents.

F) What books you studied for the examination ?

PART – B

5. Rewrite as directed :   (5×1=5)

A) Your handwriting is not easy to read.
(Replace the underlined word with a single word beginning with the prefix
'il')

B) We received a _____ (complement/compliment) from our clients. (Choose the correct word)

C) The Lok Ayukta is trying to <u>remove completely</u> corruption from public life. (Substitute the underlined phrase with an idiom comprising the word 'root')

D) My aunt is interested in <u>the study of dancing</u>. (Use a single word ending with ' – graphy' to replace the underlined words)

E) Anne Frank's _____ (diary/dairy) is a tribute to her courage and will-power.

6. Read the following passage and answer the questions given below as directed : (5×1=5)

Since their beginning in 1896, the Olympic Games have been the gold standards of athletic, prowess : Olympic competitors are the best in the world, and no trophy compares with an Olympic gold medal. However, the athletic competitions have been matched by the fierce competition between cities and nations vying to host the Games. So much money and prestige is at stake that the phenomenon has been given a name : the Olympic Effect.

Economic impacts of the Olympic games are complex. In the first place, preparations for the Games generally include vast investments not only in the stadiums, tracks, and other sports venues for the games themselves, but also in local highways, hotels and airports. Thousands of jobs are created and billions of dollars are spent. The international image of the host city goes up. Tourism experiences the greatest benefit. The Olympic Effect can exert a powerful influence on the business climate of the host country for years before, during, and after the games.

A) Suggest a suitable title to the passage beginning with 'The Olympic ....'

B) What else is at stake at the Olympic Games besides athletic supremacy ?

C) The maximum impact of the Games is seen on
   i) hospitality industry
   ii) tourism
   iii) infrastructure
   iv) gold value.

[Choose the best alternative]

D) The Olympic Games are no more a mere celebration of the human body and of the human spirit. (**True/False**)

E) Pick out a part of the opening sentence which implies that 'many athletes would be proud to win an Olympic gold medal'.

7. A) Write a précis of the following passage in about **100** words. State the number **25** of words of your précis. Use the sheets provided and secure them to the answer book.

Great social transformations – the end of slavery, the women's and civil rights movements, the end of colonial rule, the birth of environmentalism – all began with public awareness and engagement. Our political leaders followed rather than led. It was scientists, engineers, churchgoers and young people who truly led the way. If as citizens we vote for war, then war it will be. If instead we support a global commitment to sustainable development, then our leaders will follow, and we will find a way to peace.

Each of us has a role to play and a chance for leadership. First, study the problem in school, in reading on the web. Second, when possible, travel. There is no substitute for seeing extreme poverty, or deforestation, or the destructive forces of nature, to understand our generations real challenges. There is no substitute for meeting and engaging with people across cultures, religions and regions to realize that we are all in this together. Third, get your business, community or student group active in some aspect of sustainable development. Inspiring examples of today's private leadership include those who are promoting the control of malaria, the spread of solar power and the end of polio. Finally, demand that politicians honour their global promises and commitments on climate change and the fight against hunger and poverty. If the public leads, politicians will surely follow.

Our generation's greatest challenges – in environment, demography, poverty and global politics-are also our most exciting opportunity. Ours is the generation that can end extreme poverty, turn the tide against climate change and head off a thoughtless and massive extinction of other species. Ours is the generation that can, and must, solve the unresolved conundrum of combining economic well-being with environmental sustainability. We will need science, technology and professionalism, but most of all we need to subdue our fears and cynicism.

– 302 Words.

B) Answer **any one** of the following : **15**

Imagine you are Raghu/Leela. A friend of yours has invited you to attend the birthday celebration of his/her daughter. Respond to the invitation positively.

OR

You are a resident of the ML Gardens Locality of Vijayapura town. The water supply in your area is contaminated. Write a letter of complaint to the corporator of your ward.

C) Write an essay on **any one** of the following topics in about **300** words : **25**
   a) An inspiring teacher.
   b) Internet as an on-line study tool.
   c) Cricket, and not hockey, should be our national game.

FORESTRY – I

Duration : 3 Hours   Maximum Marks : 100

INSTRUCTIONS

1. Answer should be written only in **English**.

2. Answer **all** questions taking note of choice questions wherever if given.

3. Write answers for objective and descriptive type questions in the **Answerbook** itself.

PART – A

(Each sub-question carries **one** mark)

Question No. 1   Marks: 7×1=7

1. Choose the correct answer.

   A. The host species which is susceptible to spike disease and not advisable to plant in sandal plantation is

      i) <u>Pongamia</u> <u>pinnata</u>

      ii) <u>Dalbergia</u> <u>sissoo</u>

      iii) <u>Cassia</u> <u>siamea</u>

      iv) <u>Azadirachta</u> <u>indica</u>

   B. The oldest -known agroforestry practice refers to

      i) Taungya System

      ii) Alley cropping

      iii) Shifting cultivation

      iv) Tim-Fib System

   C. When seedlings are to be grown for about 4 to 6 months before eventual planting out, the optimum size of the polythene bags should be

      i) 10 c.m. × 20 c.m.

      ii) 15 c.m. × 20 c.m.

      iii) 20 c.m. × 30 c.m.

      iv) 30 c.m. × 40 c.m.

P.T.O.

D. Good indicator of well managed watershed is

    i) High sediment discharge

    ii) Higher flood peaks

    iii) Uniform stream flow

    iv) Lower Vegetative cover

E. Practice of forestry outside the farm lands and outside the reserve forests is known as

    i) Extension forestry

    ii) Recreation forestry

    iii) Rehabilitation forestry

    iv) Community forestry

F. The tree crown class comprising of trees of about 3/4th of the height of dominants·is categorised as

    i) Predominant

    ii) Codominant

    iii) Dominated

    iv) Suppressed

G. Clear felling system is one of the high forest system where mature crop is removed in

    i) One operation

    ii) Two operations

    iii) Series of operations.

    iv) Continuous operations.

Question No. 2   Marks: 7×1=7

2. Fill in the blanks :

A. Group of populations that generally interbreed with one another and that intergrade more or less continuously are referred as _____

B. Gradual replacement of one community by another in the development of vegetation towards climax is known as _____

C. A long, thickstem cutting, containing much old wood, used in propagating some species is called as _____

D. Sundarbans is the best example of _____ type of forests.

E. The operation of removal of all coppice shoots by retaining the best one is called as _____

F. The term 'Forest' is derived from Latin word i.e. _____ which means outside.

G. The study of trees and forests as biological entities, the laws of their growth and development and impact of environment on them is termed as _____ .

Question No. 3   Marks: 6×1=6

3. Answer the following questions in **one** sentence each :

A. What does mycorrhizae refer to ?

B. What is the main advantage of under cutting and wrenching operation ?

C. What is ecotype ?

D. What is half sib family ?

E. What is wilding ?

F. How was tetraploidy induced in Santalum album to develop new strains to combat spike disease ?

PART – B

SECTION – I

Write short notes on **any 5** of the following: (5×4=20)

4. Seed Orchard Records.

5. Tropical Rainforest

6. Plant containers used in forest nurseries.

7. Agroforestry classification on socio economic basis.

8. Reasons for failure of non commercial Farm Forestry projects.

9. Approaches for selection of plus trees for better phenotype.

10. Basic procedure in shelter wood method.

11. Possible ameliorative effects of trees on soil in Agroforestry.

SECTION – II

Answer **any 5** of the following : (5×12=60)

12. Explain the problems encountered normally when using the exotic species and also narrate the reasons why poor sources or wrong species are used in exotic forestry programmes.

13. Write in detail about the necessary operations to be carried out to obtain natural regeneration of a species in desired quality at a desired time and at a desired place.

14. Discuss the different methods of vegetative propagation by using different parts of the plant in Bamboo and prescribe the management practices for obtaining desired quality of culms.

15. Give a detailed account for nursery, planting and harvesting techniques adopted in sandal wood cultivation and narrate the multiple uses of sandal wood.

16. Explain how do different agroforestry systems help the culturable wastelands for their sustained productivity.

17. Agroforestry practices are assumed to be superior to other traditional cropping practices with respect to erosion protection – Justify the statement and suggest agroforestry practices for soil conservation.

18. Discuss the relation between plant and man as one of the biotic factors which affects the vegetation as well as site in forest areas.

19. Explain the impact of microorganisms on forest ecosystems and write the constraints in studies on microbial diversity in forests.

ACF 2008

FORESTRY – II

Duration : 3 Hours   Max. Marks : 100

INSTRUCTIONS

1) Answers should be written only in **English**.

2) Answer **all** questions taking note of choice questions wherever if given.

3) Write answers for objective and descriptive type questions in the **Answerbook** itself.

PART – A

(**Each** sub-question carries **one** mark)

1. Fill in the blanks :   Question No. 1   Marks : 7×1=7

   A) The diameter of standing trees is measured at _____ m to have a uniform standard through out the country.

   B) The multipurpose instrument that is used to measure height, range, basal area, slope etc. is _____

   C) The Normalised Difference Vegetation Index (NDVI) is necessarily used for estimating _____

   D) The best and only wood used for making cricket bats is _____

   E) The best quality lac is produced specially from the commercial tree species like _____ .

   F) The main and common predator which controls teak defoliator is _____ (scientific name only)

   G) The project tiger was initiated in 1973 with nine tigers with the recommendations of a task force of the _____ .

2. Choose the correct answer :   Question No. 2   Marks : 7×1=7

   A) Form factor which is a measure of form or shape of the tree is used for calculation of

       i) Girth   ii) DBH   iii) Volume   iv) Height

P.T.O.

B) The glued wood construction built of veneers is termed as

   i) Particle board   ii) Ply wood

   iii) Pulp wood   iv) Match wood

C) One of the biggest and most lucrative items of trade in the field of wild animal products is

   i) Leather   ii) Horn   iii) Fur   iv) Ivory

D) The Government of India was forced to make an enactment to check indiscriminate diversions of forest lands through enunciation of

   i) Forest Conservation Act

   ii) Indian Forest Act

   iii) Wild life Protection Act

   iv) None

E) The family that yields aromatic resins also known as oleoresins is

   i) Diptero carpaceae   ii) Pinaceae

   iii) Burseraceae   iv) Leguminosae

F) When canopy density is between 0.50 and 0.75, it is classified as

   i) Closed   ii) Dense

   iii) Thin   iv) Open

G) The climber which affects the shape and growth of stem in forest area is

   i) Bauhinia vablii   ii) Bauhinia alba

   iii) Bauhinia variegata   iv) Bauhinia sulphurica

3. Answer in **one** sentence :   Question No. 3   Marks : 6×1=6

A) What are the activities in forest areas causing emission of green house gases ?

B) Suggest one best system of vegetation for combating noise.

C) Two ways of approaching the subject of regulation and determination of yield, one is yield regulation based primarily on division of the area, what is the other one ?

D) Mention the hygroscopic substances used in place of common salt in chemical seasoning of wood.

E) What is a particulate matter ?

F) Removal of vegetation in the vicinity of the sides of a stream reduces the quality of water for human consumption and also for aquatic life, especially fish. How ?

PART – B

SECTION – I

Write short notes on **any five** of the following :   5×4=20

4. CAI and MAI with one example.

5. Tree height measurement in sloppy areas with altimeter.

6. Two areas of study in forest economics.

7. Kinds of resins.

8. Strategies for reducing emission of green house gases by the forest.

9. Effects of pollution on climate in urban areas.

10. Reasons for failure of JFM in some places of India.

11. Lidar remote sensing.

SECTION – II

Answer **any five** of the following questions :   5×12=60

12. Discuss the different types of rotations classified based on the objects of management in forest sector.

13. What is the importance of determining the age of a tree ? Explain the methods of age determination of single tree under both destructive and non destructive.

14. A) Narrate the three types of elasticity of demand.

    B) Write the salient features of National Forest Policies of 1894, 1952 and 1988.

15. A) Categorize the presently available cellulosic resources of paper as raw material base and explain.

    B) List out measures proposed for achieving the targets in healthy development of the pulp and paper industries.

16. Discuss the various fire hazard reduction measures in forest stands.

17. Explain Forest Canopy Density (FCD) Assessment by using satellite remote sensing digital data and write the use of FCD map in forest operations.

18. Narrate the common methods of selling forest produce and write the business principles to be kept in view in forest sales.

19. Discuss the sources and emission of air pollutants and write about prevention and control of air pollution.

SEAL

AGRICULTURE

Duration : 3 Hours   Maximum Marks : 100

INSTRUCTIONS

1. Answers should be written only in **English**.

2. Answer **all** questions taking note of choice questions wherever if given.

3. Write answers for objective and descriptive type questions in the **Answerbook** itself.

PART – A

(**Each** sub-question carries **one** mark)

Question No. 1   Marks: 4×1=4

1. A. India's share of world production of mangoes is more than

   i) 10%   ii) 50%

   iii) 25%   iv) 70%

   B. More than 20% decline in total food grains production in India was noticed in

   i) 2002-03   ii) 2003-04

   iii) 2004-05   iv) 2005-06

   C. The successful introduction of citrus in the northern plains of India is

   i) Santra orange   ii) Grapefruit

   iii) Kinnow   iv) Acid lime

   D. Tea mosquito bug also attacks severely

   i) Neem   ii) Sugarcane

   iii) Pongamia   iv) Coconut

Question No. 2   Marks: 4×1=4

2 A. Coconut eriophyid is

   i) Insect   ii) Nematode

   iii) Mite   iv) Snail

P.T.O.

B. Alphonso is a variety of

   i) Banana   ii) Rice

   iii) Mango   iv) Citrus

C. Pheromone trap is used for monitoring and control of

   i) Citrus aphid   ii) Mango hopper

   iii) Coffee stem Borer   iv) Rice Thrips

D. Which of the following is spread through aphid vector

   i) Banana Panama Wilt   ii) Sigatoka disease

   iii) Bunchy top disease   iv) Fruit rot

Question No. 3 Marks: **4×1=4**

3. A. The pH of saline soils will be normally in the range of

   i) 7.0 – 7.5   ii) 7.5 – 8.0

   iii) 8.0 – 8.5   iv) 8.5 – 9.0

B. Systemic induction of resistance to diseases in crop plants is due to soil inhabiting

   i) Actinomycetes   ii) Fungi

   iii) Algae   iv) Nematodes

C. Which of the following is a symbiotic nitrogen fixing organism ?

   i) <u>Pseudomonas</u>   ii) <u>Trichoderma</u>

   iii) <u>Rhizobium</u>   iv) <u>Bacillus</u>

D. Parboiling is done in the case of

   i) Maize   ii) Sorghum

   iii) Pearlmillet   iv) Paddy

Question No. 4 Marks: **4×1=4**

4. A. Vitamin C is present abundantly in

   i) Cabbage   ii) Cauliflower

   iii) Tomato   iv) Bhendi

B. NAA is a

   i) Fungicide   ii) Insecticide

   iii) Growth Regulator   iv) Fumigant

C. Good soil health is reflected by the population of

   i) Termites   ii) White grubs

   iii) Wire worms   iv) Spring tails

D. Dapag method of nursery is adopted in

   i) Chilli   ii) Tomato

   iii) Rice   iv) Brinjal

Question No. 5 Marks: 4×1=4

5. Answer the following in **one** sentence each :

A. Contour farming

B. Seed hardening

C. Multi-tier crop system

D. T&V System

PART – B

Write short notes on **any five** of the following :   (5×4=20)

6. Hybrid vigour in crops

7. Management of problem soils

8. Economic use of irrigation water

9. Genetically modified organisms

10. Commercial cultivation practices of jasmine

11. Importance of pastures in agricultural economy.

Answer **any five** of the following: (5×12=60)

12. Write an essay on Intellectual Property Rights and Agriculture.

13. Give an account of agricultural marketing and marketing policies in India.

14. What are the pollutants of irrigation water and their sources ? How will you mitigate their ill effects to the soils and crops ?

15. Elucidate the role of above-ground and below-ground biodivarsity on sustainable crop production giving suitable examples.

16. Describe the principles and practices of crop breeding for resistance to pests and diseases.

17. Explain the various horticultural development programmes in India. How will you enhance exports of horticultural products ?

SEAL

ACF 2008

ZOOLOGY

Time : 3 Hours   Maximum Marks : 100

INSTRUCTIONS

1. Answers should be written only in **English**.

2. Answer **all** questions.

3. Write answers for objective and descriptive type questions in the **Answerbook** itself.

PART – A

Question No. 1   Marks : 7×1=7

1. A) _____ carries blood from heart to lungs.

   B) Alpha helix is associated with _____ structure of proteins.

   C) Echidna belongs to class _____

   D) _____ is a precursor of cholesterol biosynthesis.

   E) Vitamin _____ deficiency causes scurvy.

   F) Chelonians belong to the class _____

   G) Action potential is an _____ phenomenon.

2. What is Bergman's rule ?   Mark : 1

3. Name three living genera of order Dipnoi.   Mark : 1

P.T.O.

4. Which type of ribosome does prokaryotes possesses 70s or 80s ?   Mark : **1**

5. What is an ecological pyramid ?   Mark : **1**

6. Name four fat soluble vitamins.   Mark : **1**

7. What is binomial nomenclature ?   Mark : **1**

8. Expand MOEF.   Mark : **1**

Question No. 9   Marks : **6×1=6**

9. A) Which is considered to be a living fossil ?

   i) Horse shoe crab   ii) Tiger

   iii) Honey bee   iv) Apple snail

   B) Which is a mammal ?

   i) Sea horse   ii) Sea cucumber

   iii) Sea anemone   iv) Sea lion

   C) Which one of the following is a ruminant ?

   i) Human   ii) Pig   iii) Cow   iv) Drosophila

   D) Balanoglossus belongs to the phylum

   i) Echinodermata   ii) Annelida

   iii) Chordata   iv) Mollusca

   E) Schwann cells form a

   i) Blood clot   ii) Myelin sheath

   iii) Adipose cells   iv) Dendrons

   F) Which is a jawless vertebrate ?

   i) Lamprey   ii) Salmon   iii) Snake   iv) Eel

PART – B

SECTION – I   (5×4=20)

10. A) Explain allopatry and sympatry.

    OR

    B) Define hypervolume niche, fundamental niche and realized niche.

11. A) Write a brief note on acid rain.

    OR

    B) Write a note on different types of coral reefs.

12. A) What is gastulation ? Explain the process of gastulation.

    OR

    B) Write a note on ketone body formation.

13. A) Define S shaped growth curve with a simple example and illustration.

    OR

    B) Explain the zygotene stage of meiosis.

14. A) Explain briefly the terms population and population dynamics.

    OR

    B) Define taxonomy, nomenclature and systematics and state how they are related ?

SECTION – II (3×20=60)

15. A) Write an essay on evolution of Humans.

OR

B) Write an essay on the ultra structure and function of mitochondrion.

16. A) Write an essay on the affinities of Onychophorans.

OR

B) Describe lac operon and explain its regulation.

17. A) Explain post transcriptional modifications in Eukaryotic cell with diagrams.

OR

B) Define Hardy Weinberg equilibrium. Write an essay on the conditions that are responsible for deviation from the equilibrium.

CHEMISTRY

Time : 3 Hours   Max. Marks : 100

INSTRUCTIONS

1) Answers should be written only in **English**.

2) Answer **all** questions.

3) Write all your answers (Objectives/Descriptives) in the **answerbook** itself.

PART – A
(**Each** sub-question carries **one** mark)

Question No. 1   Marks : 5×1=5

1. A) IUPAC name of the complex compound $[Co(NH_3)_5Cl]\,Cl_2$ is _____

   B) The zwitter ion structure of glycine is _____

   C) _____ metal is present in Vitamin B_{12}.

   D) The differential rate equation of the reaction $2A + B \rightarrow$ is _____

   E) The structure of Z-2-butene is _____

Question No. 2   Marks : 5×1=5

2. A) The catalyst used in benzoin condensation is _____

   B) The Fischer structure of R-glyceraldehyde is _____

   C) What designation is given to an orbital having n = 2 and l = 1 ?

   i) 2p   ii) 2d   iii) 2s   iv) 3p

   D) What is the bond order of O_2^- ion ?

   i) $1\frac{1}{2}$ ii) 2   iii) $2\frac{1}{2}$ iv) 1

   E) The orbitals involved in the formation of complex $[Ni\,(CN)_4]^{2-}$ are

   i) s and p   ii) p and d   iii) s and d   iv) s, p and d

P.T.O.

3. A) The molecularities of the following reactions

$$NO + N_2O_5 \rightarrow 3NO_2$$

$$2NO + Cl_2 \rightarrow 2NOCl \text{ are}$$

   i) 2 and 3   ii) 3 and 2

   iii) 2 and 2   iv) 3 and 3

B) Which is the most stable carbanion amongst the following

   i) $CH_3^{\ominus}$ ii) $PhCH_2^{\ominus}$

   iii) $CH_3CH_2^{\ominus}$ iv) $CH_3CH_2CH_2^{\ominus}$

C) $Co\,(NH_3)_6\,Cl_3$ is elctrolyte of the type

   i) $1:1$ ii) $1:2$

   iii) $1:3$ iv) $3:3$

D) Which of the following represents the electron configuration of a metalloid in the ground state

   i) 2 – 3   ii) 2 – 5

   iii) 2-8-5   iv) 2-8-6

E) State Hund's rules.

4. A) Draw the electron dot structure of F_2O.

B) Give an example each for bi- and tri-dentate ligands.

C) State the first law of thermodynamics.

D) Define molar heat capacity.

E) Give an example of heterogeneous catalysis.

PART – B

SECTION – 1

Answer **all** questions taking note of internal choice. **Each** question carries **four** marks. $(5 \times 4 = 20)$

5. A) Which of the following electron configurations would you expect to have the lowest ionization energy ? Explain.

    i) $1s^2 \, 2s^2 \, 2p^6$ ii) $1s^2 \, 2s^2 \, 2p^5$ and   iii) $1s^2 \, 2s^2 \, 2p^6 \, 3s^1$

   B) Explain why cationic radii are lower but anionic radii are larger than atomic radii.

6. One element has atomic number 14 and other has atomic number 15.

   A) What will be the maximum valence of the elements ?

   B) If all the valences are satisfied by combining with hydrogen or chlorine to form MH_n and MCl_m, what will be the value of n and m ? What will be the geometry of the compounds ?

7. A reversible Carnot cycle does work equivalent to 150 kJ per cycle. If heat supplied by heat cycle is 225 kJ at 227°C per cycle, calculate

   A) the temperature at which the heat is rejected

   B) the thermal efficiency of the engine.

8. Draw the possible isomers of the compounds $[MA_2B_4]$ and $[MA_3B_3]$ and give their names.

   OR

   A) In a reaction $H_2 + I_2 \rightarrow 2HI$, the rate of disappearance of iodine is found to be 10^{-6} mol $l^{-1}s^{-1}$. What would be the corresponding rate of disappearance of hydrogen and formation of hydrogen iodide ?

   B) What factors determine the standard electrode potential of a metal ?

9. A) Give the mechanism of S_N2 reactions.

   B) Write the structures of the products when toluene is subjected to nitration.

OR

   A) Explain the Fridel-Craft's alkylation reaction between benzene and n-propyl chloride.

   B) Write the structures of syn- and anti-isomers of oxime of acetophenone.

SECTION – 2

Answer **all** questions availing internal choice. **Each** question carries **twelve** marks.   (5×12=60)

10. A) What is the significance of the four quantum numbers ?

    B) Explain why the electron affinity of the atoms increases from left to right along a row in the periodic table.

    C) $[CoF_6]^{3-}$ is paramagnetic while $[Co(NH_3)_6]^{3+}$ is diamagnetic. Explain.

    D) Give the functions of haemoglobin and myoglobin.

11. A) Define lattice energy and give Born-Lande's equation for the same.

    B) Using crystal field theory show the splitting of d-orbitals in octahedral field.

    C) Discuss the factors which influence the stability of the complex.

    D) A dilute solution of $KMnO_4$ is purple in colour while that of $MnCl_2$ is colourless. Explain.

OR

    A) Sulphonation of aromatic hydrocarbons is a reversible reaction. Explain.

    B) Give any two rearrangement reactions of carbocations.

    C) Explain the aromaticity of benzene with the help of Huckle's rule.

    D) Explain the acidity of the following with reference to inductive effect .

    $ClCH_2COOH$, $Cl_2CHCOOH$.

12. A) What do you mean by the terms thermal-mechanical and chemical-equilibrium ?

B) What is poisoning of a catalyst ? Illustrate the poisoning phenomenon with an example.

C) Define the terms specific conductance and equivalent conductance. Give the relation between them.

D) Calculate the emf of the zinc-silver cell at 25°C when $[Zn^{2+}] = 0.10$ M and $[Ag^+] = 10$ M. (Given $E°$ for the cell at 25°C = 1.56 V).

13. A) What is racemisation ? Name any two methods for resolution of racemic mixtures.

B) Write the mechanism for aldol condensation.

C) Explain hydrogen bonding in alcohols and water.

D) What are amylose and amylopectin ? How are they obtained from starch ?

OR

A) Explain the use of IR spectroscopy in elucidating the structure of simple organic molecules.

B) Give a method of synthesis of polypeptide.

C) How do you use methylation studies in establishing the structure of disaccharides ?

D) Write the mechanism of Perkin reaction.

14. A) Explain the use of UV spectroscopy in determining the conjugation in organic molecules.

B) Write briefly about the secondary structure of proteins.

C) Give any two substitution reactions of carbanions.

D) Give the mechanism of E_1 reaction.

PHYSICS

Duration : 3 Hours

Max. Marks : 100

INSTRUCTIONS

1) Answers should be written only in **English**.

2) Answer **all** questions.

3) Write all your answers (Objectives/Descriptives) in the **answerbook** itself.

PART – A
(Each sub-question carries **one** mark)

Question No. 1   Marks : 5×1=5

1. A. If the radius of the earth is reduced by 1% and if mass remains the same then escape velocity will
   i) Increase about by 0.5% ii) Decrease by 10%
   iii) Not change iv) Decrease by 5%

   B. Is it possible to put an artificial satellite into an orbit in such a way that it will always remain directly over New Delhi ?

   C. The net gain in the entropy of the working substance in a Carnot cycle is _____ (fill up the bank)

   D. The degrees of freedom for polyatomic gases such as hydrogen and ozone will be
   i) 2 & 3 ii) 5 & 6
   iii) 3 & 4 iv) 3 & 9

   E. Which of the following properties of wave is independent of the other ?
   i) Reflection ii) Interference
   iii) Diffraction iv) Polarization

Question No. 2   Marks : 5×1=5

2. A. In Young's double slit experiment, if the separation of slit is doubled and the distance of the screen is halved, the fringe width will become _____ (fill up the blank)

P.T.O.

SEAL

B. The electric field at a point inside a hollow metallic charged sphere is

    i) Zero

    ii) Non-zero but constant

    iii) Varies with distance from the centre

    iv) Depends on charge and radius of sphere

C. Define Q-factor.

D. What is a dipole ?

E. State Poynting theorem.

                                                Question No. 3   Marks : 5×1=5

3. A. The maximum possible number of electrons in a shell with principal quantum number n is _____ (fill up the blank)

B. What is a solar cell ?

C. Define Meisner effect.

D. A particle is travelling at a speed 'v' such that $y/c = 0.99$, then the ratio m/m_0 for the particle is _____ (fill up the blank)

E. LASER is the acronym for

    i) Light Amplification by Stimulated Emission of Radiation

    ii) Light Application for Spontaneous Emission of Radiation

    iii) Light Application for Strong Emission of Radio activity

    iv) None

                                                Question No. 4   Marks : 5×1=5

4. A. An electron and a proton have same kinetic energy, then _____ has the greater deBroglie wavelength (fill up the blank).

B. Define depletion zone.

C. Which of the following statements is true ?

    i) At low temperature silicon is an insulator

    ii) At high temperature silicon is a good conductor

    iii) At high enough temperature silicon behaves like a metal

    iv) At absolute zero temperature silicon is an insulator

D. One of the following does not obey Ohm's law :

   i) A bar of pure semiconductor

   ii) N-type semiconductor

   iii) P-type semiconductor

   iv) P-N junction diode

E. On what quantum numbers does the energy of an electron depends in a Vanadium atom ?

PART – B

SECTION – 1   (5×4=20)

(Each question carries **four** marks)

5. a) Define an inertial frame . Show that a frame with constant velocity relative to an inertial frame is also inertial.

              OR

  b) What is mean-free-path ? Deduce the expression for mean-free-path of a gas in terms of gas pressure.

6. a) Obtain the expression for the velocity of transverse wave along a stretched string.

              OR

  b) Show that the intensity of light transmitted through a polarizer is half of the intensity of incident light.

7. a) Define self inductance. Obtain the expression for the self inductance of a solenoid.

              OR

  b) Describe Frank and hertz experiment and its significance.

8. a) What is the significance of wave function ψ ? Explain.

              OR

  b) What are point groups and space groups ? Explain.

9. a) Why the base region of a transistor is thin ? Explain.

              OR

  b) What is Lorentz-Fitzerald contraction ? Explain with necessary theory.

SECTION – 2 (5×12=60)

(**Each** question carries **12** marks)

10. a) Define Young's modulus, bulk modulus and Poisson's ratio, and derive the relation between them.

OR

b) Deduce the Clausius-Clapyron equation and explain why the boiling point of water increases with increasing pressure.

11. a) Derive the expression for the potential and kinetic energy of a vibrating string and calculate the energy in each normal mode of a vibrating string.

OR

b) Discuss the phenomenon of interference in thin films. Obtain the condition for maxima and minima for reflected light.

12. a) Derive helmholtz's equation for the growth and decay of an electric current in LR circuit and explain the significance of time constant.

OR

b) What is Zeeman effect ? Distinguish between normal and anomalous-Zeeman effect. Give the classical theory of normal Zeeman effect.

13. a) Show that the necessary and sufficient condition for the wave functions ψ_1 and ψ_2 to be linearly independent is that their Wronskian does not vanish.

OR

b) What is Raman effect ? On the basis of quantum theory explain the origin of Stokes and Anti-Stokes lines in Raman spectrum.

14. a) Explain the concept of density of states for a free electron gas.

OR

b) What is Minkowski space ? Explain. Show that $x^2 + y^2 + z^2 - c^2t^2$ is invariant under Lorentz transformations.

_____

| ACF 2008 |

CIVIL ENGINEERING

Duration : 3 Hours   Max. Marks : 100

INSTRUCTIONS

1) Answer **all** questions.

2) Answers to be written in **English** only.

3) Missing data, **if any**, may suitably be assumed (Mention the same).

4) IS codes, Handbooks, Charts are **not allowed**.

5) Part **A** contains "**Three**"questions and Part "**B**" contains "**Four**" questions.

PART – A
(Each Sub-question carries **one** mark)

Question No. 1   Marks : $7 \times 1 = 7$

S E A L

1. Fill in the blanks :

A) The minimum pitch distance in riveted connection is _____ times the diameter.

B) pH for drinking water should be between _____.

C) The standard length of rail in broad gauge is _____.

D) The final setting time of ordinary portland cement should not be more than _____.

E) The difference between the latest allowable time and the earliest expected time is called _____.

F) The ratio of ultimate bearing capacity and factor of safety is called _____.

G) In theodolite survey, when the line of collimation is horizontal, vertical circle reads _____.

P.T.O.

2. Choose the correct answer :

A) The imaginary point through which the resultant of all parallel forces pass through a body is called _____

   i) Moment of inertia   ii) Frictional force

   iii) Centre of gravity   iv) Support reaction

B) In the case of thick cylinders, the longitudinal stress

   i) Varies with maximum at outer surface to minimum at inner surface

   ii) Varies with maximum at inner surface to minimum at outer surface

   iii) Is uniform throughout the thickness

   iv) Is zero everywhere

C) The influence diagram for reaction at the support of a cantilever will be a

   i) Triangle with zero ordinate at fixed end unit ordinate at free end

   ii) Triangle with unit ordinate at fixed end and zero ordinate at free end

   iii) Rectangle with unit ordinate

   iv) Rectangle with ordinate of 0.5

D) A series of continuous spot weld is called

   i) Fillet weld   ii) Seam weld

   iii) Stitch weld   iv) Butt weld

E) Head loss in the pipes due to friction is calculated by using the formula

   i) $flv^2 / (2gd)$ ii) $flv / (2gd)$

   iii) $8 flv^2 / (2gd)$ iv) $4 flv^2 / (2gd)$

F) A sanitary sewer line is expected to run

   i) Full   ii) 50% full

   iii) 75% full   iv) 67% full

G) Combined pumping and gravity flow system is best suited where

   i) City is in plains and source is elevated

   ii) City is on a gentle slope and source is elevated

   iii) City is on a steep slope and source is below

   iv) Any type of topography

3. Answer in **one** sentence :

   A) What is the minimum gradient to be provided in plain ?

   B) Where do you provide Cribb ballasting in railways ?

   C) Why do you use clinometer ?

   D) What is the name given for time versus activity chart in construction management ?

   E) What is meant by point of known elevation ?

   F) What is a lintel ?

PART – B   (4×20=80)

4. A) Define

   i) Shear force and

   ii) Bending moment for a statically determinate beam. Figure 1 shows a cantilever beam subjected to uniformly distributed load. Draw shear force and bending moment diagram.   12
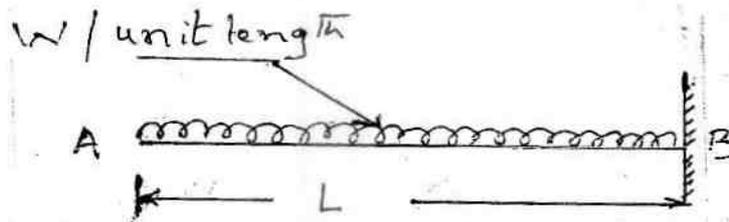

Figure 1

B) A ladder of length rests against a wall as shown in Figure 2. The coefficient of static friction at both wall and ground is "f". Determine how high a man of weight W can climb before ladder slips. Neglect the weight of ladder.   8
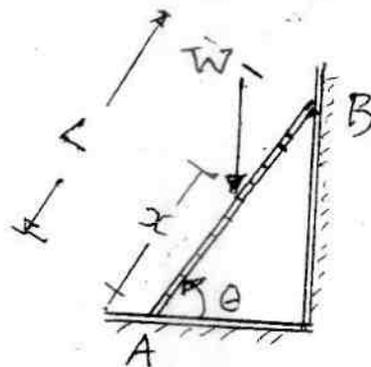
Figure 2

OR

Define a three-hinged arch. Bring out the salient features of a three hinged arch.
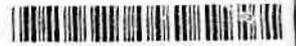
5. A) What are the reasons due to which maintenance of canal is essential ? Explain the measures to be adopted for silt removal. 12

   B) Sketch the main parts of a single stage centrifugal pump. 8

   OR

   Explain the procedure of "Analysis of waste water sample for B.O.D" test.

6. A) Explain the following in highway planning :

   i) Requirements in alignment between two terminals

   ii) Factors controlling the alignment

   iii) Special considerations while aligning hill roads. 12

   B) The vertical angles of two vanes fixed at 1 m and 3 m above the foot of a staff held vertically, at a station A were 3°10' and 5°24' respectively. Find the horizontal distance (H) and reduced level, if the instrument axis is 138.556 m. 8

   OR

   Explain the following types of errors in levelling :

   i) Instrument errors

   ii) Personal errors

   iii) Natural errors

7. A) Explain the method of determining "Shear Parameters' for silty clays by conducting direct shear test. Bring out the advantages of direct shear test. 12

   B) Write the sketches of the following types of stair cases (plan view only) : 8

   i) Straight stairs   ii) Quarter-turning stairs

   iii) Spiral stairs   iv) Bifurcated stairs

   OR

   Bring out the properties and uses of cement mortar.

MATHEMATICS

Duration : 3 Hours   Max. Marks : 100

INSTRUCTIONS

1) Answers should be written only in **English**.

2) Answer **all** questions.

3) Write answers for objective and descriptive type questions in the **Answerbook** itself.

PART – A
(**Each** sub-question carries **one** mark)

1. **Choose the correct answer.**

                                    Question No. 1   Marks : **7×1=7**

A) $\lim\limits_{m\to\infty}\left(\dfrac{1}{1-m^2}+\dfrac{2}{1-m^2}+\ldots+\dfrac{m}{1-m^2}\right)$ is equal to

i) 0   ii) $-\dfrac{1}{2}$ iii) $\dfrac{1}{2}$ iv) none of these

B) $f(x) = x|x|$ is differentiable

i) on $(-\infty,\infty)$ ii) only on $(-\infty,0)\cup(0,\infty)$

iii) only on $(0,\infty)$ iv) none of these

C) The number of solutions of $z^3 + \bar{z} = 0$ is

i) 2   ii) 3   iii) 4   iv) 5

D) If $I = \int\limits_{-2}^{2} |1 - x^4|\, dx$, then I equals

i) 6   ii) 8   iii) 12   iv) 21

                                                                P.T.O.

E) The function $f(x) = x^2 e^{-2x}$, $x > 0$ has the maximum value of $f(x)$ equal to

    i) $\dfrac{1}{e}$ ii) $\dfrac{1}{2e}$

    iii) $\dfrac{1}{e^2}$ iv) none of these

F) The set of integers $\mathbb{Z}$ is a cyclic group generated by

    i) only the element 1

    ii) only the element -1

    iii) infinitely many elements of $\mathbb{Z}$

    iv) none of these

G) $G = \{1, -1, i, -i\}$ is a group under multiplication. Then the order of i, denoted by $0(i)$ is

    i) 1   ii) 2   iii) 4   iv) none of these

2. **Fill in the blanks with correct answer.**

                                                    Question No. 2   Marks : 7×1=7

A) The degree of the differential equation

$$\left(1 + \left(\frac{dy}{dx}\right)^2\right)^{1/3} = \frac{d^2y}{dx^2} \text{ is } \underline{\hspace{3cm}}.$$

B) The remainder when 2^{1000} is divided by 17 is $\underline{\hspace{3cm}}.$

C) The particular solution of the differential equation $\dfrac{dy}{dx} = y$ with $y(0) = 1$, is

$\underline{\hspace{4cm}}.$

D) If G is a finite group and $a \in G$, then the order $O(a)$ of a divides $\underline{\hspace{3cm}}.$

E) If a and n are two positive integers such that $(a, n) = 1$ and if $\phi(n)$ is the Euler ϕ-function, then Euler's theorem states that $\underline{\hspace{3cm}}$

F) Define linearly dependent vectors in a vector space V over ℝ.

G) If $\sum_{n=1}^{\infty} a_n$ is a series and $a_n \not\to 0$, as $n \to \infty$, then the series $\sum_{n=1}^{\infty} a_n$ is

_____

3. **State whether the following statements are true or false or answer briefly.**

Question No. 3   Marks : 6×1=6

A) If $\lim_{x \to a} \dfrac{f(x) - f(a)}{x - a}$ exists, then

$\lim_{x \to a} f(x) = f(a)$

(True or False)

B) For two complex numbers z_1 and z_2 (non-zero), $|z_1 + z_2| = |z_1| + |z_2|$, then $\arg z_1 = \arg z_2$. (True or False)

C) The vectors (1, 0, 0), (0, 2, 0), (0, 0, 3) are linearly dependent.

(True or False)

D) Let $a_1 x + b_1 y = c_1$

$a_2 x + b_2 y = c_2$

be a system of equations. If $D = \begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}$

$D_1 = \begin{vmatrix} c_1 & b_1 \\ c_2 & b_2 \end{vmatrix}$ and $D_2 = \begin{vmatrix} a_1 & c_1 \\ a_2 & c_2 \end{vmatrix}$, $D \neq 0$, then the solution is given by

x = _____ and y = _____

E) The function $f(z) = |z|$, $z \in \mathbb{C}$ is analytic at 0.

(True or False)

F) The series $\sum\limits_{n=1}^{\infty} \dfrac{1}{n}$ is convergent.

(True or false)

PART – B

SECTION – 1

Answer the following questions. (5×4=20)

4. A) If d is the g.c.d. of a and b, then show that there exist integers x and y such that d = xa + yb.

OR

B) Solve $(x^2 + y^2)\, dx - 2xy\, dy = 0$.

5. A) State and prove Lagrange's theorem on the orders of finite groups.

OR

B) State and prove the Mean value theorem of real analysis.

6. A) State and prove Cauchy's integral formula of complex analysis.

OR

B) Show that $L[\sinh ax] = \dfrac{a}{p^2 - a^2}$, $p > |a|$.

7. A) For the matrix $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ find the corresponding linear transformation $T : \mathbb{R}^2 \to \mathbb{R}^2$ w.r.t. the basis $\{(1, 0), (1, 1)\}$.

OR

B) If $f'(z) = 0$ in a domain D in the complex plane, then show that f is a constant in D.

8. A) If u is a homogeneous function in x and y then show that $\dfrac{\partial^2 u}{\partial x \partial y} = \dfrac{\partial^2 u}{\partial y \partial x}$.

OR

B) Show that $x^2 + y^2 + x + y + xy$ has a minimum value at $\left(-\dfrac{1}{3}, -\dfrac{1}{3} \right)$ and the minimum value is $-\dfrac{1}{3}$.

SECTION – 2

Answer the following questions. (5×12=60)

9. A) If a, b, c are three positive integers such that the g.c.d. of a and b namely (a, b) = 1 and a|c, b|c, then, prove that ab|c.

B) Prove that the product of r consecutive positive integers is divisible by $\lfloor$ r.

OR

A) Solve $\dfrac{d^2 y}{dx^2} - 5\dfrac{dy}{dx} + 6y = e^{4x}$.

B) Find particular solution of the equation $y'' + y = \text{cosec} x$, by the method of variation of parameters.

10. A) Show that every subgroup of a cyclic group is cyclic.

B) If G and G' are two groups and if f : G → G' is a homomorphism, then show that Kerf is a normal subgroup of G.

OR

A) Find the equation to the sphere which passes through $(1, -3, 4)$, $(1, -5, 2)$, $(1, -3, 0)$ and whose centre lies on the plane $x + y + z = 0$.

B) Find the equation to the tangent plane to the sphere $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$.

11. A) State and prove De Moivre's theorem for any integer index.

B) Find n, n^{th} roots of -1.

OR

A) Define dot product and cross product of two vectors $\vec{a}$ and $\vec{b}$. Show that $\vec{a}.(\vec{b} \times \vec{c}) = (\vec{a} \times \vec{b}).\vec{c}$ for three vectors $\vec{a}, \vec{b}, \vec{c}$ in $\mathbb{R}^3$.

B) Use the scalar triple product to show that the vectors $\vec{a} = (1, 4, -7)$, $\vec{b} = (2, -1, 4)$ and $\vec{c} = (0, -9, 18)$ are coplanar.

12. A) Define a bilinear transformation and define the cross ratio of four distinct points in the extended plane $\overline{\mathbb{C}}$. Show that a bilinear transformation preserves the cross ratio of four points.

B) Find the bilinear transformation which maps $0, -i, -1$ to $i, 1, 0$ respectively.

OR

A) Prove that a monotonically increasing sequence which is bounded above always converges and it converges to its supremum.

B) Discuss the convergence of the sequence $\{x_n\}$, where

$$x_n = \frac{1}{n+1} + \frac{1}{n+2} + \dots + \frac{1}{n+n}.$$

13. A) Let $f : I = [a, b] \rightarrow [a, b]$ be a continuous function. Then, show that the equation $x = f(x)$ has atleast one solution in I. When is the solution unique ?

B) Find a real root of the equation,

$F(x) = x^3 - 6x + 1 = 0,$

using bisection method.

OR

A) Explain Newton-Raphson method.

B) Find the square root of 2 using Newton-Raphson method.

BOTANY

Duration : 3 Hours   Maximum Marks : 100

INSTRUCTIONS

1. Answer should be written only in English.

2. Answer all questions.

3. Write answers for objective and descriptive type question in the **Answerbook** itself.

PART – A

(**Each** sub-question carries **one** mark)

Question No. 1   Marks : 7×1=7

1. Fill in the blanks :

   A. Synangium is a group of spore bearing structure found in _____ .

   B. Retinacula is seen in the fruits of _____ family members.

   C. Self pollination resulting in never opening flowers is called _____ .

   D. Balloon like protrusions into the tracheary elements is called _____ .

   E. _____ cells in the epidermis are supposed to help the closing and opening movements of grass leaves.

   F. Citrus canker is caused by _____ .

   G. _____ tissue in the aerial roots of epiphytic orchids help in absorption of moisture.

2. Choose the correct answer :   Question No. 2   Marks : 7×1=7

   A. Synzoospore is produced by

      i) <u>Spirogyra</u>   ii) <u>Chara</u>

      iii) <u>Vaucheria</u>   iv) Diatoms

   B. The modified calyx in Asteraceae is called

      i) Pappus   ii) Achene

      iii) Involucre   iv) Palea

C. Quinine is obtained from _____ of <u>Cinchona Officinalis</u>

    i) Root   ii) Flower

    iii) Leaf   iv) Stem bark

D. Maturity of carpels prior to anthers is

    i) Herkogamy   ii) Protogyny

    iii) Protandry   iv) Chasmogamy

E. Digestive glands are characteristic of

    i) Mangroves

    ii) Orchids

    iii) Insectivorous plants

    iv) Diatoms

F. Exudation of water in liquid form takes place through

    i) Lenticels   ii) Stomata

    iii) Hydathodes   iv) Pneumatophores

G. The chlorophyll pigments in a chloroplastid are located in

    i) Stroma   ii) Grana

    iii) Chloroplast membrane   iv) Cytoplasm

3. Answer in **one** sentence :   Question No. 3   Marks : 6×1=6

A. What is a plasmid ?

B. Give the meaning of hydroponics.

C. Explain Gondwana Land.

D. What is a golgi complex ?

E. What are long day plants ?

F. What is meant by food chain ?

PART – B

SECTION – 1

5×4=20

4. Write notes on :

A. Economic importance of Cyanobacteria.

OR

B. Coralloid roots of <u>cycas.</u>

5. A. Salient features of Asteraceae.

OR

B. Sporophyte of <u>Anthoceros</u>.

6. A. Environmental factors influencing rate of photosynthesis.

OR

B. Mechanism of stomatal opening and closing.

7. A. <u>In situ</u> conservation of biodiversity.

OR

B. Characters of mangroves.

8. A. Define endosperm and comment on their types.

OR

B. Comment on pigments involved in photosynthesis.

SECTION – 2

9. Answer the following :

5×12=60

A. Explain in detail the vegetation of Karnataka.

OR

B. Write critically in soil erosion. Add note on the methods of controlling soil erosion.

10. A. Differentiate between hydrophytes and xerophytes.

OR

B. Give symptoms, causative agent and control of Tikka disease.

11. A. Explain the Mendel's work of monohybrid and dihybrid crosses.

OR

B. Describe in detail the types of vascular bundles.

12. A. Give the salient features and two examples of following families :

i) Annonaceae

ii) Rubiaceae

iii) Lamiaceae

OR

B. Differentiate between :

i) Capparidaceae and Brassicaceae

ii) Asclepiadaceae and Verbenaceae

iii) Arecaceae and Liliaceae

13. A. Compare the anatomy of Selaginella and Equisetum stems.

OR

B. Give the life-cycle of Batrachospermum.

_____