Subject Code : CEM-1

વિષયકોડ-CEM 1 (વર્ણનાત્મક)

ગુજરાતી (માધ્યમ – ગુજરાતી) (મુખ્ય પરીક્ષા)

ગુણ : ૧૦૦ સમય – ૨ કલાક

પ્રશ્નપત્ર

પ્રશ્ન-1. નીચે આપેલ ત્રણ વિકલ્પોમાંથી કોઈ એક મુદ્દા પર ઓછામાં ઓછા ૨૫૦ અને વધુમાં વધુ ૩૦૦ શબ્દોમાં, યોગ્ય ઉદાહરણોનો આધાર લઈને નિબંધ લખો.

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 20

૧.૧ 'ગ્રીન બિલ્ડીંગ'ની વિભાવના અને ફાયદા

૧.૨ ભારતનો સ્થાપત્યકલાનો ઇતિહાસ – પ્રમુખ લાક્ષણિકતાઓ

૧.૩ સમસ્યા એક ઉપહાર છે...!

પ્રશ્ન-2. નીચે આપેલ બે વિકલ્પોમાંથી કોઈ પણ એક પંક્તિનો આશરે ૧૦૦ શબ્દોમાં વિચારવિસ્તાર કરો. (૧૦ ગુણ)

૨.૧ નામની આગળ અને પાછળ કશું ના જોઈએ.
એ બધું છે કેટલું પોકળ, કશું ના જોઈએ...
- ગુણવંત ઉપાધ્યાય

૨.૨ તરસની તીવ્રતા આંબી જવાનું,
મળે ઝાકળ તો ઝાકળ પી જવાનું.
- રશીદ મીર

પ્રશ્ન-3. નીચે આપેલ ગદ્યખંડનો (૨૧૦ શબ્દો), મૂળ વિચાર જળવાઈ રહે એ રીતે લગભગ ૧/૩ ભાગમાં સંક્ષેપ કરો. (૧૦ ગુણ)

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 10

શહેરીકરણ, યંત્રીકરણ, વિજ્ઞાન, ટૅકનોલૉજીના વિકાસ સાથે નગર-જીવનમાં પ્રવેશેલાં જડતા, ભૌતિકવાદ, ભીંસ અને ભીષણતા વર્ગભેદ અને વર્ગસંઘર્ષ, અસમાનતા અને સામાજિક ન્યાય, જાતીય વૃત્તિઓ-પ્રકૃતિઓ, માનસિક રોગિષ્ઠ મનોદશા આદિનો આપણા કથાસાહિત્યમાં નોંધપાત્ર ચિતાર અપાયો છે. વિજ્ઞાને ભૌતિકવાદ પ્રસાર્યો, સામાન્ય સગવડો વધારી આપી, પણ માનવીને નૈતિક રીતે પાયમાલ કર્યો. વિજ્ઞાન અને ટૅકનૉલોજીના વિકાસે માનવમૂલ્યોનો હ્રાસ કર્યો. વિશ્વને વિનાશના વમળમાં ફંગોળી દીધું, તેનું ચિત્રણ કરવાનું આપણા વાર્તાકારોને સદાય આકર્ષણ રહ્યું છે.

આપણી પ્રજાનો મોટોભાગ વિજ્ઞાન, યંત્ર કે ટૅકનોલૉજી પ્રત્યક્ષ સંપર્કમાં ઓછો આવ્યો હોવાથી તેની સાથે બહુ આત્મીયતા કેળવી શક્યો નથી અને ગાંધીવાદ-પ્રગતિવાદ બેઉની અસર નીચે તેનો સિધ્ધાંતિક વિરોધ આપણા સાહિત્યમાં થયો છે. આપણી કૃષિસંસ્કૃતિનાં જ મૂળ વિશેષ ઊંડાં હોવાથી, યંત્રસંસ્કૃતિ સાથે આપણી આમપ્રજા અને બૌધ્ધિકો મેળ કરી શક્યાં નથી. એટલે આ બધાનો વિરોધ જ આપણા સાહિત્યમાં જોવા મળે છે. યંત્રસંસ્કૃતિનાં ગુણગાન આપણા સમસ્ત સાહિત્યમાં ભાગ્યે જ જોવા મળે છે. એટલે યંત્રસંસ્કૃતિએ માનવીને કેવો જડ, નિર્મમ બનાવ્યો છે. યંત્રો શોષિતોનું લોહી ચૂસનારાં છે. યંત્રવાદ અને વિજ્ઞાન મનુષ્યને નૈસર્ગિક જીવનથી દૂર લઈ જાય છે. એમનો ભાવનાભ્રંશ કરે છે, એને સંકુચિત, સ્વાર્થી, દંભી, રોગિષ્ઠ માનસનો બનાવે છે એવી એવી વાતો જ આપણા સાહિત્યમાં જોવા મળે છે. તેથી શહેરીકરણ-યંત્રસંસ્કૃતિ એટલે નગરનું દુર્ભગ જીવન અને ગ્રામજીવન એટલે આપણી પ્રાચીન મંગલમય કૃષિ-સંસ્કૃતિ એવો મેળ મળી જતાં ગામડાં અને શહેરની સંસ્કૃતિ વિશેનો એકપક્ષી અભિગમ પણ સહજતાથી કેટલીક વાર કેળવાયેલો નજરે ચડે છે.

- વિજય શાસ્ત્રી / ચંદ્રકાન્ત ગાંધી / અશ્વિન દેસાઈ

પ્રશ્ન-4. નીચે આપેલ ગદ્યખંડની સઘન વાચના કરી પ્રશ્નોના ઉત્તરો આપો. (૨ ગુણ x ૫ પ્રશ્નો)

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 10

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'ગુજરાતની અસ્મિતા' એવો વિચાર કરીએ છીએ ત્યારે તેથી આપણી સમક્ષ અનેક પ્રશ્નો સામે આવીને ઊભા રહે છે. અહીં વાણીવિલાસ ચાલે તેમ નથી તેમ ગુજરાતી છીએ એ પ્રમાણપત્ર પણ કામ આપે તેમ નથી. આપણે એ અસ્મિતાને અંદરથી પ્રકટાવવા માટે આખી પરંપરાને અવગત કરવી પડે, તેના ઇતિહાસ અને તેની ઘટનાઓમાંથી પસાર થવું પડે, ઊંડું ઉત્ખનન કરવું રહે. ત્યારે પેલી ગુજરાતી વિશેષતા સમજાય. ત્યારે તેની અસ્મિતાનો લ્હાવો સાચા અર્થમાં લઈ શકીએ. એ ખરું કે પરંપરામાં નવી બાબતો ભળે, અસ્મિતાનો અર્થ શુદ્ધિ-વૃધ્ધિ પામે. ખાસ તો આજના ગ્લોબલાઈઝેશનના સમયમાં સઘળું એકમેકમાં ભળી રહ્યું છે ત્યારે અસ્મિતાનો મુદ્દો વધુ ધારદાર બને છે. આપણને અહીં આપણા પ્યારા ગાંધી બાપુનું સ્મરણ જરૂર થશે. તેમણે બધી દિશાઓ ઉઘાડી રાખવાની વાત કરી હતી. સાથે પોતાની ધરતી ઉપર પોતાના પગ ખૂંપેલા રાખવાનું કહ્યું હતું. અસ્મિતાનું કાર્ય, આપણને સદા આપોપાપણા તરફ ખેંચવાનું છે. આપણી ધરા, આપણા વિશિષ્ટ રીતરિવાજ, આપણી શ્રધ્ધાઓ, માન્યતાઓ, તે વિશેની આપણી સભાનતા – આ બધું અસ્મિતા છે. જો આટલું પામી લઈએ તો ઉત્તમ કહી શકાય તેવાં અન્ય, બાહ્ય તત્વોનો સ્વીકાર અને આપણું જે શ્રેષ્ઠ છે તેમાં અચળતા – તો બસ, પ્રશ્નનો ઉત્તર પછી મળી જાય.

હું ગુજરાતની અસ્મિતાની વાત કરતો હોઉં તો હું ગુજરાતી રહીને જ વૈશ્વિક બની શકું તેવી સમુદારતા મારામાં હોવી ઘટે. ગુજરાતની ધરતી અને એના ઇતિહાસ માટે, તેની કળા માટે, શિલ્પ, સ્થાપત્ય, સાહિત્ય, સંગીત, નૃત્ય માટે પણ એટલો જ પ્રેમ હોવો ઘટે. ગુજરાતનાં પર્વો વિશે, તેનામાં રહેલી ભાઈચારાની વૃત્તિ વિશે, તેના ઔદાર્ય વિશે પણ મને સમજ હોવી જોઈએ. ગાંધી-સરદાર-રવિશંકર-નરસિંહ-મીરાં-દયારામ-અખા સાથે મારું એક અનુસંધાન રહેવું ઘટે. રાજ્ય કે રાષ્ટ્રની આપત્તિમાં ગુજરાતી તરીકે ગુજરાતીજનની ભૂમિકા કેવી રહી છે તે પણ મારી જાણમાં હોવું ઘટે. પાટણનાં પટોળાંથી ગોળગધેડાના ઉત્સવો, આદિવાસીઓના મેળા કે અવકાશમાં કે લશ્કરમાં જોડાતાં ગુજરાતી જનોની રોમાંચ પ્રેરે તેવી ઘટનાઓ. મારા ઊંડા રસની વાચક બની રહેવી જોઈએ. ગુજરાતની પરંપરાઓ સાથે આજના ટેકનોલોજીના યુગમાં, વિશ્વની બદલાયેલી તાસીરમાં, ગુજરાતી તરીકે આપણે જે ગજું કાઢી રહ્યા છીએ તે પણ ધ્યાનમાં હોવું જોઈએ. ગુજરાતની કેળવણીમાં જીવનનાં જે કેટલાંક પાયાનાં તત્વોનો સમન્વય થયો છે તે પણ યાદ રાખવું જોઈએ. પરિવર્તનને જરૂર સત્કારીએ, નવાં શિખરો આંબીએ પણ સાથે 'ગરવી' અને 'ગુણિયલ' 'મોંઘેરી' ગુજરાત શું છે તે પણ પામીને તેને ટકાવીએ.

- પ્રવીણ દરજી

પ્રશ્નો

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૪.૧ લેખકના મતે ગુજરાતની અસ્મિતા કઈ રીતે સમજી શકાય?
૪.૨ લેખકની નજરે પ્રદેશની અસ્મિતાને કયાં પરિબળો પ્રભાવિત કરે છે?
૪.૩ લેખકની દૃષ્ટિએ અસ્મિતા આપણને કઈ રીતે અસર કરે છે?
૪.૪ લેખકના વિચારો મુજબ ગુજરાતની અસ્મિતા વિશે વાત કરવા માટે કેવી પાત્રતા હોવી જોઈએ?
૪.૫ આ ગદ્યખંડમાં લેખકનો ગુજરાત પ્રત્યેનો કેવો ભાવ પ્રગટતો જણાય છે?

પ્રશ્ન-5. (આશરે ૨૦૦ શબ્દો)

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 10

તમે 'અ બ ક' શહેરના નાગરિક છો. તમારું શહેર વિકાસ પામીને સમગ્ર દિશાઓમાં વિસ્તરી રહ્યું છે. આ વિકાસ સંદર્ભે શહેરની ગટર-વ્યવસ્થા અંગે તમે ચિંતિત છો અને સમસ્યાઓ અંગે નિવારણ રજૂ કરવા ઇચ્છો છો. તમારા મુદ્દાઓને વર્ણવતું ચર્ચાપત્ર શહેરના મ્યુનિસિપલ કમિશ્નરશ્રીને લખો.

પ્રશ્ન-6. (આશરે ૨૦૦ શબ્દો)

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 10

તમે ગુજરાતના ભિન્ન ભિન્ન જૈન મંદિરોની મુલાકાત લીધી છે. તમને આ મંદિરો સ્થાપત્યકલાની દૃષ્ટિએ ઘણાં રસપ્રદ જણાયાં છે. આ નિરીક્ષણોને વર્ણવતો અહેવાલ લખો.

પ્રશ્ન-7. (આશરે ૧૫૦ શબ્દો)

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 10

નીચે આપેલ ફોટોગ્રાફ વિશે તમારાં રચનાત્મક નિરીક્ષણો લખો.

પ્રશ્ન-08. (૧૦ ગુણ)

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 10

આપેલ અંગ્રેજી ગદ્યખંડનો ગુજરાતીમાં ભાવાત્મક અનુવાદ કરો.

What nature teaches -

Today, at a time of multiple crises intensified by globalization, we need to move away from the paradigm of nature as dead matter. We need to move to an ecological paradigm, and for this the best teacher is nature herself. This is the reason I started the Earth University/Bija Vidyapeeth at Navdanya's farm. The Earth University teaches Earth Democracy, which is the freedom for all species to evolve within the web of life, and the freedom and responsibility of humans, as members of the Earth family, to recognize, protect, and respect the rights of other species. Earth Democracy is a shift from anthropocentrism to ecocentrism. And since we all depend on the Earth, Earth Democracy translates into human rights to food and water, to freedom from hunger and thirst. Because the Earth University is located at Navdanya, a biodiversity farm, participants learn to work with living seeds, living soil, and the web of life. Participants include farmers, schoolchildren, and people from across the world. Two of our most popular courses are "The A-Z of Organic Farming and Agroecology" and "Gandhi and Globalization.".

– Vandana Shiva

પ્રશ્ન-09. (૧ X ૧૦ = ૧૦ ગુણ)

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 10

સૂચના પ્રમાણે ગુજરાતી વ્યાકરણને લગતા પ્રશ્નોના ઉત્તરો આપો.

૯.૧ : રૂઢિપ્રયોગનો અર્થ આપી તેમનો વાક્યમાં પ્રયોગ કરો.

૯.૧.૧ અટકળ પંચા દોઢસો

૯.૨ : કહેવતનો અર્થ સમજાવો.

૯.૨.૧ ઊલેચે અંધારું ન જાય

૯.૩ : સમાસનો વિગ્રહ કરી તેની ઓળખ આપો.

૯.૩.૧ દીવાસળી

૯.૪ : પંક્તિનો છંદ ઓળખાવો.

૯.૪.૧ આંસુના પડદા વતી નયન તો મારાં થયા આંધળા.

૯.૫ : અલંકાર ઓળખાવો.

૯.૫.૧ હૈયું જાણે હિમાલય.

૯.૬ : શબ્દસમૂહ માટે એક શબ્દ આપો.

૯.૬.૧ પાંદડાનો અવાજ

૯.૭ : શબ્દની જોડણી સુધારો.

૯.૭.૧ શ્વાનૂભુતી

૯.૮ : વાક્યમાં જોડણી અને વાક્યરચનાની ભૂલો સુધારો.

૯.૮.૧ રામ અને સીતા ચાલતા ચાલતા નદીમાં ઓળંગી ગયા.

૯.૯ : શબ્દોની સંધિ જોડો.

૯.૯.૧ સંધિ જોડો – પ્ર + નય

૯.૧૦ : વાક્યરચના અંગે આપેલ સૂચના મુજબ ઉત્તર આપો.

૯.૧૦.૧ વિધાન વાક્યમાંથી પ્રશ્ન વાક્ય બનાવો – દેવોની પણ ઘણી દુર્દશા છે.

Subject Code : CEM-2
English

Total Marks : 100 Time : 2 Hours

Q.-1. **Write an essay on any ONE of the following in minimum 250 to maximum 300 words. It must exhibit your grasp and critical understanding of the subject in the best possible individual style having originality of thought and expression. It must be well-argued piece of writing coherently and sequentially with observance of grammatical rules.**

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 20

I. **The world is once against at the crossroads to sort out issues related to global and regional security.**
II. **Cutting trees is injurious to health.**
III. **Great teachers make great society.**
IV. **Has cricket overshadowed other sports in India?**
V. **Justice in its true sense is hardly served by mere release of the victim from prison after prolonged wrongful detention.**

Q.-2. **Imagine you are a Junior Engineer in your office. The office is facing an issue of delay in getting the reports of the inspection of quality control of the material-samples from the laboratory resulting into further delay of civil works. Your senior officer has sought your opinion about the needful actions to be taken to address the said issue. Write a letter, in about 150 words, to your senior officer suggesting necessary measures**

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 10

Q.-3. **Write a report in about 200 words on your recent undergoing a training program of the application of new software SAP program of preparing purchase orders of various engineering related material for your office.**

Q.-4. **Reflect on the following picture with meaningful observations in about 150 words.**

Q.-5. **The Road and Building Department of the state has organized an inauguration ceremony of a newly constructed overbridge at a busy junction of your city. Draft a formal inaugural speech, in about 150 words, to be delivered by the honorable Minister who is the chief guest of the online inauguration function of the program.**

Q.-6. **Write a precis of the following passage in about one-third of its original length.**

Mining is an essential industry that will provide key materials needed for India infrastructure development. Mining is one of the core sectors and growth driver of Indian economy. Minerals and ores provide basic raw materials to many important industries like power generation (thermal), iron and steel, cement, petroleum and natural gas, petrochemicals, fertilizers, precious

and semi-precious metals/stones for jewellery, electrical and electronics equipment, glass, ceramics, etc. The mining sector in India was poised for robust growth in the financial year 2020–2021, on the back of rising demand from end-use sectors and fresh investments announced by the mining companies. However, the spread of COVID-19, right at the beginning of the financial year, has led to disruptions across industries. There is a significant scope for new mining capacities in iron ore, bauxite, coal and other minerals and considerable opportunities for future discoveries of sub-surface deposits. Infrastructure projects continue to provide lucrative business opportunities for steel, zinc and aluminum producers. Iron and steel make up a core component for the real estate sector. Demand for these metals is set to continue given strong growth expectations for the residential and commercial building industry. India's mining sector is expected to show positive growth in 2021 compared to 2020. As different arms of the government work with stakeholders to bring the economy on the growth path, it is important for the policymakers of mining to continue making such changes to the policies, which can ramp up the contribution of the sector to Gross Domestic Product. Under such circumstances and situation, it becomes imperative for the policy makers to take an overview of impact of lockdown on the mining industry in India as discussed with special reference to production scenario of minerals, employment, export-import scenario of ores and minerals and other developments during the period.

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 10

Q.-7. **Read the following passage carefully and answer questions that follow.** **(10 x 1 = 10)**

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 10

Education is acquiring of knowledge beyond what is academic and professional. It should be neither bookish learning nor memorizing of facts and figures, stuffing the mind with information unrelated to life. It is also not memorization of thoughts of others and reproducing those in examinations to get diplomas and degrees for jobs.

Education is the assimilation of values and ideas for character building and preparing to face life's challenges. The realm of mystery begins where scientific knowledge ends. The world of scientific facts and the world of values are different. If education does not build wisdom and humanity in the hearts and minds, all its professional, scientific and technological triumphs would be meaningless. Education is, thus, an enlightenment of soul that dispels ignorance and illuminates the individual.

A teacher must create an environment that nurtures the student with his warm, kind-hearted, accessible, enthusiastic and caring approach. Valuing students' ideas and opinions will encourage students to confidently express their feelings and learn to respect and listen to others.

The teacher should have no fear of learning new teaching strategies. He must focus on shared decision-making and teamwork as well as on community building. It is the thought process of the teacher which enables him to impart the reasoning of the knowledge. The teacher also needs to make the students think and dwell into the world of new ideas and thoughts. Interpreting what has learnt along with the different verticals of everyday application of knowledge makes education worthy.

Questions :

1. **According to the passage, what should be the scope of education?**
2. **Identify the idiomatic phrase in the passage which means 'students' emotions and reasoning'?**

3. When can education be a futile exercise?
4. Identify the word in the passage which means 'brightens'?
5. When does the realm of mystery begin?
6. On what should the teacher focus?
7. Why is the valuing of the ideas and opinions of students important?
8. What enables the teacher to impart the reasoning of knowledge?
9. What makes education worthwhile?
10. Give a suitable title to the passage.

Q.-8. Do as directed: (10 x 1 = 10)

Choose the correct answer from the given options and darken the circle (●) as well as write the correct answer in the bracket (CAPITAL LETTER) as per the sample given below.

Sample Ans.: (C) (A) ¨ (B) ¨ (C) ● (D) ¨ (E) ¨

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 10

1. When he ____ her as a cheater, she _____ about him to the headmaster.
- **A. had called / was complaining**
- **B. called / had complained**
- **C. has called / complains**
- **D. called / complained**
- **E. has called / will be complaining**

Ans.: ( ) (A) ¨ (B) ¨ (C) ¨ (D) ¨ (E) ¨

2. Can those happy moments be ever forgotten by me? *(Change the voice)*
- **A. Shall I ever forget those happy moments?**
- **B. Can I ever forget those happy moments?**
- **C. Will I ever forget those happy moments?**
- **D. Could I ever forget those happy moments?**
- **E. Who can forget ever those happy moments?**

Ans.: ( ) (A) ¨ (B) ¨ (C) ¨ (D) ¨ (E) ¨

3. He informed his friend that he could make use of his car while he was away. *(Change the narration)*
- **A. He said to his friend, "You will make use of my car while I was away".**
- **B. He said to his friend, "Use my car while I go away".**
- **C. He said to his friend, "you can make use of my car while I am away".**
- **D. He asked his friend, "Will you make use of my car while I am away?"**
- **E. He asked his friend, "You can use my car when I go away"**

Ans.: ( ) (A) ¨ (B) ¨ (C) ¨ (D) ¨ (E) ¨

4. No other metal is as expensive as gold. *(Transform the given sentence into superlative)*
- **A. No other metal except gold is expensive.**
- **B. Gold is expensive of all the metals.**
- **C. Isnt gold the most expensive of all metals.**
- **D. Gold is the most expensive of all metals.**
- **E. None of the above.**

Ans.: ( ) (A) ¨ (B) ¨ (C) ¨ (D) ¨ (E) ¨

5. ____ of the soldiers was given two complete uniforms, ____ of which they were expected to keep spotlessly clean.
- **A. All / some**
- **B. Every / either**
- **C. Each / both**
- **D. Some / all**
- **E. The whole / many**

Ans.: ( ) (A) ¨ (B) ¨ (C) ¨ (D) ¨ (E) ¨

6. She hired a removals company _____ clearing out all that junk.
   A. behind
   B. to
   C. into
   D. onto
   E. for
   Ans.: ( ) (A) ¨ (B) ¨ (C) ¨ (D) ¨ (E) ¨
7. She is a very ____ child, who always does as she's told.
   A. apparent
   B. influential
   C. fanciful
   D. desperate
   E. compliant
   Ans.: ( ) (A) ¨ (B) ¨ (C) ¨ (D) ¨ (E) ¨
8. Some people have habit of <u>wearing their heart on their sleeve</u>. *(Select the correct meaning of the underlined idiomatic expression.)*
   A. avoiding being friendly with others
   B. saying something which is not to be taken seriously
   C. exposing their innermost feelings to others
   D. wasting their time on unnecessary details
   E. None of the above
   Ans.: ( ) (A) ¨ (B) ¨ (C) ¨ (D) ¨ (E) ¨
9. Select the correct synonym of the word 'Pensive'.
   A. Affluence
   B. Thoughtful
   C. Strange
   D. Suppress
   E. Cheerful
   Ans.: ( ) (A) ¨ (B) ¨ (C) ¨ (D) ¨ (E) ¨
10. Select the correct antonym of the word 'Embellish'.
   A. Perish
   B. Disarm
   C. Adorn
   D. Disfigure
   E. Decorate
   Ans.: ( ) (A) ¨ (B) ¨ (C) ¨ (D) ¨ (E) ¨

Q.-9. **Translate the following passage from Gujarati into English.**

'મજબૂરીનું નામ મહાત્મા ગાંધી' એવું લાંબા સમયથી હું માનતો રહ્યો. એવું કહેતો પણ. પણ જ્યારે મેં શાંતિથી વિચાર્યું ત્યારે ખ્યાલ આવ્યો કે ખરેખર તો મજબૂરી હિંસા છે. હિંસા દૃઢતા અને શક્તિને પ્રગટ નથી કરતી, તે નબળાઈને પ્રગટ કરે છે. આજ સુધી હું કોઈ એવી વ્યક્તિ, વિચાર કે શાસકના સંપર્કમાં આવ્યો નથી જેઓએ હિંસા કરીને એમ ન કહ્યું હોય કે 'અમે તો હિંસા કરવા મજબૂર હતા'. રાજ્યસત્તા હિંસા કરે છે કારણ કે તેને વ્યવસ્થા બનાવી રાખવાની મજબૂરી છે. ક્રાંતિકારી હિંસા કરે છે કારણ કે રાજ્યસત્તાએ તેમને મજબૂર કરી દીધા છે. અધ્યાપક હિંસા કરે છે કારણ કે તે વિના અનુશાસન શીખવી નથી શકતા. બાળકો હિંસા કરે છે કારણ કે હિંસા વિના સમાજ કશું સાંભળવા તૈયાર નથી. આપણે નહીં, પૂરી દુનિયા આત્મસાત્ કરીને બેઠી છે કે અહિંસા મજબૂરીનું પ્રમાણ છે અને હિંસા શક્તિનું. પરંતુ આ વાત બિલકુલ વિપરીત છે. ગાંધીજીનું સામાજિક અને રાજકીય જીવન તેમના કટ્ટર વિરોધીઓના મનમાં પણ તેથી જ આસ્થા જન્માવે છે.

મેળવેલ ગુણ / OBTAINED MARKS
કુલ ગુણ / TOTAL MARKS: 20

Subject Code : CEM-3
Paper 3: Civil Engineering - 1
Medium - English

Total Marks : 200 **Time : 3 Hours**

મેળવેલ ગુણ / OBTAINED MARKS

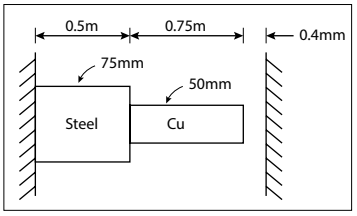
કુલ ગુણ / TOTAL MARKS: 5

Q.-1. Classify Ceramic Building materials based on composition & application.

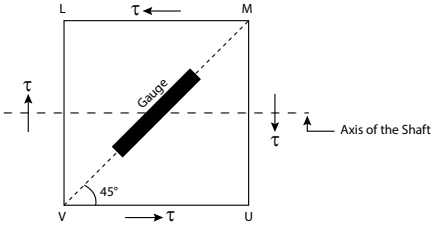
Q.-2. Explain in brief any five tests on limestone as per IS:1624-1974.

Q.-3. Classify bricks with general specification according to IS:1077:1992.

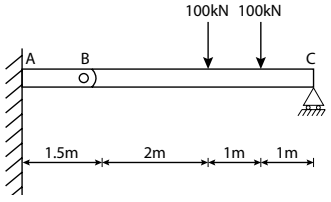
Q.-4. A rod consists of two parts that are made of steel and copper as shown in figure below. The elastic modulus and coefficient of thermal expansion for steel are 200 GPa and 11.7×10^{-6} per °C respectively and for copper 70 GPa and 21.6×10^{-6} per °C respectively. If the temperature of the rod is raised by 50° C, determine the forces and stresses acting on the rod.



Q.-5. A solid phosphor bronze shaft 60 mm in diameter is rotating at 800 rpm and transmitting power. It is subjected to torsion only. An electrical resistance strain gauge, mounted on the surface of the shaft with its axis at 45° to the shaft axis, gives the strain reading as 3.98×10^{-4}. If the modulus of elasticity for bronze is 105 GN/m^2 and Poisson's ratio is 0.3, find the power being transmitted by the shaft. Bending effect may be neglected.



Q.-6. Two bars AB and BC are connected by a frictionless hinge at B. The assembly is supported and loaded as shown in figure below. Draw the shear force and bending moment diagrams for the combined beam AC, clearly labelling the important values. Also indicate your sign convention.



Q.-7. How are the Angle sections eccentrically loaded through gussets plate?

Q.-8. What is the effect of strain hardening and the absence of clearly defined yield point?

Q.-9. Write short notes on shear lag effects.

Q.-10. What is a Built-up compression member? Explain different types of lateral systems used to connect the different components of a Built-up section.

Q.-11. Define Factor of Safety and Partial load factor.

Q.-12. Identify the right method of estimation of earthquake forces for different types multi-storeyed building using the options provided below.

Types of building	*Method*
1. Taller than 90 m in zones III, IV and V	Detailed dynamic analysis with modal analysis for preliminary design
2. Taller than 90 m in zones I and II	Modal analysis with response spectrum
3. Between 40 and 90 m in all zones	Better to use modal analysis with response spectrum. However, the use of simple response spectrum method is allowed in zones I-III.
4. Less than 40 m in all zones	Modal or simple response spectrum method

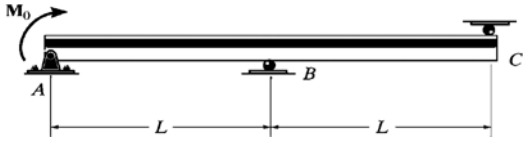
Q.-13. State & explain the field & laboratory tests for cement. State the relevance of these tests from practical considerations.

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 10

Q.-14. Distinguish between Slump Test and Compaction Factor Test. State the relevance of each test with respect to field practices. Explain in detail which Test replicates the field situation the most.

Q.-15. Determine the reactions at the pin at A and the rollers at B and C by using Force Method.



Q.-16. The horizontal span of a suspension cable is 60 m. The right-hand support B is lower than left-hand support A by 8 m. The dip of the lowest point C below B is 2 m. If a platform load of 5 kN per horizontal metre of span is transmitted to the cable, calculate the maximum pull in the cable. If the permissible tensile stress in the cable is 100 MN/m^2, calculate the sectional area required. Ignore the self-weight of the cable.

Q.-17. Two loads of an electrical crane, 60 kN each spread at 3 m centre to centre cross a girder of 9 m span. Find the absolute Bending Moment in the beam.

Q.-18. Explain the design principles of gantry girder.

Q.-19. Design the longitudinal and lateral reinforcement in a rectangular reinforced concrete column of size 300 mm $\times$ 600 mm to support a factored axial load of 1500 kN. The column has an unsupported length of 3.3 m and is braced against side sway in both directions. Use M20 grade concrete and Fe-415 HYSD steel bars.

Q.-20. Explain structural planning of a building with respect to following points:

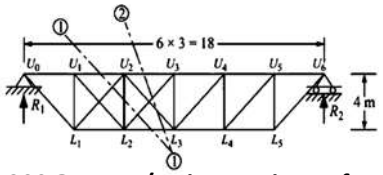
- Positioning and orientation of columns
- Positioning of beams
- Spanning of slabs
- Layout of Stairs
- Selection of Proper types of Footing

Q.-21. Explain the principles of Concrete Mix Design. Enlist the Concrete Mix Design methods and state how IS method of Mix Design differs from other methods.

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 15

Q.-22. Determine the maximum forces in the members U_2L_2, U_3L_3 and U_2U_3 of the truss shown in figure, when an uniformly distributed load of 60 kN/m longer than the span, moves from left to right on the top chord.



Q.-23. A column section ISHB 300@577 N/m is carrying a factored axial load of 600 kN. A factored moment of 30 N-m and a factored shear force of 60 kN. Design a suitable column splice. Assume ends are milled.

Q.-24. Provide at least two alternatives and with numerical explanation for safe design if, A simply supported beam of 10 m span and restricted 230 mm $\times$ 450 mm cross section is loaded with ultimate UDL of 17 kN/m fails when designed as singly reinforced beam. Beam is of M20 grade of concrete and Fe-500 grade of steel.

Subject Code : CEM-4

Paper 4: Civil Engineering – 2

Total Marks : 200 **Time : 3 Hours**

મેળવેલ ગુણ / OBTAINED MARKS

કુલ ગુણ / TOTAL MARKS: 5

Q.-1. Draw the sketch showing details of timber formwork for RCC beam and slab floor. Mention the order of removal of each component with minimum period of time after casting of concrete.

Q.-2. Differentiate (i) confined masonry and (ii) RC frame construction with masonry infills.

Q.-3. Draw the velocity profile across the depth in (i) pipe with pressurized flow and (ii) open channel flow. Also explain how to measure the average velocity in open channel across the depth at certain section by using current meter.

Q.-4. A concrete storm water drain is to be provided with circular pipe of 1.0 m diameter. The Manning roughness of pipe is 0.014. The normal depth of flow is to be maintained at 0.8 m for the design discharge of 0.7 m^3/s. Find the required bed gradient of the drain.

Q.-5. Draw the typical layout of pumped storage hydropower plant and discuss the advantages of the same.

Q.-6. A thin highly permeable riverbed aquifer is recharged by river stream. Suggest suitable well structure to draw the water from such river aquifer. Draw the neat sketch and state the two major advantages of this well.

Q.-7. A diversion structure is to be constructed on an alluvial river to divert the water into left bank canal. The river flow contains sediments. Also, river is found to be a habitat for migratory fish.

(i) Draw a typical plan of the structure and label each component.

(ii) Mention the structural measures you propose for (a) the management of sediments, (b) arrangement for migration of fish and (c) the prevention of additional area being submerged due to afflux head. Show these measures in the layout plan.

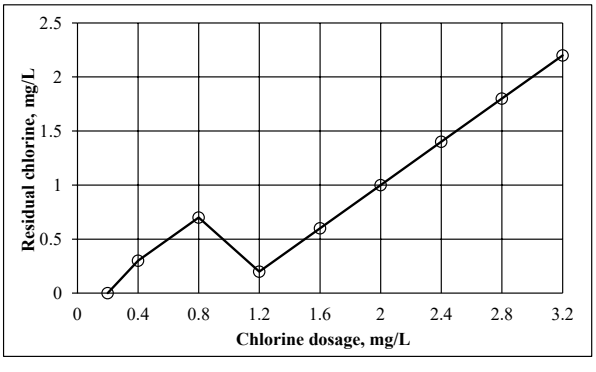
Q.-8. For the figure shown below, answer the following questions:

(i) What is this chart called?

(ii) What is wrong in this plot if it is prepared for a sample of distilled water containing a small concentration of ammonia?

(iii) At what dosage of chlorine, the concentration of chloramine is maximum?

(iv) What is the chlorine dosage required to achieve a free residual chlorine concentration of 0.5 mg/L?



Q.-9. **A State Pollution Control Board (SPCB) received a complaint that a tanker has illegally discharged industrial wastewater in a dry open pit. When visiting the site, officers of SPCB were informed that the wastewater was discharged two days ago. The officers collected a sample from the pit whose 5-day BOD was 1024 mg/L and reaction rate constant was 0.12 day^{-1} (base 10). The table below shows 5-day carbonaceous BOD of raw wastewater of 4 industries in that region. Which industry is most likely the source of wastewater discharged in the pit? Support your answer with calculations.**

Industry	Dairy	Fruit processing	Sugar	Meat processing
5-day cBOD	1080	1800	895	2105

Q.-10. **Describe bio-toilets.**

Q.-11. **Write any five features of Green Building.**

Q.-12. **Discuss major advantages and disadvantages of use of microfiltration membrane bioreactors in the wastewater treatment.**

Q.-13. **What are the advantages and limitations of cement concrete flooring? Draw the typical cross section of cement concrete floor finish with sub-base over the ground having expansive soil. Explain the procedure of its construction.**

Q.-14. **An overflow spillway has its crest at RL 125.3 m and d/s horizontal apron at RL 95.00 m. Find the RL of tail water to form the hydraulic jump when TEL before the jump is at RL 127.8 m. The discharge coefficient Cd for the flow over the weir is 0.735. The energy loss for the flow over the spillway is to be neglected. Also estimate the energy loss in metre within the hydraulic jump.**

Q.-15. **A gravity flow occurs between impounding reservoir and service reservoir having head difference of 40 m. The pipeline connecting these two reservoirs has a length of 1000 m, diameter of 300 mm and Darcy-Weisbach friction factor of 0.021. The minor losses in a pipeline are 1.5 times the velocity head.**

(i) Estimate the discharge in m^3/s and velocity in m/s in pipeline.

(ii) Due to increase in demand, if the discharge is to be increased by 25% in the same pipeline by using the booster pump, what will be the discharge (m^3/s), head (m) and capacity (kW) of the booster pump? Assume overall efficiency of the pump as 70%.

Q.-16. **The 100 km^2 urban watershed area is classified based on land use and soil type as per the following table. SCS Curve Number (CN) corresponding to each land use and soil type is also mentioned in the table.**

Land use	Soil Group B		Soil Group C	
	% of total area	CN	% of total area	CN
Open spaces	5	61	5	74
Commercial Area	12	92	12	94
Residential Area	30	85	30	90
Paved Road & Parking	3	98	3	98

Considering antecedent moisture condition of type-II, estimate the runoff volume in m^3 for one day rainfall of 100 mm.

Hint: $Q = \frac{(P-0.2S)^2}{P+0.8S}$ and $CN = \frac{25400}{S+254}$

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Q.-17. An earth dam is to be designed to retain the 30 m depth of water. The foundation is deep alluvium and pervious. SW and CL type soils are available from the nearby borrow area for the construction. The climate at the dam site permits short dry period in a year.

(i) Suggest the most suitable cross section of an earth dam and label all the components. Also mention in the sketch, the type of material to be used for different components.

(ii) What measures can be provided to safeguard the dam against seepage failure? Show them in the same figure.

Q.-18. Answer the following questions in brief:

(i) Following constituents of municipal solid waste is generated in a house. 20 g/person stall chapatti and bread, 72 g/person vegetable peals, 50 g/person paper, 10 g/person broken glass pieces or bottles, 25 g/person metal tins, and 30 g/person plastic. What is the amount of garbage and rubbish per person? What is the amount of waste that can be composted? What is the amount of waste that can be burnt to generate energy after drying?

(ii) Why isokinetic sampling method is used for sampling of particulate matter in stack attached to a coal-fired boiler?

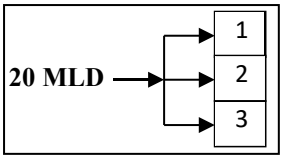
Q.-19. Data of operation of an activated sludge plant having a mechanical slow-speed surface aeration system are given below:

(i) BOD_5 of settled sewage: 150 mg/L, (ii) BOD_5 of treated sewage: 20 mg/L, (iii) MLSS: 2500 mg/L, (iv) Average daily sewage flow: 10000 m^3/d, (v) Dimensions of aeration tank: 15 m x 60 m x 3.5 m (liquid depth), (vi) volume of biomass settled after 30 min: 225 mL/L, (vii) Effluent SS concentration: 35 mg/L, (viii) Waste activated sludge flow: 60 m^3/d.

Calculate: (a) HRT of aeration tank, (b) F/M ratio, (c) SVI, and (d) Sold retention time.

Q.-20. A designer designed a cross-flow flocculation basin consisting of 3 compartments each of size 5 m long, 5 m wide, and 5m deep (liquid depth) to treat a total of 20 MLD of water. Each Compartment is equipped with a horizontal paddle wheel of diameter 4.0 m rotating at 2.5 rpm. Number of paddle blades (4.0 m long x 150 mm wide) in compartments 1, 2 and 3, are 6, 4 and 2, respectively.

The designer has suggested the flow configuration shown in figure below. Is this a correct configuration? If not, draw the correct configuration. Also, check whether the design meets with the normal design criteria such as Camp's number: 20000-80000, and the overall power supply: 0.9-2.5 W/m^3 flocculator volume. Assume that temperature is 20° C ($\mu = 1.003 \times 10^{-3}$ Pa.s.), $C_D = 1.8$, and $V_r = 0.75\ V_p$.



Q.-21. For a reservoir the relationship between Capacity/Inflow ratio and Trap Efficiency is given by the following table:

Capacity/Inflow Ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Trap Efficiency %	87	93	95	96	96.4	96.8	97	97.2	97.3	97.5

Estimate the probable life of the reservoir with following data if the useful life of the reservoir will terminate when 80% of the initial capacity is filled with sediments.

(i) Initial capacity of reservoir = 25 MCM

(ii) Annual flood inflow = 50 MCM

(iii) Average annual sediment inflow = 25,00,000 kN

(iv) Specific weight of sediment = 12 kN/m^3

Q.-22. **A 200 mm dia. tubewell is completely penetrated in a confined aquifer lying between 35 m and 80 m below the ground. The piezometric head before pumping is 15 m below the ground level. After a long period of pumping, a steady state discharge is observed as 2100 lpm. The drawdowns at two observation wells located at 100 m and 200 m from pumping well are measured as 1.0 m and 0.7 m respectively.**

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(i) Determine the hydraulic conductivity of the confined aquifer in m/s.

(ii) Estimate the radius of influence of the well.

(iii) If 200 mm diameter slotted pipe well screen with 10% effective open area is proposed for the tubewell for the design discharge of 2625 lpm, what will be the minimum length of screen pipe required for the tubewell? Take the maximum permissible entrance velocity of the water as 3 cm/s.

Q.-23. **A tree type water distribution layout for an intermittent water supply system is shown below. Water @ 100 LPCD is to be supplied from an ESR which maintains a constant water level of 30 m. A1, A2, and A3 denote three localities in which water is to be supplied. P1, P2, and P3 denote population and E1, E2, and E3 denote average elevations of these areas. The lengths of pipes AB, BC, and CD are 1 km, 1.2 km, and 0.8 km, respectively. The maximum daily demand is 1.8 times the average daily demand and the entire quantity of water is to be supplied in a period of 6:00 AM to 10:00 AM. DI pipes of nominal diameters 100 mm, 150 mm, 200 mm, 250 mm, and 300 mm are available. All pipes can be assumed to have a Darcy-Weisbach friction factor of 0.02.**

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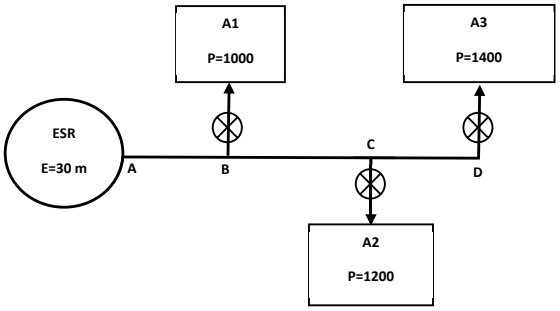
Calculate:

(i) The pipe diameters suitable to achieve 0.8-1.3 m/s velocity.

(ii) The pressure (in m water column) at which water will be available in this areas at the time of supply.

(iii) If valves at B, C, and D are closed, what will be the gauge pressure at D? (Assume elevation of D the same as E3)



Q.-24. **A circular RCC sewer is to be designed to serve a current population of 50000 persons who are supplied water @ 120 LPCD. Find the diameter of the sewer if it has to run at 70% depth at peak flow for available ground slope of 1 in 600. Will the velocity at peak flow be self-cleansing? The population in this community is increasing geometrically @ 12% per decade. If the rate of water supply remains the same, at what population and after how many years of service this sewer will be running full at peak flow? Assume peak flow/average flow=2.5, 80% of water supplied is discharged as sewage, Manning's n (constant) = 0.013. For d/D=0.7, take Q/Q_f = 0.85 and v/v_f = 1.15.**

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Subject Code : CEM-5

Civil Engineering – 3

Total Marks : 200 **Time : 3 Hours**

Q.-1. Differentiate between Turnkey and Non-turnkey contracts.

Q.-2. A bed of compressible clay of thickness 4 m is overlaid by a pervious sand layer on top and impervious rock layer at the bottom. 1-D consolidation test was performed on the soil sample recovered from this layer. If the 20 cm thick specimen reached to its 90% settlement in 4 hours, then estimate the time (in years) for the building founded over this deposit to reach 90% of its final settlement.

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Q.-3. A horizontal stratified soil deposit consists of 3 layers each uniform in itself. The permeabilities of these layers (from Top to Bottom) are 8×10^{-4} cm/s, 52×10^{-4} cm/s and 6×10^{-4} cm/s, and their thicknesses are 7, 3 and 10 m respectively. Find the effective average permeability of the deposit in the horizontal and vertical directions.

Q.-4. The in situ void ratio of a granular soil deposit is 0.5. The maximum and minimum void ratios of the soil were determined to be 0.75 and 0.35. If the specific gravity of the soil is 2.67, then determine the relative density and relative compaction of the deposit.

Q.-5. With reference to traversing, explain the term 'closing error'. Which principle is used to adjust it?

Q.-6. Distinguish between Cumulative error and Compensating error in chain surveying.

Q.-7. Enlist the various Geohazards and adverse geological conditions.

Q.-8. Enlist and explain the various factors controlling highway alignment.

Q.-9. Draw and label a typical Highway cross-section and explain any five highway cross-sectional elements as per IRC guidelines.

Q.-10. Explain the various stages in tunnel construction.

Q.-11. Write briefly regarding the chemical demolition technique used for buildings.

Q.-12. Enlist few provisions mentioned in the Indian Standards for Plain and Reinforced Concrete regarding serviceability requirements.

Q.-13. Write briefly on 'Work breakdown structure' and its significance in Construction Project Management.

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Q.-14. A clay soil sample obtained from a site is found to have the following Atterberg limits: Liquid limit = 75%, Plastic limit = 45% and Shrinkage limit = 25%. If a sample of this clay has a volume of 30 cm^3 at the liquid limit and a volume 16.6 cm^3 at the shrinkage limit, determine the (i) specific gravity of solids, (ii) shrinkage ratio, and (iii) volumetric shrinkage.

Q.-15. A foundation, 2.0 m square is installed 1.2 m below the surface of a uniform sandy gravel having a density of 19.2 kN/m^3, above the water table and a submerged density of 10.1 kN/m^3. The strength parameters with respect to effective stress are $c' = 0$ and $\phi' = 30°$. Find the gross ultimate bearing capacity for the following 3 conditions:

(i) Water table is well below the base of the foundation (i.e. the whole of the rupture zone is above the water table);

(ii) Water table rises to the level of the base of the foundation;

(iii) the water table rises to ground level.

(For $\phi = 30°$, Terzaghi gives $N_q = 22$ and $N_\gamma = 20$)

Q.-16. In conducting a traverse PQRSTP, the lengths of the lines QR and TP could not be measured due to field difficulties. Find the length of these lines from the remaining data given below:

Line	PQ	QR	RS	ST	TP
Bearing	S52°30'E	N48°45'E	N18°15'W	S78°30'W	S32°30'W
Length	357.2	Missing	389.2	253.4	Missing

Q.-17. Two stations P and Q were on either side of a river 1200 m apart. The instrument was kept near P and the readings on the staff at P and Q were 1.700 m and 2.425 m respectively. The instrument was then shifted to Q and the reading on the staff held at P and Q were 0.805 m and 1.285 m respectively. If the reduced level of P was 203.135 m, find the reduced level of Q. Also find the error due to refraction of the collimation error of the instrument is 0.002 m in 100 m.

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Q.-18. Briefly explain the steps involved in Slab Thickness Design for a Rigid pavement as per IRC-58.

Q.-19. List all the loads to be considered while arriving at the appropriate combination for carrying out the necessary checks for the design of road bridges and culverts as per IRC 6-2017.

Q.-20. Enlist at least 05 repair methods to enhance the performance of pre-stressed concrete systems and briefly explain any one of them.

Q.-21. Define Cost Slope. Prepare network diagram for the following project data and find out the critical path. Work out the total cost of the project completion in 11 weeks (Draw time grid diagram for each stage of crashing) and find out the optimum total cost and optimum duration of the project. Take direct cost of the project as Rs 1500 per week and Total Cost = Indirect + Direct cost.

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Activity	Normal Duration (in Week)	Normal Cost (in Rs)	Crash Duration (in Week)	Crash Cost (in Rs)
1-2	2	1800	1	2800
1-5	12	12000	10	14000
2-3	4	16000	3	22000
2-4	6	13000	4	18000
3-4	3	1400	2	2000
4-5	5	3600	4	4800

Q.-22. Answer the following questions on soil exploration techniques:

(a) The N value obtained in a deposit of fully submerged fine sand is found to be 40 at a depth of 6 m. Determine the corrected N value considering overburden and dilatancy correction both. (take gamma = 20 kN/m^3)

(b) Seismic refraction method was used for soil exploration of an area and following data was obtained.

Distance from impact point to geophone (m)	15	30	60	90	120
Time to receive wave (s)	0.025	0.05	0.10	0.11	0.12

(i) Plot the time travel data and determine the seismic velocity for the surface layer and underlying layer.

(ii) Determine the thickness of the upper layer.

(iii) Using the seismic velocity information, give the probable earth materials in the two layers.

Q.-23. A curve of radius 400 m and deflection angle 30° is to be set using a tacheometer. If the tacheometer constants are 100 and 0, list the staff intercepts to locate points on the curve at 20 m intervals. The chainage of the tangent point T_1 is 1103 m.

Q.-24. The speed of the overtaking and overtaken vehicle is 70 and 40 kmph, respectively on a two-way traffic road. If the acceleration of overtaking vehicle is 0.99 m/sec^2, reaction time = 2sec, then

a. Calculate safe overtaking sight distance

b. Calculate the minimum and desirable length of overtaking zone

c. Draw a neat sketch of the overtaking zone and show the position of the signposts.