Candidate Marks Report

Series : Mar-Apr 2017

This candidate's script has been assessed using On-Screen Marking. The marks are therefore not shown on the script itself, but are summarised in the table below.

Centre No :	RPSC	Assessment Code :	Paper - II_Eng Med_2
Candidate No :	205543	Component Code :	01
Candidate Name :	NONAME		
Total Marks :	**107 / 200**		

In the table below 'Total Mark' records the mark scored by this candidate.
'Max Mark' records the Maximum Mark available for the question.

Paper:	**8002A**
Paper Total:	**107 / 200**

Question	Total Mark / Max Mark
1	2 / 2
2	0 / 2
3	2 / 2
4	NR / 2
5	2 / 2
6	NR / 2
7	NR / 2
8	NR / 2
9	2 / 2
10	2 / 2
11	5 / 5
12	0 / 5
13	NR / 5
14	5 / 5
15	5 / 5
16	10 / 10
17	10 / 10
1	2 / 2
2	NR / 2
3	0 / 2
4	2 / 2
5	0 / 2
6	4 / 5
7	5 / 5
8	1 / 5
9	3.5 / 5
10	5 / 10
11	3.5 / 10
12	6.5 / 10
13	1 / 10
1	1 / 2
2	1 / 2

Shailesh khairva

Rank 2-A

3	1 / 2
4	1 / 2
5	0 / 2
6	3 / 5
7	3 / 5
8	3 / 5
9	2.5 / 5
10	3 / 5
11	NR / 10
12	4 / 10
13	6 / 10

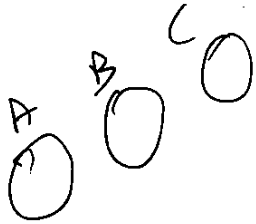
39438

PART - I

Paper Code

P-2

205543



5, 7, 9

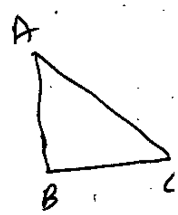
3 5

LCM

315) 1000 (3
945
55

315) 9

9) 943
184



$AC^2 = AB^2 +$

IMPORTANT NOTES
महत्त्वपूर्ण निर्देश

(A) Please fill up the OMR Sheet of this Question-Answer Booklet properly before answering.
प्रश्नोत्तर पुस्तिका में प्रश्न हल करने से पूर्व उसके संलग्न ओ.एम.आर. पत्रक को भली प्रकार से भर लें ।

(B) The question paper is divided into different unit and parts. The number of questions to be attempted and their marks are indicated in each unit and parts.
प्रश्न-पत्र विभिन्न यूनिट एवं भागों में विभाजित है । प्रत्येक यूनिट एवं भाग में से किये जाने वाले प्रश्नों की संख्या और उनके अंक उस यूनिट एवं भाग में अंकित किये गए हैं ।

(C) Attempt answers either in **Hindi or English**, not in both. For Language Papers, answer in concerned language and script, unless directed otherwise to write in Hindi or English specifically.
उत्तर **अंग्रेजी या हिन्दी** भाषा में से किसी एक में दीजिये, दोनों में नहीं । भाषा विषयक प्रश्नों के उत्तर उनकी संबद्ध भाषा व लिपि में ही दिए जाएँ, जब तक कि प्रश्न विशेष के लिए अलग से हिंदी या अंग्रेजी में उत्तर देने के लिए न लिखा गया हो ।

(D) The candidates should not write the answers beyond the prescribed limit of words; failing this, marks will be deducted.
अभ्यर्थियों को अपने उत्तर निर्धारित शब्दों की सीमा से अधिक नहीं लिखना चाहिए । इसका उल्लंघन करने पर अंक काटे जायेंगे ।

(E) Please write answers only in the prescribed space of booklet. Do not write any mark of identity inside the Answer Script (including Paper for rough work) i.e. name, address, telephone number, Name of God etc. or any irrelevant words other than the answer of question. Such act will be treated as unfair means. The Commission may also deduct 5 marks from the marks obtained, if Roll Number is not filled correctly on the O.M.R. Sheet.
किसी भी प्रश्न का उत्तर प्रश्नोत्तर पुस्तिका में निर्धारित स्थान पर ही लिखें । प्रश्नोत्तर पुस्तिका (रफ कार्य के पृष्ठ सहित) के अंदर कहीं पर भी अपना नाम, रोल नंबर अथवा अन्य कोई पहचान चिह्न यथा -- प्रश्नोत्तर में नाम, पता, दूरभाष नंबर, देवताओं के नाम अथवा अन्य कोई भी प्रश्नोत्तर से असम्बंधित शब्द, वाक्य एवं अंक आदि न लिखें । ऐसा करने पर आयोग द्वारा इसे अनुचित साधन अपनाने का कृत्य माना जायेगा । ओ.एम.आर. पत्रक पर रोल नम्बर का त्रुटिपूर्ण अंकन करने पर आयोग द्वारा उसके प्राप्तांकों में से 5 अंक भी काटे जा सकते हैं ।

(F) Candidates are directed that they should not write (answer) out side the border line in every page. Answer written out side the border line will not be checked by the Examiner.
अभ्यर्थियों को निर्देशित किया जाता है कि प्रश्नोत्तर पुस्तिका में प्रत्येक पृष्ठ में बनाई गई बार्डर लाईन से बाहर प्रत्युत्तर नहीं लिखें । बार्डर लाईन के बाहर लिखे गये उत्तर को परीक्षक द्वारा जाँचा नहीं जायेगा ।

(G) If there is any sort of ambiguity/mistake either of printing or factual nature then out of Hindi and English version of the question, the English version will be treated as standard.
यदि किसी प्रश्न में किसी प्रकार की कोई मुद्रण या तथ्यात्मक प्रकार की त्रुटि हो तो प्रश्न के हिन्दी तथा अंग्रेजी रूपान्तरों में से अंग्रेजी रूपान्तर मान्य होगा ।

(H) The Question-Answer Booklet is provided in a sealed envelope to the candidate. Candidate must sign the declaration as per directions printed on the envelope and return it to the invigilator.
अभ्यर्थी को प्रश्नोत्तर पुस्तिका सीलबंद लिफाफे में प्रदान की गई है । अभ्यर्थी लिफाफे पर अंकित निर्देशों को पढ़कर घोषणा पर हस्ताक्षर कर लें और उसे अभिजागर को वापस कर दें ।

(I) Candidate should fill up all desired details on this attached OMR sheet of Question-Answer Booklet with **blue** ball point pen. Please ensure that this OMR Sheet is not torn or damaged.
अभ्यर्थी प्रश्नोत्तर पुस्तिका के ऊपर संलग्न इस ओ.एम.आर. पत्रक पर सभी वांछित विवरण **नीले** बॉल पेन से सावधानीपूर्वक भरें । ध्यान रखें कि यह ओ.एम.आर. पत्रक कहीं से कटे-फ़टे नहीं अथवा किसी भी प्रकार से क्षतिग्रस्त नहीं हो ।

(J) This **OMR** Sheet consists of **Two** parts, in which some information is pre-printed; remaining details have to be filled by the candidate.
यह **ओ.एम.आर.** पत्रक **दो** भागों में बंटा है, जिसमें कतिपय सूचनाएँ पूर्वमुद्रित हैं । शेष की पूर्ति अभ्यर्थी को करनी है ।

(K) If the Question-Answer Booklet is torn or not printed properly, bring it to notice of invigilator and change the Question-Answer booklet, otherwise the candidate will be liable for that.
यदि प्रश्नोत्तर पुस्तिका कहीं से कटी-फटी या अमुद्रित है, तो अभिजागर के ध्यान में ला दें तथा उसे बदलवा ले, अन्यथा उसका दायित्व अभ्यर्थी का होगा ।

विशेष नोट :
अभ्यर्थी द्वारा यदि ओ.एम.आर. पत्रक पर गलत सूचना भरी जाती है या उसे किसी प्रकार की क्षति पहुँचाई जाती है अथवा उस पर किसी प्रकार का पहचान चिह्न अंकित किया जाता है, तो आयोग द्वारा संपूर्ण परीक्षा हेतु अभ्यर्थिता निरस्त की जा सकेगी और उसके लिए अभ्यर्थी उत्तरदायी होगा ।

Special Notes :
If there is any wrong information filled by the candidate or any attempt is made to damage it or any marking as identification is done, then his candidature for the entire examination shall be rejected by the commission, for which he will be liable.

SPACE FOR ROUGH WORK

PAPER – II GENERAL STUDIES & GENERAL KNOWLEDGE

(Total 200 Marks)
(Total 43 Questions)

Unit – I **(65 Marks)**
(यूनिट – I) **(65 अंक)**

Part – A **Marks : 20**
भाग – अ **अंक : 20**

Note : Attempt **all** questions. Answer the following questions in **15** words each. Each question carries **2** marks.

नोट : **सभी** प्रश्नों के उत्तर दें । निम्न प्रश्नों का उत्तर **15-15** शब्दों में दें । प्रत्येक प्रश्न के **2** अंक निर्धारित हैं ।

1. Find the number of 5's in the following number chain such that sum of two digits before it is not greater than the sum of two digits that follows it.
2459358765215050 3503
नीचे दी गई संख्या शृंखला में ऐसे कितने 5 हैं जिनके ठीक पहले के दो अंकों का योग उसके ठीक बाद के दो अंकों के योग से अधिक नहीं है ?
2459358765215050 3503

There are four such 5's in 2459358765215050 3503

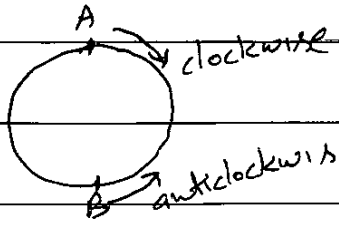
(2+4) ≤ (9+3) ✓

(9+3) ≤ (8+7)

(2+1) ≤ (0+5)

(0+3) ≤ (0+3)

2. A particle can complete a circular round in one minute, but it moves half round clockwise and one-third round anticlockwise successively. Find the time in which the particle will complete one round.
एक कण एक वृत्ताकार चक्र एक मिनट में पूरा कर सकता है परन्तु वह क्रमानुसार आधा चक्र घड़ी की दिशा में तथा एक तिहाई चक्र घड़ी की विपरीत दिशा में चलता है । वह समय ज्ञात कीजिये जिसमें वह कण एक पूरा चक्र करेगा ।



0 ✗

It will never complete one complete round as it will keep oscillating between A and B.

3. Find the smallest integer greater than 1 which is simultaneously a square and a cube of certain integers.
1 से अधिक वह छोटे से छोटा पूर्णांक ज्ञात कीजिये जो एक साथ किन्हीं कतिपय पूर्णांकों का वर्ग व घन हो ।

64 is the number which is square of 8 and cube of 4. ✓2

4. In a right angle triangle ABC, right angled at B, prove that
$(AB)^3 + (BC)^3 < (AC)^3$
एक समकोण त्रिभुज ABC में कोण B समकोण है । सिद्ध कीजिये कि
$(AB)^3 + (BC)^3 < (AC)^3$

5. What is the variance of first n natural numbers ?
प्रथम n प्राकृत संख्याओं का प्रसरण क्या है ?

Standard deviation of first n natural numbers $= \sqrt{\frac{\Sigma x^2}{n} - \left(\frac{\Sigma x}{n}\right)^2}$

$\Sigma x = 1+2+\cdots n = \frac{n(n+1)}{2}$

$\Sigma x^2 = 1^2+2^2+\cdots n^2 = \frac{n(n+1)(2n+1)}{6}$

$S.D = \sqrt{\frac{(n+1)(2n+1)}{6} - \left(\frac{n+1}{2}\right)^2} = \sqrt{(n+1)\left\{\frac{2n+1}{6} - \frac{n+1}{2}\right\}}$

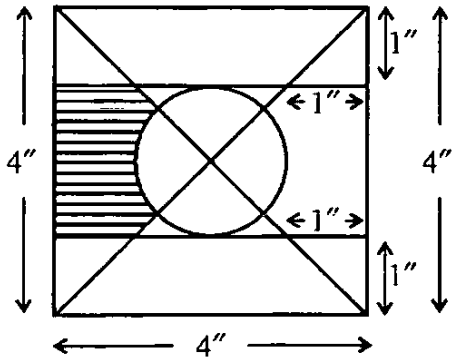
$= \sqrt{(n+1)\left(\frac{n-1}{12}\right)} = \sqrt{\frac{n^2-1}{12}}$ ✓2

Variance $= (S.D)^2 = \frac{n^2-1}{12}$ Ans.

6. If A, B and C are three sets such that none is a subset of other. Use the Venn Diagram to find $(A - C) \cap (C - B)$
यदि A, B व C तीन ऐसे समुच्चय हैं कि कोई भी दूसरे का उपसमुच्चय नहीं है । वेन आरेख का उपयोग कर $(A - C) \cap (C - B)$ ज्ञात कीजिये ।

7. If "SHANTI" is coded as A981A4B09, "FORUM" is coded as 6A5A8B1A3 in a certain code language, then how will "BUILD" be coded in the same language ?
यदि एक निश्चित कूट भाषा में "SHANTI" को A981A4B09 लिखा जाता है, "FORUM" को 6A5A8B1A3 लिखा जाता है तो उसी कूट भाषा में "BUILD" को क्या लिखा जायेगा ?

8. Find the area of the shaded portion in the following figure.
दिये गये चित्र में छायांकित भाग का क्षेत्रफल ज्ञात कीजिये ।



9. In an examination it is required to get 36% of maximum marks to pass. A student got 94 marks and was declared fail by 14 marks. Calculate the maximum marks.
किसी परीक्षा में उत्तीर्ण होने के लिए अधिकतम अंक का 36% की आवश्यकता है । एक विद्यार्थी को 94 अंक प्राप्त होते हैं और उसे 14 अंकों से अनुत्तीर्ण घोषित कर दिया जाता है । अधिकतम अंकों की गणना कीजिये ।

let the total marks in exam are x.

passing marks $= x \times \frac{36}{100}$

As per the question, $x \times \frac{36}{100} - 14 = 94$

$\Rightarrow x \times \frac{36}{100} = 108 \quad \Rightarrow x = \frac{108 \times 100}{36}$ ✓2

$\Rightarrow x = 300$ Ans.

10. An electronic device makes a beep after every 60 seconds. Another device makes a beep after every 62 seconds. They beep together at 10 a.m. for the first time, then find the time when they beep together at the earliest.
एक इलेक्ट्रॉनिक उपकरण प्रत्येक 60 सेकण्ड पश्चात् एक सीटी बजाता है । दूसरा उपकरण प्रत्येक 62 सेकण्ड पश्चात् सीटी बजाता है । पहली बार वे दोनों उपकरण 10 a.m. पर साथ में सीटी बजाते हैं, तो वह शीघ्रतम समय ज्ञात कीजिए जब वे एक साथ सीटी बजायेंगे ।

both the devices will beep together at the earliest after the time duration equal to their LCM.

LCM (60, 62) = 1860 seconds

1860 second $\equiv \frac{1860}{60} = 31$ minutes

$\Rightarrow$ they will beep together at 10:31 am ✓2 Ans

Part – B **Marks : 25**
भाग – ब **अंक : 25**

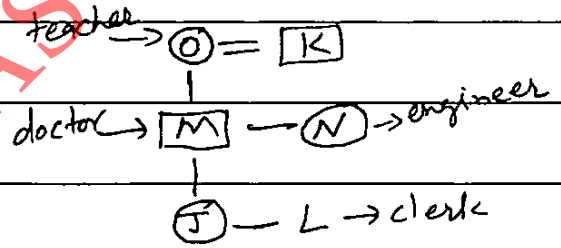
Note : Attempt **all** questions. Answer the following questions in **50** words each. Each question carries **5** marks.

नोट : **सभी** प्रश्नों के उत्तर दें । निम्न प्रश्नों का उत्तर **50-50** शब्दों में दें । प्रत्येक प्रश्न के **5** अंक निर्धारित हैं ।

11. J, K, L, M, N and O are the members of a family. Professions of all members are different. If
(i) Family has two married couples.
(ii) 'M' is a doctor and his wife is an engineer
(iii) 'J' is grand daughter of 'O' and sister of 'L'.
(iv) 'K' is grand father of 'L' and is married to a teacher.
(v) 'L' is a clerk and his mother is 'N'.
Then, who is the wife of 'M' ?

J, K, L, M, N और O एक परिवार के सदस्य हैं । सभी सदस्यों के व्यवसाय भिन्न हैं । यदि :
(i) परिवार में दो विवाहित युगल हैं ।
(ii) 'M' एक चिकित्सक है और उसकी पत्नी एक इंजीनियर है ।
(iii) 'J', 'O' की पौत्री है व 'L' की बहन है ।
(iv) 'K', 'L' के दादा हैं व इनकी शादी एक अध्यापिका से हुई है ।
(v) 'L' एक क्लर्क है व उसकी माता 'N' है ।
तब 'M' की पत्नी कौन है ?

As per given information, family tree will be like



As per the diagramme, wife of M is N who is an engineer. 5

12. If $\tan\theta = \frac{x\sin\phi}{1-x\cos\phi}$, $\tan\phi = \frac{y\sin\theta}{1-y\cos\theta}$, then prove $\frac{\sin\theta}{\sin\phi} = \frac{x}{y}$

यदि $\tan\theta = \frac{x\sin\phi}{1-x\cos\phi}$, $\tan\phi = \frac{y\sin\theta}{1-y\cos\theta}$, तो सिद्ध कीजिये $\frac{\sin\theta}{\sin\phi} = \frac{x}{y}$

$\frac{\sin\theta}{\cos\theta} = \tan\theta = \frac{x\sin\phi}{1-x\cos\phi} \Rightarrow \sin\theta = \frac{x\cdot\sin\phi\cdot\cos\theta}{1-x\cos\phi}$

$\frac{\sin\phi}{\cos\phi} = \frac{y\sin\theta}{1-y\cos\theta} \Rightarrow \sin\phi = \frac{y\cdot\cos\phi\cdot\sin\theta}{1-y\cos\theta}$

$\frac{\sin\theta}{\sin\phi} = \frac{x\sin\phi\cos\theta}{(1-x\cos\phi)} \cdot \frac{(1-y\cos\theta)}{y\cdot\cos\phi\cdot\sin\theta}$

solving above we get

$\frac{\sin\theta}{\sin\phi} = \frac{x}{y}$ (Hence proved)

0

13. N is a three digit number that is a multiple of 7, what is the probability that it will be a multiple of 5 also ?

N तीन अंकों की 7 के गुणज की कोई संख्या हो तो उसके 5 के भी गुणज होने की क्या प्रायिकता है ?

14. What is the largest integer not exceeding 1000 which leave remainder 3 when divided by 5, remainder 5 when divided by 7, and remainder 7 when divided by 9 ?
1000 से अधिक न हो, वह सबसे बड़ी पूर्णांक संख्या क्या होगी जिसे 5 से विभाजित करने पर शेषफल 3, 7 से विभाजित करने पर शेषफल 5 तथा 9 से विभाजित करने पर शेषफल 7 रहता है ?

As per the question, when the number is divided by 5, 7, 9 gives remainder 3, 5, 7.

difference between divisor and remainder in each case is 2. (5-3=2 ; 7-5=2 ; 9-7=2)

so the number will be = LCM (5, 7, 9) - 2

LCM (5, 7, 9) = 315

largest number below 1000 which is a multiple of 5, 7, 9 = 3×315 = 945 ✓5

⇒ so the required number is 945-2 = 943 Ans.

15. Mr. X invested money in two schemes A and B offering compound interest 5% and 10% per annum respectively. If the total amount of interest accrued through both schemes together in two years was ₹ 2075 and the total amount invested was ₹ 15,000. Find the amount invested in scheme A.
श्रीमान X ने दो योजनाओं A और B में धन निवेश किया जो क्रमश: 5% और 10% प्रतिवर्ष चक्रवृद्धि ब्याज प्रदान करती थी । यदि दो वर्षों के बाद दोनों योजनाओं द्वारा कुल अर्जित ब्याज की राशि ₹ 2075 थी तथा कुल निवेश किया गया धन ₹ 15,000 था । योजना A में निवेश की गई राशि ज्ञात कीजिये ।

let's say amount invested in first scheme is P_1 ⇒
amount in second scheme B = $(15000 - P_1)$

total interest given is 2075 ₹

so total amount of A and B = 15000 + 2075 = 17075 ₹

$$\Rightarrow P_1\left(1+\frac{5}{100}\right)^2 + (15000-P_1)\left(1+\frac{10}{100}\right)^2 = 17075$$

$$\Rightarrow P_1\left(\frac{441}{400}\right) + (15000-P_1)\frac{121}{100} = 17075$$ ✓5

$$\Rightarrow \frac{431P_1}{400} = 1075 \Rightarrow P_1 = 10{,}000\ ₹$$ Ans.

Part – C **Marks : 20**
भाग – स **अंक : 20**

Note : Attempt **all** questions. Answer the following questions in **100** words each. Each question carries **10** marks.

नोट : **सभी** प्रश्नों के उत्तर दें । निम्न प्रश्नों का उत्तर **100-100** शब्दों में दें । प्रत्येक प्रश्न के **10** अंक निर्धारित हैं ।

16. Two tapes A and B can fill a tank in 5 hrs and 20 hrs respectively alone. If both taps are opened then it takes 30 minutes more to fill the tank completely due to a hole in the tank. If tank is completely filled then how much time (in hrs) will it take to get tank empty due to drain water from hole ?
दो नल A और B एक टंकी को क्रमश: 5 घंटे तथा 20 घंटे में अकेले भर सकते हैं । यदि दोनों नल खोल दिये जायें तो टंकी में एक छेद के कारण इसको पूरा भरने में 30 मिनट और अधिक लगते हैं ।
यदि टंकी पूरी भरी हुई हो तो उस छेद में से सारे पानी के निकलने पर टंकी को खाली होने में कितना समय (घंटों में) लगेगा ?

Let's say the total amount of work = LCM (5, 20) = 60 units

A can fill a tank in 5 hrs. ⇒ A can do 60 units of work in 5 hrs.

⇒ A's one hour work = $\frac{60}{5}$ = 12 units

Similarly, B's one hour work = $\frac{60}{20}$ = 3 units

(A+B)'s one hour work = 12+3 = 15 units

So, time taken by (A+B) to fill the tank = $\frac{60}{15}$ = 4 hrs.

Now Given that due to hole, it take 30 minutes more to fill.

⇒ work done by hole in (4hrs + 30 minutes)

= work done by (A+B) in 30 min

⇒ work done by (A+B) in 30 min = $15 \times \frac{1}{2} = \frac{15}{2}$ units

Now, hole takes 4.5 hrs to do 15/2 units of work

⇒ time taken in doing 60 units of work ✓10

= $\frac{9}{2} \times \frac{2}{15} \times 60$ = 36 hrs. Ans.

17. In an election 10% of the voters on the voter's list did not cast their votes and 60 voters cast their ballot papers blank. There were only two candidates. The winner was supported by 47% of all voters in the list and got 308 votes more than his rival. Find the number of voters on the voter list.

एक चुनाव में मतदाता सूची में से 10% मतदाताओं ने अपना मत नहीं दिया तथा 60 मतदाताओं ने मत पत्र रिक्त डाले । वहाँ पर केवल दो उम्मीदवार थे । विजेता को मतदाता सूची में से 47% मतदाताओं का समर्थन मिला तथा उसे अपने प्रतिद्वंद्वी से 308 मत अधिक प्राप्त हुए । मतदाता सूची में मतदाताओं की संख्या ज्ञात कीजिये ।

Let us say total voters in voter list = x

given, 10% didn't cast their votes

$\Rightarrow$ total cast votes = $x \times \frac{90}{100}$

given, 60 votes were invalid

$\Rightarrow$ valid votes = $\left(x \times \frac{90}{100} - 60\right)$

Now as per question, winner got 47% of total voters in the list $\Rightarrow$ votes of winner = $\frac{x \times 47}{100}$

votes of loser = valid votes − votes of winner

$= \left(x \times \frac{90}{100} - 60\right) - \left(x \times \frac{47}{100}\right)$

$= \left(x \times \frac{43}{100} - 60\right)$

As given, difference between the votes of winner and loser = 308

$\Rightarrow \frac{x \times 47}{100} - \left(x \times \frac{43}{100} - 60\right) \Rightarrow \left(x \times \frac{4}{100} + 60\right) = 308$

$\Rightarrow \frac{x \times 4}{100} = 308 - 60 = 248$ ✓10

$\Rightarrow x = \frac{248 \times 100}{4} = 6200$

Paper-II 14

(Unit-II) (70 Marks)

(यूनिट-II) (70 अंक)

Part – A Marks : 10

भाग – अ अंक : 10

Note : Attempt **all** questions. Answer the following questions in **15** words each. Each question carries **2** marks.

नोट : **सभी** प्रश्नों के उत्तर दें । निम्न प्रश्नों का उत्तर **15-15** शब्दों में दें । प्रत्येक प्रश्न के **2** अंक निर्धारित हैं ।

1. A light and a heavy body have same momentum. Which one will have greater kinetic energy ?

एक हलकी व एक भारी वस्तु का संवेग समान है । इनमें से किसकी गतिज ऊर्जा अधिक होगी ?

since light body and heavy body have same momentum

$\Rightarrow mv = MV \Rightarrow \boxed{v > V}$

now, kinetic energy $\propto (\text{velocity})^2$

$\Rightarrow \frac{1}{2}mv^2 > \frac{1}{2}MV^2$ (as velocity has an index of 2 in the formula) ✓2

$\Rightarrow$ Kinetic energy of lighter object will be more.

2. How does the density of nuclear matter depends on size of nucleus ? Does the density of atom also follows the same rule ?

नाभिकीय पदार्थ का घनत्व नाभिक के आकार पर किस प्रकार निर्भर करता है ? क्या परमाणु का घनत्व भी इसी नियम का पालन करता है ?

3. What do you understand by "Joule-Thomson effect" ?

जूल-थॉमसन प्रभाव से आप क्या समझते हैं ?

Joule-Thomson effect is related to the heating property of electricity. It says that heat generated due to a current I flowing for t sec in a resistor of R ohm, is given by following formula: $H = I^2Rt$

Heating appliances, incandescent bulb work on this principle. 0

4. Write the name of causal organism and vector of 'Dengue fever'.

'डेंगु बुखार' के कारक जीव तथा इसके वाहक का नाम लिखिए ।

Dengue fever is caused by 'dengue virus' which is a arbo-virus. Vector of 'Dengu fever' is aedes aegypti mosquito. 1/2

5. What are umbrella species ? Give an example of umbrella species.

छत्र प्रजातियाँ क्या हैं ? छत्र प्रजाति का एक उदाहरण दीजिए ।

Umbrella species also known as 'keystone species' are those species which are critically important for survival of an ecosystem and are interconnected with a large numbers of species in food web. Their extinction causes cascading effect on ecosystem. eg. sea urchins 0

Part – B **Marks : 20**
भाग – ब **अंक : 20**

Note : Attempt **all** questions. Answer the following questions in **50** words each. Each question carries **5** marks.

नोट : **सभी** प्रश्नों के उत्तर दें । निम्न प्रश्नों का उत्तर **50-50** शब्दों में दें । प्रत्येक प्रश्न के **5** अंक निर्धारित हैं ।

6. Write Kepler's law of planetary motion.
ग्रहीय गति के केप्लर के नियमों को लिखिए ।

Kepler gave three laws regarding movement of planets around earth: (1) Kepler's first law – It states that planets move round the sun in an elliptical orbit, with sun being on one of the two focii of ellipse. ½

(2) Kepler's second law states that radius vector of a planet with sun at centre, sweeps equal area in equal time. ½

$A_1 = A_2$ 1½

(3) Kepler's Third law – it states that square of the time period of revolution is proportional to cube of semi-major axis. 1½

$T^2 \propto a^3$

7. The concentration of Hydrogen ion in a sample of soft drink is 4.0×10^{-3} M. What is its pH ? ($\log_{10}2 = 0.301$)
पेय पदार्थ के नमूने में हाइड्रोजन आयन की सान्द्रता 4.0×10^{-3} M है । इसका pH क्या होगा ? ($\log_{10}2 = 0.301$)

As per the formula: $pH = -\log[H^+]$

Here given $[H^+]$ = concentration of hydrogen ion
$= 4 \times 10^{-3}$ M

$\Rightarrow \quad pH = -\log(4 \times 10^{-3})$

$\Rightarrow \quad -\log 4 - \log(10^{-3})$

$\Rightarrow \quad -\log 2 - \log 2 + 3\log 10$

$\Rightarrow \quad -(.301) - (.301) + 3(1)$ ✓5

$\Rightarrow \quad -(.602) + 3 \Rightarrow 2.398$ Ans.

8. Write a note on genetically engineered insulin.
आनुवंशिकत: अभियांत्रित इन्सुलिन पर टिप्पणी लिखिए ।

Genetically engineered insulin is produced through a genetic engineering technology, namely, gene splicing (gene cloning). In this technique, genes responsible for insulin production are taken from a donar cell and then fused within a plasmid (a vector). Now this plasmid is allowed to infect a bacteria (host) which produces multiple copies of the gene by fission process. This technique ✓1 is also called recombinant DNA technology. Genetically engineered insulin can be used for diabetic patients who are unable to produce enough insulin through pancreas.

9. Enlist various trophic levels in an ecosystem and give suitable example of each trophic level.
एक पारिस्थितिक तंत्र के विभिन्न पोषी स्तरों को सूचीबद्ध कीजिए तथा प्रत्येक पोषी स्तर के उचित उदाहरण दीजिए ।

Trophic levels are the distinct levels through which food energy flows from producers to final consumers. Generally, there are four trophic levels in an ecosystem

as beyond four trophic levels, there is left not sufficient energy

(1) Primary Producer - Photosynthetic plants and certain bacteria synthesise food by using simple inorganic molecules (CO_2, H_2O).

(2) Primary Consumer - these are dependent on primary producers directly. These are also called 'Herbivores' eg. cow ✓ 3½

(3) Secondary consumer - these are dependent on primary consumers. Carnivores (lion etc) are example. (4) Tertiary consumer - top level consumers eg. vultu

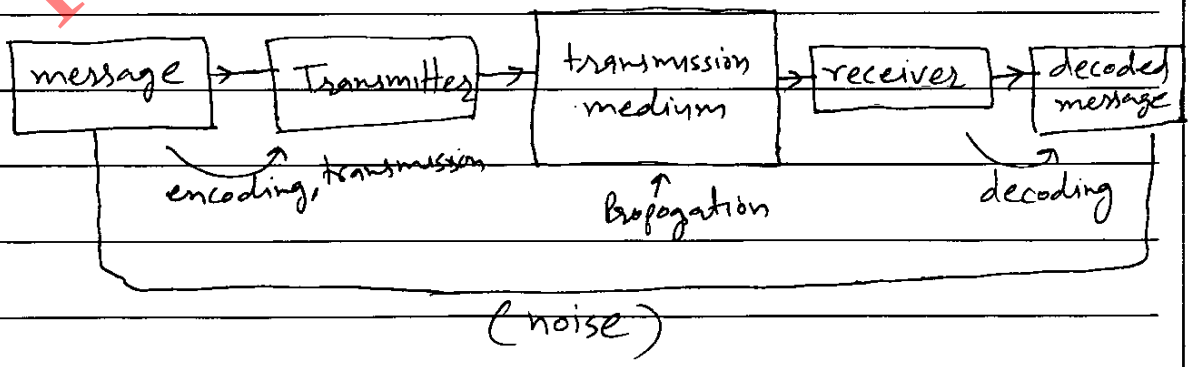
Part – C **Marks : 40**
भाग – स **अंक : 40**

Note : Attempt **all** questions. Answer the following questions in **100** words each. Each question carries **10** marks.

नोट : **सभी** प्रश्नों के उत्तर दें । निम्न प्रश्नों का उत्तर **100-100** शब्दों में दें । प्रत्येक प्रश्न के **10** अंक निर्धारित हैं ।

10. What do you understand with communication system ? Give block diagram of communication system and explain its elements.
संचार निकाय से आप क्या समझते हैं ? संचार निकाय का ब्लॉक चित्र देते हुए इसके अवयवों को समझाइए ।

Communication system is a system through which information is passed from one place to another. It has three main components, namely, transmitter, transmission medium, receiver.

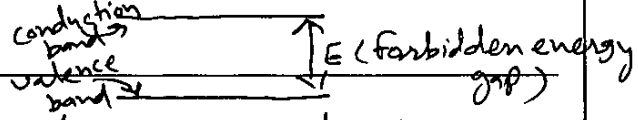


Noise is considered as the unwanted element of the system.

(1) Transmitter – It converts message single in appropriate electrical signal through transducer, then modulates it with modem and then transmits it with antenna. (2) Transmission medium can be coaxial cable, optical fibre or space. (3) Receiver recieves the transmitted signal, demodulates it, decodes it. (4) Noise It is the disturbances causing inefficiency during the entire process. ✓5

11. Distinguish between conductor, semi-conductor and insulator on the basis of band theory of solid.
ठोस के बैंड सिद्धान्त के आधार पर चालक, अर्द्धचालक व कुचालक में भेद कीजिये ।

Generally two energy levels are considered for an electron of a solid. (1) Valence band – It is the energy level of valence electrons (2) conduction band – It is the energy level of excited electrons. ✓½



In conductors, these two bands are overlapping, so most of the electrons are in conduction band. Hence, conductor conducts electricity with ease. In insulators, forbidden energy gap between the two bands is very large, so most of the electrons are in valence band. Hence, it can't conduct electricity. In semiconductors, forbidden energy gap between the two bands is such that electrons can easily jump to conduction band if provided with energy. That's why semiconductors can conduct electricity if temperature increases. ✓3

12. What are chromosomal disorders in human beings ? Write causes and symptoms of any two such disorders.
मानवों में गुणसूत्री विकार क्या होते हैं ? इस प्रकार के किन्हीं दो विकारों के कारण व लक्षण लिखिए ।

Chromosomal disorders are the disorders in chromosome either in their number or in their structure. ✓1 These disorders are inherited from parents to progeny. Down syndrome, ✓1 Klinefelter syndrome are some examples of disorders due to change in numbers of chromosome. Sickle-cell-anaemia, thallasimia, haemophilia are some examples of disorders due to change in structure of chromosomes.

(1) Haemophilia – It is a X-chromosome linked recessive disorder where blood-clotting proteins (fibrinogen, prothrombin etc) are not produced. Mothers are generally the carriers of this disease. It is also known as 'Royal Disease' as it affected British royal family.

(2) ~~Sickle-cell~~ Klinefelter syndrome – In this, there is a trisomy of sex chromosomes, i.e, an additional X-chromose is present. It causes to develop feminine features in males such as breast, hips enlargement etc. It causes rudimentary development of male sexual characteristics. ✓4

13. Discuss the Breed Improvement Programme undertaken by the Department of Animal Husbandry, Government of Rajasthan.
राजस्थान सरकार के पशुपालन विभाग द्वारा चलाये जा रहे नस्ल सुधार कार्यक्रम की विवेचना कीजिए ।

Department of Animal Husbandry, Government of Rajasthan is undertaking a broad-based breed improvement programme especially for bovine animals.

Artificial Insemination of indigenous breeds with semen of high quality breeds is undertaken. Facilities for storing these high quality semen are also being strengthened. Government is providing with portable nitrogen kits to veterinary assistants also, so that they can go to far-off places. Training programmes are also being arranged for the same.

Rearing of good quality bulls, male goats etc is being incentivised. Government is providing for the sale of the meat of these male animals. ✓1

Various awareness campaigns are being organised so as to make people understand the importance of breed improvement programme.

As animal husbandry is a major contributor to the state GDP and employment, the programme is very much praiseworthy.

Paper-II

22

(Unit-III) (65 Marks)

(यूनिट-III) (65 अंक)

Part – A Marks : 10

भाग – अ अंक : 10

Note : Attempt **all** questions. Answer the following questions in **15** words each. Each question carries **2** marks.

नोट : **सभी** प्रश्नों के उत्तर दें । निम्न प्रश्नों का उत्तर **15-15** शब्दों में दें । प्रत्येक प्रश्न के **2** अंक निर्धारित हैं ।

1. What are the meteoric lakes ?

उल्का झीलें क्या हैं ?

Meteoric lakes are those lakes which are formed due to the collision of meteorite with earth surface. Nakki lake in Mount Abu is an example of meteoric lake. ✓1

2. What is Epicentre ?

अधिकेन्द्र क्या है ?

Epicentre is the point on the earth surface which is at the minimum distance from focus (hypocentre) of the earthquake. It is the point where EQ waves first reach. ✓1

3. Which are the areas of India, receive winter rain ?

भारत के कौन से क्षेत्र शीतकालीन वर्षा प्राप्त करते हैं ?

Winter rain is due to the North-East trade winds, which pick moisture from Bay of Bengal and cause rainfall in the areas of Eastern Ghat and Eastern coast Odisha, Andhra Pradesh, Middle and eastern part of Tamil Nadu gets rain due to this. ✓1

4. Write the names of major non-metallic minerals of Rajasthan.

राजस्थान के मुख्य अधात्विक खनिजों के नाम लिखिये ।

Major non-metallic minerals of Rajasthan are Rock Phosphate (Jhamarkotda), Gypsum (Nagaur, Barmer), lime stone (Jaisalmer, Chittor), Wolastonite (Sirohi), Marble (Nagaur) Asbestos, sandstone, quartz, pyrites (Sikar), Jasper, various gemstones ✓1

5. What are the male and female literacy rates in Rajasthan as per Census-2011 ?

सन् 2011 की जनगणना के अनुसार राजस्थान में पुरुष एवं स्त्री साक्षरता की दरें क्या हैं ?

As per Census-2011, literacy rate of Rajasthan is 67.1%. Male literacy rate is around 78% and female literacy rate is around 56%. ✗

0

Part – B **Marks : 25**
भाग – ब **अंक : 25**

Note : Attempt **all** questions. Answer the following questions in **50** words each. Each question carries **5** marks.

नोट : **सभी** प्रश्नों के उत्तर दें । निम्न प्रश्नों का उत्तर **50-50** शब्दों में दें । प्रत्येक प्रश्न के **5** अंक निर्धारित हैं ।

6. Explain in brief the location, names and importance of the great lakes of North America.
उत्तरी अमेरिका की महान् झीलों की अवस्थिति, नाम एवं महत्त्व को संक्षेप में स्पष्ट कीजिये ।

Great lakes, namely Superior, Michigen, Huron, Erie, Ontario are five large lakes located in Canadian Shield at the borders of Canada and USA. These lakes are very important as they form the large part of North-American grasslands 'Prairies'. These lakes are connected with each-other through soo canal and welland canal, and then linked with Saint Lawrence rives system which is the busiest water route of North America. Various manufacturing industries are located around this. Birmingham, the steel capital of the world is located around these lakes.

7. Describe the 'Bshw' type of climate of India.
भारत की 'Bshw' प्रकार की जलवायु को स्पष्ट कीजिये ।

'Bshw' is a type of Indian climate as per Coeppen classification. It refers to those areas which fall in rain-shadow zone of western ghats. Marathwada of Maharashtra, Saurashtra of Gujarat are the major areas of this climate, but in general we can say that the part of deccan plateau which is in rain-

shadow zone of Southwest monsoon, fall under this category. North-East monsoon also can't cause rainfall in these areas because they lie in interior, away from eastern coast. 3

8. Discuss the impact of La-Nina on Indian Monsoon.
भारतीय मानसून पर ला-नीना के प्रभाव को स्पष्ट कीजिये ।

La-nina is a phenomenon wherein warm Peruvian current of East pacific coast (during El-Nino) is replaced by cold current. So La-Nina is reversal of El-Nino. La-Nina causes the temperature of waters of pacific ocean to decrease. It makes the ~~the~~ atmospheric pressure pattern of pacific and Indian ocean oscillate. 'Maxarene high', the high pressure zone for Indian monsoon gets strengthened due to La-Nina, which causes greater intensity of south-west monsoon in India. So, India receives greater rainfall due to La-Nina. 3

9. Discuss in brief the types and distribution of building stones in Rajasthan.
राजस्थान में इमारती पत्थरों के प्रकार एवं वितरण को संक्षेप में समझाइये ।

Rajasthan is very rich in resources of building stone. Aravali region of Rajasthan is a store-house of these building stone as abundance of sedimentary rocks is found in Aravali region. Hadauti plateau, a part of ~~Vind~~ Malwa plateau is also rich in these.

Marble, Sandstone, Limestone, Kota stone, granite are the major building stones. Marble is found in Nagaur (Makrana), Rajsamand. Sandstone is found in entire Aravali region. Limestone is found in Bilada (Jodhpur), Sanu (Jaisalmer), Nimbahera (Chittor). Kota stone is found in mainly Kota, Bundi and Jhalawar.

10. Write about the distribution and industrial uses of lignite coal in Rajasthan.
राजस्थान में लिग्नाइट कोयले के वितरण एवं औद्योगिक उपयोग के बारे में लिखिये ।

Lignite coal is found mainly in western Rajasthan. Bikaner (Palana, Bassinghsar, Jamsar), Barmer (Jalipa, Kapurdi, Giral), Nagaur (Merta Road, Sonari, Matasukh - Kasnau area, Igyas) are the major regions for lignite production.

Lignite is mainly used in thermal power plants, steel production, other manufacturing industries such as textiles, paper-making etc. Many thermal power plants of Rajasthan are located around lignite producing areas such as Jalipa-Kapurdi Thermal Power Project,

Part – C **Marks : 30**
भाग – स **अंक : 30**

Note : Attempt **all** questions. Answer the following questions in **100** words each. Each question carries **10** marks.
नोट : **सभी** प्रश्नों के उत्तर दें । निम्न प्रश्नों का उत्तर **100-100** शब्दों में दें । प्रत्येक प्रश्न के **10** अंक निर्धारित हैं ।

11. Explain the divisions of Geological Time Scale.
भूगर्भिक समय सारिणी के विभाजनों को स्पष्ट कीजिये ।

SEEN

12. Divide coastal plains of India into sub-divisions and explain their characteristics.
भारत के तटीय मैदानों को उप-विभागों में विभाजित कीजिये तथा उनकी विशेषताओं का वर्णन कीजिये ।

On the two sides of Indian peninsula, western coastal plains and eastern coastal plain are there. Western coastal plains start from the mouth of river Tapi and extends till Cardamom hills. It can be subdivided in fours parts: (1) Gujrat coast (2) Konkan coast (3) Kannad coast (4) Malabar coast. Gujrat coast includes coasts of Kachchh and Saurashtra. Konkan coast is the coast of Maharashtra and Goa. Kannad coast includes Karnataka coast and Malabar coast includes Kerala coast. Western coasts are submergent type of coasts, so they are good for ports. They ~~are~~ have narrow continental shelf and rivers like Narmada and Tapi flow through it forming estuaries.

Eastern coastal plain are divided into two parts: (1) Northern Circar (from west Bengal to Godavari delta) (2) Coromandal coast (from godavari delta to TamilNadu coast). These are emergent type of coast, so are not suitable for ports. They have wide continental shelf. Big rivers like Godavari, Krushna, Kaveri flow through it forming big deltas.

4

13. Describe the habitat, economy and society of Bhil tribe in Rajasthan.
राजस्थान में भील जनजाति के आवास, अर्थव्यवस्था एवं समाज का वर्णन कीजिये ।

'Bhil' is the oldest tribe of Rajasthan and it is second after Meena in population terms. Literally the world 'Bhil' means arches. They have significant importance in the history of Rajasthan. They are found mainly in Udaipur, Dungarpur, Chittorgarh, Pratapgarh and Sirohi districts. 50% of Bheel population reside in above mentioned districts.

The houses of Bheel are called 'koo'. Groups of houses are called 'Paal'. Head of paal is called 'Palik'. Their villages are ~~called~~ very much united and head of village is called 'Gameti'. Bheels are divided into two types : (1) Langotiya bheel (who wears only a loin) (2) Patidar bheel (who wear dhoti-kurta). They worship their ancestors by a ritual called 'Chida Bawsi'. Each family has their god called 'totam'. Women can divorce by a custom of 'Cheda Phadna'. The new husband has to pay 'Jhagd', a monetary lumpsump amount. Their economy is mainly based on hunting, poaching and accruing forest products. They live on subsistence basis and all that is earned is consumed.

SPACE FOR ROUGH WORK

5% 10%

P_1 P_2

$P_1 + P_2 = 15000$

$C_1 + C_2 = 2075$

$A_1 + A_2 = 13025$

15000 − 2075 = 13025

$P_1\left(1+\frac{5}{100}\right)^2 + (15000-P_1)\left(1+\frac{10}{100}\right)^2 = 17075$

$P_1\left(\frac{21}{20}\right)^2 + (15000-P_1)\left(\frac{11}{10}\right)^2 = 17075$

$P_1\left(\frac{21}{20}\right)^2 + (15000-P_1)\frac{121}{100} = 17075$

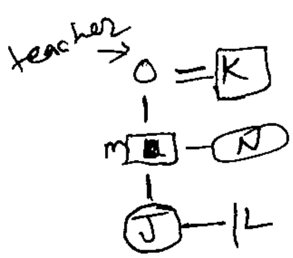
$P_1 \cdot \frac{441}{400} + 150 \cdot 121 - \frac{121 P_1}{100} = 17075 - 1815$

$\frac{441 P_1 - 484 P_1}{400} = 10075$

$\frac{43 P_1}{400} = 10075$

J K L M N O

M → doct eng.



mv M $m_1 v_1 = m_2 v_2$

$\frac{1}{2}$

$\frac{1}{2} mv^2$

35
4
315

5%   10%

$P_1\left(1+\frac{5}{100}\right)^2$

$(15000-P_1)\left(1+\frac{10}{100}\right)^2$

313 CI = 2075

$P_1 + P_2 = 15000$

$P\left(1+\frac{R}{100}\right)^T$

$(15000-P_1)$

$P_1\left(\frac{441}{400}\right) - P_1$

$(15000-P_1)\left(\frac{121}{100}\right) - (15000-P_1)$

list → 100%
voting → 90%
invalid → 60
winner → 47%
loser →

1000
55
945

(90% − 60)

47% − {(90% − 60) 43%}

$\frac{n(n+1)(2n+1)}{6} - \frac{(n+1)^2}{4}$

$(n+1)\left[\frac{2n+1}{6} - \frac{n+1}{4}\right]$

$\frac{4n+2-3n-3}{12}$

$\frac{n-1}{12}$

list → x
voting → $x \times \frac{90}{100}$
valid = $x \times \frac{90}{100} - 60$
winner = 47% = $x \times \frac{47}{100}$
loser = $\frac{x \times 43}{100} - 60$

$x \times \frac{4}{100} + 60 = 308$

60
248 × 100

A → 25
B → 20

64
82
43

94
14
108

36

4 × n × 4

2 × 31 × 30
60 × 31
62 or
1860

30 min
½ hr

3/15   4 hrs

60   6 × 10
31 × 2
2 × 30

2 | 62
31 | 31

$\frac{(n+1)(2n+1)}{6} - \frac{(n+1)}{2}$

$\frac{(n+1)}{2}\left[\frac{2n+1}{6} - \frac{n+1}{2}\right]$

$\left[\frac{4n+2-6n-6}{6}\right]$

$\frac{(n+1)}{2}\left(\frac{-2n-4}{6}\right)$

15 × ½ = 7.5 units

4½   9/2 hr — 15/2

$\frac{9}{2} \times \frac{2}{15} \times 60$

15/2 — $\frac{9}{2} \times \frac{2}{15} \times 60$

1860
60
31 min

27

60 → 2 × 30
62 → 2 × 31

2 × 30 × 31
6200
60
31
1860
620
60
560

6240 × 4/100

308
60
248

62

2914

$-\log(4\times10^{-3})$

$-\log 4 - \log 10^{3}$

$-\log 4 + 3\log 10$

$-.301 - 301 + 3$

$\frac{78+x}{2} = 67$

$x = 134 - 78$

56